



**Commuting in the Counties of
Norrbotten and Västerbotten
– a current state analysis**

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Report 2013:5**

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Transport Analysis

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Summary

It is easy to form the impression that Norrbotten and Västerbotten counties constitute a homogenous region of mines and forestry operations, with an ageing and sparse population, tied together by a low quality road system. Such an impression does accord with reality to an extent, but the two counties also contain areas with major concentrations of population and a balanced population structure, and it is possible to use an attractive public transport system to commute between locations with different commercial and economic orientations.

This part of Sweden has major potential for the future, but it also faces real challenges in a number of areas, particularly in terms of how its infrastructure can and should be used to tie population concentrations together to achieve labour market matching, ensure competence supply, and ensure public welfare.

The competence supply: a tough nut to crack

The opportunities to meet the increased demand for labour that several studies have predicted clarify the challenges faced by this part of the country. These counties have a population concentration on the coast, while most municipalities are experiencing net population loss. Upwards of 95% of the population aged 20–64 years will need jobs in 2020, an even greater share than at present.¹ These conditions are also shared by most municipalities in northern Norway and northern and eastern Finland, making the situation even more problematic from a labour- and competence-supply standpoint.² Healthcare and nursing personnel are identified as one group in which the number of new recruits will grow. The total increased pressure on the labour force is expected to lead to a shortage of human resources accompanied by increased competition for the workers available from other sectors of society. A diminished labour supply relative to the population will also make it more difficult to find suitable competence among new recruits. This problem will be exacerbated by the generally below-average level of education in many smaller municipalities compared with that of the country as a whole.

The population bases in most of the region's municipalities are small and shrinking. The demographic breakdown in most of the inland municipalities also makes it difficult to recruit labour locally.³ One well-known and increasingly discussed problem is that young people, particularly young women, are moving out of the region. The result is a surplus of men, particularly in the young-adult age group. The issue of equality will consequently be important, as the survival of this region's society depends on it to a certain degree. If places in Northern Sweden are to be attractive to women, they must be able to offer good and rewarding jobs, varied professional lives, and meaningful leisure opportunities to more women than is currently the case. The issue of quality is also important because a gender-divided economy

¹ Not gainfully employed = jobless, students, on parental leave, sick, in early retirement, or receiving old-age pension.

² Swedish Public Employment Service [Arbetsförmedlingen] (2010).

³ Brandén, Forsgren, Holmström, and Olsson-Spjut (2011), Garli and Pettersson (2011), Swedish Agency for Growth Policy Analysis [Tillväxtanalys] (2010a,b).

with little differentiation is vulnerable. Despite strategic equality initiatives in both the public and private sectors, the labour market remains largely gender-divided.

A shrinking population base is also problematic because it means that the breadth of competence is also generally decreasing. There is, in fact, a clear positive correlation between population size and breadth of competence.⁴ In other words, the range of professions is broader in municipalities with large populations. The breadth of competence improves markedly if individual municipalities are aggregated into labour-market regions. In Northern Sweden, this improvement would be most evident in the coastal area between Umeå and Luleå, and on to Haparanda and Övertorneå.⁵ Creating bigger regions can thus help meet the challenges of the future. However, a feature common to most labour-market regions in this region whose breadth of competence is not improving simply because they consist of only one or a few municipalities. This is particularly true of the Norrland municipalities bordering Norway. Large geographical distances combined with a modest breadth of competence in surrounding regions also reduces the prospects of using the breadth of competence of surrounding regions.

The municipalities are facing new problems, which may be perceived as difficult to address, when establishing new mining operations or reopening idled ones. Establishing an enterprise of the scope of a mining operation often results in claims being made on a large share of a municipality's resources for an extended period, to deal with the requisite decisions and actions. Affected municipalities also face demands for new housing and expanded municipal services and infrastructure.

The positive stimulus that the expansion of a mining business provides can, to some extent, encounter problems in terms of access to local labour with the right competence as well as a shortage of housing. Kiruna, Gällivare, Pajala, and other mining communities in the region face an almost paradoxical situation in which, while they have been reducing their populations and cutting back on the public sector for a number of years, a boom in the mining industry is bringing low unemployment and heavy demand for qualified workers. Higher demand has led to shortages of housing and commercial space and to difficulty in recruiting the appropriate competence.

Conditions for regional enlargement

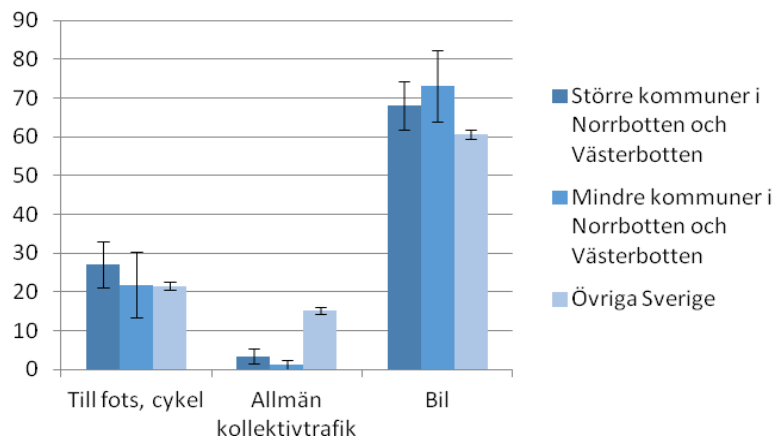
The design and layout of the transport system affect how we use the system, the modes of transport we use, and how often and how far we travel. Roughly 15% of the gainfully employed population in Norrbotten and Västerbotten counties commutes to and from work across a municipal boundary. In other words, most of the workforce commutes within the municipalities in which they reside. At the same time, the *length of the average trip* to work in the two counties is shorter than in the rest of Sweden (see Figure 3.13 and Figure 3.14). The *travel time* for the average commute is also somewhat shorter than in the rest of Sweden (see Figure 3.16).

Most commutes are made by passenger car (see Figure 1.1). The results of the Swedish National Travel Survey indicate that commuting to work using public transport is limited, while roughly 20–30% of trips to and from work are made on foot or by bicycle. Men account for a

⁴ Breadth of competence = the number of job titles divided by the total number of positions.

⁵ Forsgren (2011).

greater share of car trips and also travel farther than do women, who walk or cycle to work to a greater extent.



Key:

Större kommuner i Norrbotten och Västerbotten = Larger municipalities in Norrbotten and Västerbotten
 Mