

An analysis of the necessity of Skellefteå City Airport and its socioeconomic contribution

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Picture source: Skellefteå kommun

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Table of Contents

1.	Introduction	3
1.1	<i>Our engagement</i>	3
1.2	<i>Purpose and method of the report</i>	3
1.3	<i>Scope of the report</i>	3
2.	Geographical conditions and communication possibilities	5
2.1	<i>Skellefteå's geographical surroundings impede transportation alternatives</i>	5
2.2	<i>Travel options from Skellefteå to Stockholm</i>	5
2.2.1	Travel via airports	6
2.2.2	Travel by car or rail	6
3.	The necessity of Skellefteå City Airport for regional, social, and economic development	8
3.1	<i>Air transport is vital for business development in the green industrial transition as well as other business sectors</i>	8
3.1.1	Air is often the only viable alternative for business travel by export industries	9
3.1.2	The airport is a precondition to consider Skellefteå for new business establishment	9
3.1.3	A well-connected airport is crucial to attract skilled professionals, research, and innovation to the region	10
3.1.4	Regional and sustainable air transports can support business development and grow the labor market to include inland regions and neighboring countries	11
3.2	<i>A well-functioning airport is crucial to support the necessary increase of inhabitants in Skellefteå, driven by the new industrial developments</i>	11
3.2.1	The airport contributes to enhanced accessibility that enables population development	11
3.2.2	The airport contributes to job creation within the region	12
3.2.3	Investment in Skellefteå's long-term growth indicates an attractive city	13
4.	Skellefteå City Airport's contribution to preparedness and safety	14
4.1	<i>Agreement on constant availability in emergencies or specially prioritized aircraft transportation</i>	14
4.2	<i>Skellefteå airport is a connection point for defense cooperation</i>	14
4.3	<i>A connection to Swedish political independence</i>	15
5.	The airport's socioeconomic contribution	16
5.1	<i>Skellefteå City Airport contributes to regional production and employment</i>	16
5.1.1	We use data on operational costs and employment at Skellefteå City Airport as inputs to our model	16
5.1.2	The total value added to regional production by the airport's operations is 45.15 million SEK per year and the total number of FTEs created is 226	18
5.2	<i>Skellefteå City Airport contributes directly to public finances at the municipal, regional, and state level</i>	19
5.3	<i>The airport's operations further contribute to dynamic effects pertaining to regional development</i>	20

6.	The air travel market to Skellefteå constitutes a market failure	22
6.1	<i>A market failure is a situation in which the free market does not function efficiently</i>	22
6.1.1	Goods or services with large externalities result in more prominent market failures	22
6.2	<i>The air travel market to Skellefteå constitutes a market failure</i>	23
6.2.1	There are likely no viable alternatives to Skellefteå City Airport	23
7.	Concluding observations	24
	List of references	26
	List of interviews	28

1. Introduction

1.1 Our engagement

Ramboll has been engaged by Skellefteå City Airport AB (the Client), based on an engagement letter signed June 30th, 2023, to collect market information and engage in an analysis in connection to the preparation of a renewed ordinance for public support based on Skellefteå City Airport being considered a service of general economic interest "SGEI".

1.2 Purpose and method of the report

In December 2013, Skellefteå municipality decided to appoint a service of general economic interest "SGEI" regarding Skellefteå airport, resulting from ownership of the airport having shifted from the state-owned company Swedavia to Skellefteå municipality. The decision to appoint public support, which was based on EU rules regarding the member states' ability to use public funds to support certain activities and approved by the European Commission in 2016, applies for a period of ten years until 31st of December 2023.

Skellefteå municipality has now begun the work of preparing a renewed ordinance that Skellefteå Airport shall provide a service of general economic interest for another period of ten years. The starting point is that a new SGEI appointment will take place on essentially the same terms as before.

Ramboll has been engaged to collect information to illustrate the current and updated situation with regard to the areas set out in the scope below. The resulting report is intended to serve as objective support for the application in accordance with EU-regulations.

The information collected and applied in the report consist of publicly available data as well as interviews with various stakeholders. Opinions expressed primarily represent views held by each interviewee respectively. The report has been prepared for Skellefteå municipality based on the engagement letter and we accept no use of the report for other purposes than for which it was prepared.

1.3 Scope of the report

The scope of the report entails five areas:

1. The necessity of the airport with regard to geographical conditions and communication possibilities (chapter 2)

Describing Skellefteå's conditions as a geographically sparsely populated and isolated area with difficult geographical conditions as well as mapping and describing transportation and travel times

2. The need for the airport for regional, social, and economic development (chapter 3)

Analyzing the importance of communications for business development as well as resident attractiveness that contributes to immigration and population development (to meet population targets for 2030)

3. The necessity of the airport with regard to preparedness and security (chapter 4)

Describing the resilience perspective and explaining why an airport is important for municipal/ regional/ national preparedness

4. The airport's socio-economic contribution (chapter 5)

Describing the added value the airport has in the form of the socioeconomic contribution (employment and tax revenue)

5. Market failure (chapter 6)

Analyzing how other actors would likely not be able to run a business that meets transportation needs (and creates the values from 1a.-c.) and makes a profit

2. Geographical conditions and communication possibilities

Skellefteå is in a sparsely populated region of Sweden, with limited access to transportation by train, and geographic conditions that impede travel by car during several months of the year. As such, the city and nearby municipalities are dependent on the airport for relatively speedy travel to the rest of Sweden. Our estimates show that with no weather interference, travel by Skellefteå City Airport is between two to ten hours faster compared to other available options. During the winter season, as conditions makes travel by car slower and less reliable, the time saved by using Skellefteå City Airport further increases. In this section, we describe in detail Skellefteå's population related as well as geographic conditions and provide estimates of travel time from Skellefteå to Stockholm using different modes of transportation.

2.1 Skellefteå's geographical surroundings impede transportation alternatives

The location of Skellefteå results in several challenges when it comes to transportation. Skellefteå is located within the Northern Sparsely Populated Areas of the European Arctic.¹ These areas face several challenges, including those related to communication. Population density is low, the winters are severe and may impede transportation, and the distances to the larger cities in Sweden are vast. Under these conditions, there is an increased dependence on air travel.

Skellefteå municipality encompasses a land area of about 6 800 km², which represents about 1,7 percent of the total land area of Sweden as a whole.² However, the municipality's 74 760 inhabitants only represent about 0,7 percent of the total Swedish population: a population density of 11 persons per square kilometer.³ This population density is lower than in the rest of Sweden (25) and significantly below the EU-average of 109 inhabitants per square kilometers.⁴

2.2 Travel options from Skellefteå to Stockholm

In a sparsely populated area in a geographically challenging position, the role of transportation is key to facilitate growth. In this section, we estimate the current transportation alternatives available to the inhabitants of Skellefteå. Specifically, we will estimate the travel time from central Skellefteå (Skellefteå bus station) to Stockholm central station using the five current likely alternatives. These include flying from Skellefteå City Airport, Luleå Airport, or Umeå Airport, traveling the entire distance by car, or going by bus to Umeå and then by rail to Stockholm.⁵ We find that without weather interference, traveling from Skellefteå to Stockholm city using Skellefteå City Airport, is between two to ten hours faster compared to other forms of travel.

In this analysis we make some basic assumptions to facilitate the ability to make time estimates.⁶ The main challenge in calculating travel times from Skellefteå is accounting for weather conditions. Many of the options include travel by car or bus for at least part of the journey – a form of travel that can be severely slowed by inclement weather such as heavy snow. This type of uncertainty is difficult to model as it may increase travel times by anything between a few minutes to several hours. To account for the uncertainty in our estimates, we assume that drivers on average leave 30 minutes earlier than necessary when traveling outside Skellefteå. For instance, travel by car to Umeå takes two hours in perfect conditions, but to account for weather

¹ NSPA, 2015

² Statistics Sweden, 2023c

³ Statistics Sweden, 2023d

⁴ Eurostat, 2023

⁵ The respective estimations were done using momondo.se to estimate travel times by air, google.com/maps to estimate all travel using car or bus, and sj.se to estimate travel times by rail.

⁶ We assume that air passengers arrive at the airport 90 minutes before take-off, and that travel from Arlanda to Stockholm central takes 1 hour.

conditions, we assume this journey takes 2,5 hours in our estimates. Furthermore, Skellefteå does not have a train station. Thus, transportation by bus is necessary for individuals without access to a car.⁷

2.2.1 Travel via airports

In addition to Skellefteå City Airport, there are two main alternatives in terms of air travel: Umeå Airport to the south of Skellefteå, and Luleå Airport to the north of Skellefteå. Umeå airport is roughly 140 km (traveling by road) from Skellefteå. We estimate that travelling to Umeå takes between 2,5 to 3,5 hours depending on if the passenger can go by car (faster) or must take the bus (slower). The flight to Arlanda from Umeå is one hour. Therefore, the total travel time from Skellefteå to Stockholm central station via Umeå is between six to seven hours including time at the airport before departure (about 90 minutes in all our estimates) and travel from Arlanda to central Stockholm (1 hour).

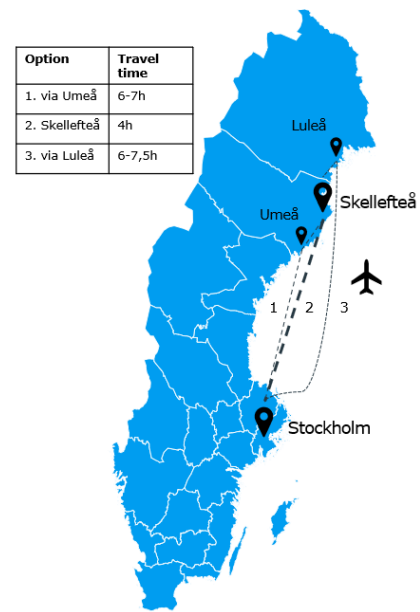


Figure 1. Travel times to Stockholm by Skellefteå, Umeå and Luleå airports

In contrast, the total travel time from central Skellefteå to central Stockholm using Skellefteå City Airport is about four hours. The travel time from Skellefteå to the airport is about 30 minutes, and the flight is around one hour.

Luleå Airport is located about 130 kilometers from Skellefteå. Travel to the airport takes between 2 to 3,5 hours; faster if going by car, and slower if the passenger must take the bus. The flight from Luleå to Stockholm is about 1,5 hours, bringing the total travel time to central Stockholm to between 6 to 7,5 hours.

The above calculations are done using the previously mentioned assumption that travel to Umeå and Luleå on average take 30 minutes compared to the best-case scenario to account for inclement weather. It should also be noted that travel times are estimated from central Skellefteå. But as previously discussed, Skellefteå and its surroundings is a sparsely populated region, and for the many inhabitants living outside Skellefteå, travel times obviously increase even further, especially when traveling to Umeå or Luleå.

Traveling via Umeå or Luleå thus takes at least two hours longer than if going by Skellefteå City Airport. These increases are particularly important when considering business travelers who go back and forth during the same day – which leaves Skellefteå Airport as the only realistic option.



Figure 2. Travel times from Skellefteå to Stockholm by car, and by bus/train

2.2.2 Travel by car or rail

It is possible to use alternative modes of transportation for travelling to and from Skellefteå. One option is to go by car. The journey to Stockholm takes about nine hours of

⁷ In 2023, construction is set to start for Norrbotniabanan, connecting Skellefteå to Umeå by train. It is however difficult to find a clear answer as to when passenger travel on this line will begin (one estimate is 2030 by the Swedish Transport Administration, 2023)

continuous driving from start to finish. Obviously, the travel time is prolonged by stops at gas stations, restaurants etcetera. Another option is to go by train. However, as stated earlier, Skellefteå does not have a train station. Thus, someone choosing this option must first go by bus (to Umeå for instance) and from there take a train to Stockholm. The fastest total travel times we were able to identify were about nine hours from Skellefteå to Stockholm central station. Other options, including sleeping trains, take about 15 hours.

3. The necessity of Skellefteå City Airport for regional, social, and economic development

Today, northern Sweden is an important region in Europe when it comes to the green transition and a forerunner in the development of new sustainable industries such as the production of fossil-free steel (LKAB, H2GS) and batteries for electric vehicles (Northvolt). Investments in the northern part of Sweden ranges around 100 billion euros. This, in addition to what is already a large stream of exported raw materials and products to the rest of Sweden and the world. There are now vast opportunities to form new value chains that make use of the available green renewable energy, and of existing metals and minerals, applying circular business models. The development of these industries and other industry in the region face a common challenge in terms of attracting competence to the companies and to the cities. Around 100 000 new inhabitants could move into Norrbotten and Västerbotten combined, if the necessary preconditions are in place, such as sustainable housing, transport opportunities, and different municipal services.

In 2021, Ramboll conducted a scenario analysis based on the upcoming business and public investments in Skellefteå municipality, including the establishment of the Northvolt battery factory as well as investments by other companies such as Boliden. As public statistics did not foresee a large increase of inhabitants at this time, Skellefteå needed to understand what the possible growth of the city could be due to these investments. The analysis established that there would be an increase in inhabitants to supply competence to the growing business sector. Following this analysis, Skellefteå decided on a new and increased population goal of 90 000 inhabitants in 2030, and is in the process of building the city to house and support new inhabitants. To make this possible, there is also a need to develop the local, regional, and state-owned infrastructure: harbor, railroads, roads, and the airport.⁸

In 2022, another Ramboll study covered the so-called Nordic Battery Belt in the Kvarken region, including regions in northern Norway, Sweden, and Finland. In order to support the logistics in the new value chain around several battery factories in the three countries, there will be increased demand put on transportation and capacity when it comes to both goods and people. The importance of Skellefteå City Airport was highlighted in this study. The study further discussed the possibilities for regional air transports using electric planes.⁹

These two studies indicate the municipal and regional importance of Skellefteå City Airport as part of a transportation network connecting a growing population and many new workplaces with the rest of Europe, following the green transition. Anders Hjalmarsson¹⁰, Västerbotten Chamber of Commerce, believes that Skellefteå may also be able to act as an example, showing other parts of Europe how to create new sustainable development and growth in less populated areas.

3.1 Air transport is vital for business development in the green industrial transition as well as other business sectors

According to every interviewee, air is often the only viable alternative for the export industries and business sectors in the region to connect with business partners.¹¹ They furthermore see air travel as a prerequisite when companies are considering establishment in the area. The existence of air travel enables research exchange and innovation. It may also help to connect the inland and

⁸ Scenarioanalys för Skellefteå kommun, 2021

⁹ Nordic Battery Belt Logistics, 2022

¹⁰ For a detailed list of interviewees, see *List of Interviews*

¹¹ See *List of Interviews*

regions in neighboring countries (Norway and Finland), especially by electric air, hence growing the labor market. The hospitality sector also needs the airport in order to bring in tourists. Many services provided by municipal and regional actors are equally dependent on swift air transports.

3.1.1 Air is often the only viable alternative for business travel by export industries

As was described in *Chapter 2*, there are no viable alternatives from Skellefteå when traveling to and from Stockholm and Europe. The airport serves as a crucial transportation hub connecting Skellefteå to other cities in Sweden, both when companies are establishing in Skellefteå as well as in their day-to-day business operations, as many of the industries and companies rely on exporting goods and services and its associated business travel to other parts of the world. This connectivity is essential for businesses in the region to access national and international markets efficiently. According to Anja Palm, head of business at Skellefteå municipality, export-intense companies such as Northvolt¹², Alimak¹³, and Boliden¹⁴, are important companies for Skellefteå that are dependent on the airport.¹⁵ The airport enables travel for sales and business partners, and the larger corporations also use the airport to connect to their headquarters and their other sites. Furthermore, it allows for local companies to participate in trade, establish partnerships, and engage in various business activities that contribute to economic expansion in the region. According to Lars Hedqvist, head of planning at Skellefteå municipality, the cost of transit travel to reach an alternative airport in Luleå or Umeå would be far too high for these companies. Airlines like SAS are making sure that connections can be swift from Skellefteå to Arlanda and onwards and more airlines in operation helps make prices competitive.

Airline connections are also important in order to attract skilled staff to the region - commuters and new residents alike. The airport enables weekly commuting during the different stages of establishment, when a lot of consultants are brought in for a period without them moving permanently to Skellefteå. It also enables fly-in fly-out, and even if this is not what the municipality is wishing for, it will continue to be necessary for establishment of larger companies.

The dynamic effects of the airport are large when it comes to value created by companies, workplaces provided by these companies, as well as tax income to the municipality generated by new inhabitants. According to Lars Hedqvist, this is likely to amount to several hundreds of millions of euros per year, who points out that before Northvolt the estimate was already that 100 million euros per year would be lost if the airport did not exist. Today, the risk of job-loss and companies relocating further increase this number.

3.1.2 The airport is a precondition to consider Skellefteå for new business establishment

The airport has been an important part, and in many cases a determining factor, for the business sector to settle their operations in the municipality. According to Anja Palm, the airport has been crucial for Skellefteå to appear on the shortlist of possible cities to establish in. The airport has, for example, enabled the first stages of establishment for Northvolt. The distance to the airport from the city center and what lines are served by the airport are among the first questions asked by companies considering Skellefteå. Transportation infrastructure is vital when deciding where to set up operations.

The possibility of air transportation to and from Northvolt's headquarters in Stockholm was vital in the decision to establish operations in Skellefteå. According to Anders Thor, Head of

¹² [Northvolt - the future of energy | Northvolt](#)

¹³ [Alimak Group Corporate](#)

¹⁴ [Boliden – Metals for modern life](#)

¹⁵ For a comprehensive list of interviews, see *List of Interviews*

Communications at Northvolt, the company would not have settled in Skellefteå if the airport did not exist. He further expresses that it would not be possible to stay in Skellefteå if the airport should vanish. It would be the main operational threat against Northvolt, says Anders Thor, because today's employees, business partners, and consultants rely heavily on available flights to and from Skellefteå. This is also why Northvolt is pushing for more flights and competing airlines serving the area and keeping prices low.

Hence, the presence of an airport in Skellefteå makes it easier for investors to visit the region, explore opportunities, establish a presence, and run their operations. Businesses rely on swift travel opportunities. According to Anja Palm, the hospitality sector is furthermore dependent on bringing national and foreign visitors to the region. Anders Hjalmarsson adds that municipal and regional actors investing in housing, schools, healthcare, and so on will need to secure their transportation needs. In addition, defense operations and its associated transportation will increase following the possible entrance into NATO.

3.1.3 A well-connected airport is crucial to attract skilled professionals, research, and innovation to the region

Companies often require specialized talent to drive innovation and growth. This is most crucial for new industries linked to the green transition. Airport accessibility enables convenience for potential employees when relocating to Skellefteå for work. Northvolt is dependent on the airport in order to transport employees as well as business partners to and from Skellefteå. A majority of the individuals moving to Skellefteå nowadays are from other countries and they require suitable connections to their home cities or countries. According to Anja Palm, during the year of 2022 there was an increase in inhabitants by 1115 (net), where 824 of them came from abroad. This means that international immigration represented 74 percent of the immigration to Skellefteå in 2022. The majority of the international immigration consists of labor immigration according to Anja Palm, who furthermore highlight the dependency on international immigration for the business sector. Moreover, Anders Hjalmarsson stresses the role of the airport in the total infrastructure, how the closeness of the airport makes people less dependent on other means of transportation and on other airports, and the need to look to the whole travel experience including bus transport, road conditions, and airport facilities, in order to form an attractive travel option.

Professionals in various industries such as technology, research, and manufacturing, often value the convenience of direct flights. The airport's ability to bring experts and specialists to Skellefteå foster an environment conducive to innovation and expertise-sharing. International travel will allow research exchange with the research environment in Skellefteå. According to Peter Larsson, the government's coordinator for the development in northern Sweden, another transportation need is based on a new form of university alliance. The plan is to set up a new research environment in Skellefteå together with established universities. Establishing a research environment is important for business development in the region. In order to create a flourishing research environment, there is an essential need for national and international exchange. According to Peter Larsson, Skellefteå has now become a hub for sustainable industries and Northvolt will be followed by other companies such as organizations within battery production and related industries. A research environment with international connections may foster cluster development and future industrial growth.

3.1.4 Regional and sustainable air transports can support business development and grow the labor market to include inland regions and neighboring countries

In the future, a sustainable network of electric air travel can be developed to service regional transports. Skellefteå is an important part of the regional structure for the labor market, and sustainable air commuting across Kvarken as well as to the inland cities, could help expand the region¹⁶. The airport thereby contributes to a balanced regional development. This may lead to a more sustainable and inclusive growth model for the entire region. Electric flights lead to a more sustainable delivery than existing alternatives and overall improved operational efficiency for businesses in the area. In the near future, Northvolt and other companies related to the green transition would need access to sustainable transportation, such as electric flights, in order to live up to their sustainability goals.

Even if commuter links may be created by Norrbottenbanan in the future - and cities like Luleå, Piteå and Umeå may be more easily connected through this railroad - there are additional connections that the airport could supply making growth possible across more parts of the Arctic region and northern Sweden. Possible connections in the Kvarken area such as between Vasa, Finland, and Skellefteå as well as inland east-west connections may be established through electric flights¹⁷. Businesses need intermodal solutions in the northern region of Norway, Finland, and Sweden. As such, it may in the future involve and connect new places such as the ice-free port in Mo I Rana and Skellefteå. As there are plans to establish additional battery factories and related activities in the Swedish northern regions, Norway, and Finland, the airport can serve as an important tool in connecting the three countries.

For industries, such as Northvolt, that rely on efficient supply chains, a nearby airport can support movement of goods and materials that need to be transported on short notice, such as spare parts that would cause production halts and result in large costs. Even if most transports of goods in larger volumes use transportation by rail and sea, there are occasions in which none of these options are fast enough. Therefore, Anders Thor concludes that it is crucial for Northvolt with access to air freight.

3.2 A well-functioning airport is crucial to support the necessary increase of inhabitants in Skellefteå, driven by the new industrial developments

A citizen-need for transportation to and from Stockholm, other parts of Sweden, as well as internationally will increase with the predicted population growth due to the new industrial development and the need for a skilled workforce. The airport in Skellefteå plays a pivotal role in strengthening resident attractiveness, fostering demographic growth, and contributing to the city's 2030 population development goal.

3.2.1 The airport contributes to enhanced accessibility that enables population development

One of the key advantages of a well-connected airport is the increased accessibility it offers to Skellefteå. This accessibility is a significant factor for potential residents, as it reduces the geographical barriers that often discourage individuals and families from considering a move. The ease of air travel makes Skellefteå more appealing to those coming from both distant national locations and international origins. The airport's contribution extends to strengthening family and social ties as well. According to every interviewee, accessible air travel enables residents to maintain connections with loved ones across distances.

¹⁶ Nordic Battery Belt Logistics, 2022

¹⁷ Nordic Battery Belt Logistics, 2022

Moreover, cultural exchange and global appeal are made possible through the airport, as the airport contributes to the city's cultural exchange and tourism endeavors. It enables residents to maintain connections with their families, attend international events, and explore new destinations. This infusion of cultural experiences and global perspectives can be a major draw for individuals who appreciate a city that is closely connected to the broader world.¹⁸

For a smaller town located in the northern region, the significance of internationalization and globalization has notably increased over time. As observed by Lars Hedqvist, this has led to an increased dependency on international contacts, and therefore the relevance of travel connections. Hedqvist emphasizes the continuing necessity for meeting in person. In this context, the development of Skellefteå City Airport is essential, with a minimum of three operators being deemed crucial for maintaining reasonable airfare pricing. Failure to achieve this could potentially result in a lock-in effect, where limited air connections and high-ticket prices hinder resident-mobility.

Anja Palm furthermore highlights globalization, emphasizing that whether you are a returning resident or a new resident, the desire to connect with the broader world and visit family and friends remains strong. Skellefteå now attracts newcomers with no prior ties to the region but with extensive connections elsewhere. The perception of Skellefteå as a distant destination can be a barrier for potential residents. However, air travel serves as a crucial tool for overcoming this perception. Regardless of whether the journey takes one hour for a domestic flight, it serves to bridge geographical distances, making Skellefteå more accessible and appealing to individuals considering a move to the city.

According to Lars Hedqvist, the airport doesn't itself generate the necessary city attractiveness. Rather, it serves as a hygiene factor for ensuring accessibility to Stockholm, Europe, and the rest of the world. The airport acts as an enabler for various aspects of life, including culture and hobbies, among others. These factors collectively contribute to making Skellefteå an appealing place to reside. However, to foster growth, Skellefteå must invest in initiatives that makes it a more attractive city to live in. Here, Skellefteå City Airport can be the enabler for people moving to Skellefteå, thus making the population grow. Anders Hjalmarsson adds that there is an attraction to swift and flexible transportation opportunities, where the airport is providing people with a viable alternative. Furthermore, he adds that investment in infrastructure shows a belief in the place.

The airport will also have a role within the European "movement model" and the Just Transition Platform. This initiative aims to address demographic disparities across Europe by promoting population distribution. Notably, the northern part of Europe, including Sweden, is positioned to leverage unique opportunities in this context, as highlighted by Peter Larsson.

3.2.2 The airport contributes to job creation within the region

The airport's influence on the business landscape is equally impactful. By serving as a gateway to markets beyond the region, the airport enhances business growth and job creation prospects. It enables companies in Skellefteå to establish connections with clients, partners, and markets on a broader scale, making the city an attractive destination for professionals seeking promising career opportunities and entrepreneurs looking to establish or expand their ventures.

The presence of the airport serves as a fundamental prerequisite for positioning Skellefteå as an attractive destination for both employment opportunities and residential living. It becomes an integral part of the city's identity and its reputation as an innovation hub for green industrial

¹⁸ Scenarioanalys för Skellefteå kommun, 2021

development, as emphasized by Anja Palm. Furthermore, the airport exhibits Skellefteå as a reliable and dependable city for both domestic and international mobility.

3.2.3 Investment in Skellefteå's long-term growth indicates an attractive city

Importantly, a functional airport represents an investment in Skellefteå's long-term growth. Its presence underscores the city's commitment to infrastructure development and forward-looking planning. Potential residents are likely to find this commitment reassuring, as it reflects a city that is dedicated to creating a sustainable and thriving community with ample opportunities for personal and professional advancement. The airport contributes to broader economic development, making the entire area more appealing for residents.

According to Lars Hedqvist, the airport plays a significant role in an individual's decision to relocate to Skellefteå. This importance stems from the human need to travel, experiencing diverse environments, and engaging in physical meetings. As newcomers settle in, a demand for connections to their places of origin arise. Consequently, the airport, in conjunction with the forthcoming Norrbotniabanan, assumes a central role in shaping future travel possibilities.

In conclusion, the aggregate of reviewed documents and interviewees communicate that Skellefteå City Airport is crucial to support the necessary increase of inhabitants to Skellefteå driven by new industrial development. Moreover, access to air transport is vital for business development in the green industrial transition as well as other business sectors within the northern part of Sweden.

4. Skellefteå City Airport's contribution to preparedness and safety

During the Cold War, the Swedish defense, military and civil alike, was of significant size. The Swedish Airforce was considered the fourth biggest in the world. But after the fall of the Soviet Union, which marked the end of the Cold War, the Swedish defense was significantly downsized and the mandatory conscription of male citizens to the Swedish Armed Forces during peacetime was laid to rest.

However, following the changing international security paradigm - which sees democracy declining in the world,¹⁹ Russia invading Georgia in 2008, Crimea in 2014 as well as mainland Ukraine in 2022 and both China and Iran conducting several operations in and towards Sweden - the Swedish government has chosen to expand the Swedish defense once again. As for the military defense, this is being conducted through initiatives such as reintroducing the mandatory conscription as well as applying to be a member of The North Atlantic Treaty Organization (NATO). For the Swedish civil defense, the expansion is being conducted by increasing societal resilience through such initiatives as securing vital transportation routes.

4.1 Agreement on constant availability in emergencies or specially prioritized aircraft transportation

Skellefteå airport is one of 26 Swedish airports designated as a contingency airport (Beredskapsflygplats). This means that the Swedish government and the airport have an agreement stipulating its constant availability in emergencies or specially prioritized aircraft transportation.²⁰ For instance, the airport is utilized daily for both emergency and logistical transports to and from Skellefteå hospital.²¹

Numerous organizations within the Swedish civil defense employ the airport to conduct their missions, serving as both a home base and a refueling hub. Examples of such missions include fire surveillance, search and rescue operations, inspection of electric power transmissions, and coastal surveillance.²² Moreover, the airport plays a role in the Swedish military defense and in selected police operations.²³

A closure of the airport would pose challenges for many of the aforementioned organizations. The organizations using the airport as a home base would find it harder to recruit local flight crews. Utilizing another city's airport would substantially increase the organizations' response times, which could in turn decrease the Swedish capability to respond to threats or major accidents. For organizations using the airport as a refueling hub, a closure would cause problems for certain air routes, which could in turn cause major problems for some of the operations carried out.²⁴

4.2 Skellefteå airport is a connection point for defense cooperation

The airport's location on the northern Baltic Sea coast positions it as one of the gateways for regional defense and for cooperative efforts aimed at maintaining stability and security across the northern European region. Furthermore, the airport's role as an important connection point aligns with Sweden's commitment to regional and international cooperation. As the country prepares to join NATO, Skellefteå airport's strategic positioning takes on even greater significance.

¹⁹ Freedomhouse, 2023

²⁰ Swedish government, 2022a

²¹ Swedish government, 2022b

²² Skellefteå Motorflygklubb, 2023

²³ Swedish government, 2022b

²⁴ Interview conducted with the commander of the Swedish Volunteer Air Corps 9th of august 2023.

4.3 A connection to Swedish political independence

The airport's importance is not just confined to times of crisis or military operations. Given that Skellefteå city lacks passenger train connections, the airport also holds great significance for various corporations within the city. For instance, both Boliden (mining) and Northvolt (battery production) are expanding their operations within the city. These two companies are integral components of the Swedish economy,²⁵ thus contributing to Sweden's financial stability. In turn, this affects Sweden's sovereignty and independency by contributing to Sweden's freedom of action not least on the international political arena.

²⁵ Geological Survey of Sweden, 2022 & Dagens Nyheter, 2023

5. The airport’s socioeconomic contribution

Skellefteå City Airport provides a socioeconomic contribution through its operations. Operating the airport contributes directly to regional production and generates increased employment, which in turn contributes to public finances. In this section, we estimate that the total value added to regional production (after accounting for operating costs) by Skellefteå City Airport is 45.15 million SEK per year. We estimate that the total number of full-time equivalent employments supported is 226 per year, and that the additional employment contributes 60 million SEK to public finances through increased tax revenue at the local, regional, and state level. The airport further contributes to regional growth and employment through its operations, facilitating the establishment of businesses such as Northvolt, which in turn creates huge socioeconomic benefits.

Table 1. Summary of the total yearly socioeconomic contributions created by operating Skellefteå City Airport

Category of socioeconomic value	Contribution per year
Contribution to gross regional production (BRP)	45.15 million SEK
Increased employment	226 full-time employees
Contribution to public finance	59.7 million SEK

In this section we calculate three forms of socioeconomic value created through the operation of Skellefteå City Airport:

- **Contribution to gross regional production (BRP):** the value yielded by Skellefteå City Airport to the regional production through its operations, calculated by subtracting the total costs of inputs from the business’ production value.
- **Increased employment:** the operation of the airport creates employment opportunities directly at the airport, in airport-adjacent industries, and in the wider economy as well.
- **Contribution to public finance:** the increased employment also leads to increased tax revenues at the local, regional, and national level.

We will begin by discussing the socioeconomic contributions to regional production and employment, and then proceed by calculating the contributions to public finances. We finish by discussing the dynamic effects that the airport has on broader regional development.

5.1 Skellefteå City Airport contributes to regional production and employment

Skellefteå City Airport contributes to the overall economy by contributing to regional production as well as by generating employment opportunities. These effects are not limited to the airport itself. By its operation, the airport creates a ripple effect in the economy, stimulating demand and growth in other sectors. In this section, we estimate the airport’s impact on the regional economy and employment using an input-output model, which uses empirical data to model the flow of goods and services between different sectors of the economy. We estimate that the airport provides a contribution to the regional economy of 45 million SEK per year, and 226 full-time equivalent (FTE) employment opportunities.

5.1.1 We use data on operational costs and employment at Skellefteå City Airport as inputs to our model

The input-values required to estimate the contribution to the regional economy consists of the employment data for the business analyzed as well as its total costs. According to data from Skellefteå City Airport, the direct economic activity in terms of employments at the airport can be divided into executive staff, operative staff, technical staff, air traffic control, and the flight school.

Descriptions of each category, as well as the number of full-time employees per category can be found in Table 2.

Table 2. Staff categories and FTEs at Skellefteå City Airport

Staff category	Description	Number of FTE
Executive staff	CEO, HR, payroll, financial controlling, strategy development	6
Operative staff, landside	Check-in and security, retail, advertising, janitorial services	16
Operative staff, airside	Runway and taxiway maintenance, aircraft parking, aircraft incident response	22
Technical staff	Aircraft maintenance and repairs	4
Air traffic control	Managed by external company ACR (Aviation Capacity Resources)	8
Flight school	Instructors and staff at Green Flight Academy, which is based at Skellefteå City Airport	10
Total		66

The total costs at Skellefteå City Airport can be divided into staff costs, external staff costs and operating costs. The personnel costs associated with executive, operative, and technical staff added up 33.7 million SEK in 2022 according to Skellefteå City Airport’s financial reports.²⁶ Staff costs for air traffic control and flight school staff are estimated at 12 million SEK, according to salary data from Statistics Sweden.²⁷ Finally, additional operating expenses amount to 40.3 million SEK according to Skellefteå City Airport’s financial reports.²⁸ To summarize, Skellefteå City Airport’s direct input to the economy is approximately 86 million SEK. These results are presented in Table 3.

Table 3. Total costs at Skellefteå City Airport, million SEK

Cost category	Million SEK
Staff costs	33.7
External staff costs	12
Operating cost	40.3
Total	86

²⁶ Skellefteå City Airport, 2022 income statement

²⁷ Statistics Sweden, 2023. Salary search.

²⁸ Skellefteå City Airport, 2022 annual report

5.1.2 The total value added to regional production by the airport’s operations is 45.15 million SEK per year and the total number of FTEs created is 226

Using staff and cost data, we utilize the input-output-model to estimate Skellefteå City Airport’s contribution to the economy, both in terms of value added to the regional economy and full-time equivalent employments (FTE) generated. The estimated value is comprised of three components:

1. The **direct** effect at Skellefteå City Airport, for which we already know that the number of FTE’s is 66 (see Table 2)
2. The **adjacent industry** effect, which is comprised of additional employment generated at local businesses in airport-adjacent economic sectors such as transportation and logistics
3. The **indirect** effect estimates additional economic activity in wider parts of the economy, which arise due to Skellefteå City Airport’s operations. These ripple effects are noticeable in all parts of the economy, for example in sectors such as warehousing, real estate, and trade of intermediary goods

By considering all the above effects, we illustrate the airport’s overall economic significance and its interconnections with various industries and services. It should be noted that this estimate is based on a general input-output model with national-level multiplier effects. To compensate for this, we have developed locality weights that narrow the economic ripple effects to better reflect economic conditions at the local or regional level. However, some branches of the economy tend to be more locality-dependent than others (for example, construction services). For that reason, the results of the input-output model should be interpreted as a rough estimate of the local or regional economic ripple effects stemming from the airport’s business operations. The results are summarized in Table 4.

Table 4. Socioeconomic contribution, value added to regional production, and number of full-time employees

	Value added, million SEK	Number of FTE
Direct effect	13.10	66
Adjacent industry effect	14.09	71
Indirect effect	17.96	89
Total	45.15	226

The total value added to regional production by the operations of Skellefteå City Airport is 45.15 million SEK per year and the total number of full-time employment opportunities created is 226. The value added to regional production is divided between direct effects at the airport comprising of 13.10 million SEK (29 percent), the adjacent industry effect of 14.09 million SEK (31 percent), and the wider, indirect effects of 17.96 million SEK (40 percent). The total number of full-time employees created in adjacent industries is 71 (31 percent). Furthermore, 89 (40 percent) FTEs are created through indirect effects.

It is important to note that yearly value added is not the same as the total yearly economic value of the airport. Value added is strictly used to describe what additional value a business yields to

the economy through a refinement or enhancement process. It is calculated by subtracting the total costs of inputs from the business' production value. Value added is best understood as a key figure in the overall calculation of GDP or regional production. Economic value on the other hand is a broader concept that describes the valuation of something in economic terms, which can encompass everything from the value of reduced unemployment to improved public health.

The value added as well as the number of FTEs are distributed across various sectors of the economy, with the majority concentrated to the service industry (see Figure 3). This is a broad classification that encompasses industries such as real estate, transport, commerce, and financial services.

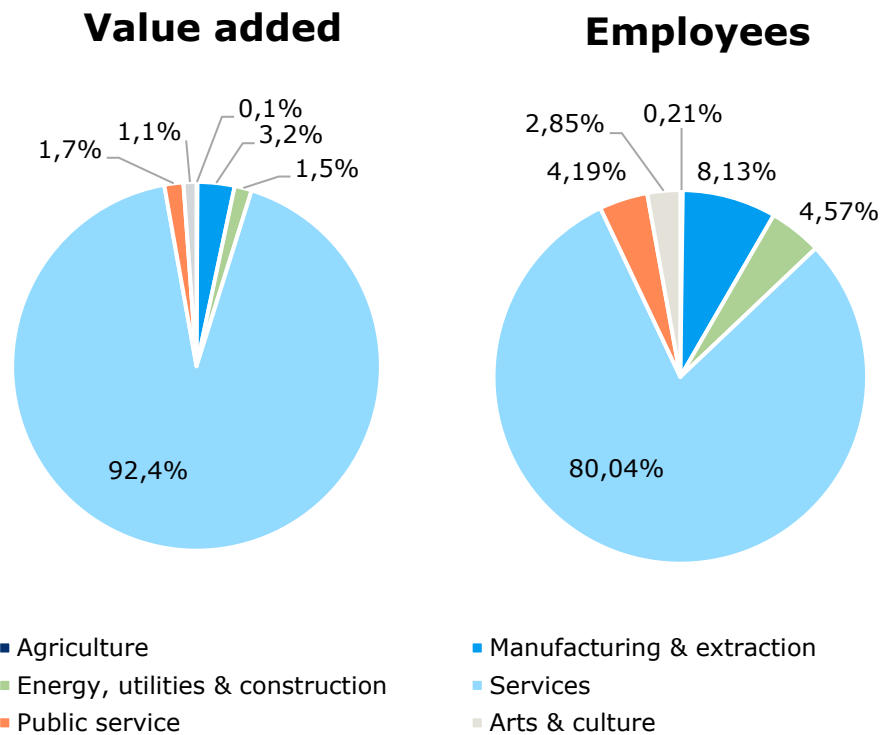


Figure 3. Distribution of Value Added and FTEs created (including direct, local supply chain, and indirect effects)

5.2 Skellefteå City Airport contributes directly to public finances at the municipal, regional, and state level

By creating job opportunities both directly at the airport and in adjacent businesses and industries, the operations of Skellefteå City Airport also contribute to public finances through increased tax revenues. These contributions are distributed between the local (municipal), regional, and national level. In this section we estimate the contributions to public finances through the employment created directly at the airport and in airport-adjacent industries as presented in Table 4. We use salary data from Statistics Sweden for each category of employment created to estimate incomes and the taxes paid by each group. The results are summarized in Table 5.

Table 5. Contribution to local, regional and state public finances through the operation of Skellefteå City Airport

Level	Economic contribution, million SEK
Municipality (tax)*	13.9
Region (tax)*	7.0
State	38.8
<i>Payroll tax and state income tax**</i>	<i>19.8</i>
<i>Consumption VAT***</i>	<i>19.0</i>
Total	59.7

* 2023 tax rates for Skellefteå municipality and Västerbotten region²⁹

** Based on applicable payroll tax rates per salary category³⁰ as well as 2023 state income tax cutoff point³¹

*** Standard 25 % VAT rate times Skellefteå City Airport’s consolidated revenue in 2022

The total contribution to public finances through the operations of Skellefteå City Airport is approximately 60 million SEK per year. The contributions are 13.9 million SEK (23 percent) at the municipal level, 7 million SEK (12 percent) at the regional level, and 38.8 million SEK (65 percent) at the state level. The state level contribution can be divided into payroll and state income tax (19.8 million SEK) as well as consumption value-added tax (19.0 million SEK).

5.3 The airport’s operations further contribute to dynamic effects pertaining to regional development

The possibility of air travel to Skellefteå is a necessity to enable population growth, tourism, and regional industrial development. As discussed in chapter 3, the airport was a key factor when Northvolt established in the region. Furthermore, the numerous exporting industries in the region are dependent upon the operations of the airport due to the lack of viable alternative transportation. Quantifying the impact of the airport in terms of additional employment and regional production when accounting for these dynamic effects is difficult and involves great uncertainty. Therefore, we will not present numeric estimations of the indirect impacts of the airport in this section. However, we will describe the impact, using Northvolt as an example.

As stated previously, Skellefteå City Airport played a key role in the early establishment of Northvolt in the region. One estimate is that by 2025, Northvolt will employ 4 000 people at the factory in Skellefteå.³² Even if we attribute only a twentieth of that increase in employment (i.e., 200) to the airport’s existence, it is close to equal to the number of full-time employments

²⁹ Statistics Sweden, 2023b

³⁰ Företagarna, 2023

³¹ Swedish Tax Agency, 2023

³² Skelleftea.se, 2022

created directly, indirectly, and in adjacent industries calculated above. This increase in employment also entails an increase in production and contributions to public finances.

The impact of Northvolt's establishment does not stop at the factory door. The operation of the factory creates an increased demand for supplies, transportation, housing, and public services. Thus, there is furthermore an increase in employment opportunities not only within local suppliers to Northvolt, but for everything from doctors to schoolteachers to bus drivers and waiters. These employees again contribute to regional production, and to public finances through tax revenues. The size of this effect is potentially very vast.

Skellefteå City Airport cannot be given sole credit for the establishment of an industry such as Northvolt. This form of establishment is clearly driven by many factors, however, of which transportation is a very important one. If no viable transportation alternative exists, Skellefteå City Airport becomes key in enabling this regional industry growth as well as in facilitating the subsequent dynamic effects that such an establishment has. These effects are likely far larger than the direct effects we have calculated in this report. Without the operations of the airport, these effects would likely not have come to fruition.

6. The air travel market to Skellefteå constitutes a market failure

The market for air travel to Skellefteå constitutes a market failure: the free market is unable to allocate resources in the most efficient way, and to maintain the societal values created by Skellefteå City Airport, government support is necessary. Skellefteå City Airport has not been able to run at a profit over the past few years. But the value created by the airport goes beyond the revenue it generates. In the previous sections we have highlighted the societal benefits created through the airport's operations: substantially reducing travel times, enabling regional growth and development, contributing to national preparedness and safety, and generating increased regional production and employment. All these factors are important and valuable for inhabitants of Skellefteå, regional industry, and for Sweden as a whole. They should therefore be considered when evaluating the future of Skellefteå City Airport.

In this section, we show that the air travel market in Skellefteå constitutes a market failure. Based on the great societal values generated through the airport's operations, we assess that it should likely receive government support to be able to keep operating. We begin by discussing the term market failure and what it entails, followed by a more detailed discussion of why the air travel market to Skellefteå constitutes a market failure. We conclude by illustrating why there are no viable alternatives.

6.1 A market failure is a situation in which the free market does not function efficiently

The term market failure refers to situations in which the free market does not function efficiently and is unable to allocate resources in a way that is most beneficial to society.³³ In a well-functioning market, consumers and producers interact with each other in such a way that the supply of goods equals demand, and prices accurately reflect both consumers' willingness to pay as well as producers' costs of production. Hence, resources are allocated where they are most valued, resulting in the most socially and economically desirable outcomes for consumers and producers. However, market failures occur when factors hinder this optimal allocation.

6.1.1 Goods or services with large externalities result in more prominent market failures

The most prominent examples of market failures tend to occur for goods or services that have large externalities. Externalities are factors associated with a good or service that affect not only the individuals directly involved in its production and consumption, but also the broader community. For instance, it is in society's best interest that the population works out and is in good health, since this reduces the need for medical care and hospital visits. But the benefits associated with a healthy population does not accrue to the owners of gyms. As such, they may set a price for memberships that is prohibitively high for many individuals who would like to work out but cannot afford to do so. Therefore, it is in the interest of the state to subsidize (through health care allowances for instance) physical activity to correct for the fact that the cost of a gym membership does not consider all the positive externalities stemming from working out. By doing so, everyone wins: more individuals can afford to join, the gym gets more members, and the state saves money in the long run since the subsidies are much cheaper than hospital care.

As it relates to airports, neglecting externalities may lead to airports being placed in suboptimal locations, failing to maximize the overall value they bring to the public. Furthermore, failure to consider positive externalities of an airport may lead to an undersupply of airports in regions where they would indeed generate a large societal benefit. This is especially true in a sparsely

³³ SIEPS, 2020

populated and geographically challenged region such as Skellefteå, where access to transportation is key to facilitate growth. Thus, by considering externalities and incorporating them into decision-making, airport development and maintenance can contribute positively to both the local community and the broader economy. Often, government support is necessary to ensure that these public interests are met.

6.2 The air travel market to Skellefteå constitutes a market failure

Based on our analysis and understanding of the definition, the air travel market to Skellefteå constitutes a market failure: the operation of the airport creates large positive externalities for the inhabitants of Skellefteå, regional growth and business development, as well as positive externalities for all of Sweden, but these benefits do not show up on the airport's balance sheet. In the previous sections we have shown the great societal benefits that Skellefteå City Airport creates in terms of reduced travel times, enabling regional growth and employment, contributing to preparedness and safety, as well as its socioeconomic contributions. Our assessment is that these benefits outweigh the costs of operating the airport and that many of these values would not be realized without the airport.

6.2.1 There are likely no viable alternatives to Skellefteå City Airport

We have shown in the previous sections that there are large positive externalities associated with operating an airport in Skellefteå. But one question remains: would it be possible for another actor to operate an airport in Skellefteå, creating the same positive externalities, but at a profit? The short answer is no. The main reason is the large costs required to construct an airport, and the fixed costs associated with running an airport that are unrelated to the number of passengers.

Firstly, the construction and operation of airports are associated with high fixed costs. Airports require large infrastructure investments such as the construction of runways and support facilities for baggage handling, security, and air traffic control. Additionally, airports face regulatory barriers such as costly and time-consuming processes for obtaining permits and adhering to security standards required in the aviation sector. Finally, incumbent airports have a competitive advantage over new players due to established relationships with airlines, granting them access to airspace, time slots, and desirable routes. All the above constitute significant barriers of entry to new players who are looking to establish an airport. Additionally, as Skellefteå airport holds an incumbent position with established airline partnerships and key infrastructure already in place, it is not likely that another player would be able to challenge their position.

Secondly, even if another airport were to be established, it is highly unlikely that it would be able to operate at a profit. The Airports Council International estimates that 80 percent of the costs of an airport are independent of the volume of passenger traffic. As such, it is difficult to reduce costs by affecting travel since most costs will occur either way. Additionally, Skellefteå City Airport is already operating based on the "Basic Airport" concept, reducing staff to a minimum by having one individual perform several tasks such as security checks and check-ins.³⁴ The only way to increase revenue is to increase passenger traffic, reducing the cost per traveler. But such an increase is mainly dependent on increasing the number of inhabitants in Skellefteå – a factor that the operation of the airport can influence through its operations (increasing likelihood of regional development and increased demand for worker for instance), but that is outside the control of the airport executives.

³⁴ Källa - Cirio

7. Concluding observations

1. The airport is necessary with regard to geographical conditions and communication possibilities

Skellefteå is in a sparsely populated region with limited access to train transportation and with geographic conditions that impede travel by car during several months of the year. Traveling to larger cities in Sweden using modes of transportation other than Skellefteå City Airport (other airports, bus, train, and car) increase travel time by between two to ten hours. In addition to longer travel times, alternative options to Skellefteå City Airport are more dependent upon weather. This further increase uncertainties when travelling, and especially so during the lengthy winter season.

2. There is a need for the airport for regional, social, and economic development

Each of the reviewed documents and interviewees state that Skellefteå City Airport is crucial to support the necessary increase in inhabitants in Skellefteå driven by the new industrial development. Moreover, access to transportation by air is vital to business development pertaining to the green industrial transition as well as other business sectors within the northern parts of Sweden.

Transportation by air is often the only viable alternative for export industries and businesses in the region when connecting with business partners. It is also a prerequisite when companies are considering establishment in the area. The existence of air travel makes research exchange and innovation possible. It can further assist in connecting the inland and regions in neighboring countries such as Norway and Finland (especially by electric air), hence growing the labor market. The hospitality sector also needs the airport to bring in tourists. Many services provided by municipal and regional actors are equally dependent on swift air transportation.

Citizen need for transportation to and from Stockholm, other parts of Sweden, as well as internationally will increase with the predicted population growth due to the new industrial development and the need for a skilled workforce. The airport in Skellefteå plays a pivotal role in strengthening resident attractiveness, fostering demographic growth, and contributing to the city's population development goal by 2030.

3. The airport is important with regard to preparedness and security

Skellefteå Airport is one of 26 Swedish airports designated as a contingency airport. Numerous organizations within the Swedish civil defense employ the airport to conduct their missions and a closure of the airport would pose challenges for many of these organizations.

The airport's location on the northern Baltic Sea coast positions it as one of the gateways for regional defense and for cooperative efforts. As Sweden prepares to join NATO, Skellefteå Airport's strategic positioning takes on even greater significance.

4. The airport provides a socioeconomic contribution

The operation of Skellefteå City Airport provides a socioeconomic contribution. We estimate that the airport's operations:

- contribute 45.15 million SEK per year to gross regional production
- support 226 full-time equivalent employments at the airport and adjacent industries
- contribute 60 million SEK per year to public finances through increased tax revenues at the municipal, regional, and state level

The operation of the airport is key in facilitating establishment of industries in the region such as Northvolt, which in turn create vast socioeconomic benefits that likely far surpass the effects calculated in this report.

5. The air travel market to Skellefteå constitutes a market failure

A market failure refers to a situation in which the free market does not function efficiently and is unable to allocate resources in a way that is most beneficial to society. In the case of Skellefteå City Airport, the operations have not run at a profit, but the socioeconomic contributions (as laid out the rest of the report) are great. We believe that it is unlikely for another actor to enter the air travel market in Skellefteå and operate at a profit. Thus, in order to sustain the great economic benefits, the operations of Skellefteå City Airport should be supported.

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Name	Title	Organisation
Anders Thor	Kommunikationschef	Northvolt
Anja Palm	Näringslivschef	Skellefteå kommun
Lars Hedqvist	Planeringschef	Skellefteå kommun
Peter Larsson	Regeringens samordnare	Regeringen
Anders Hjalmarsson	Flygrådets och handelskammarens ordförande	Handelskammaren
Hans Spets	Commander of the Swedish Volunteer Air Corps	Swedish Volunteer Air Corps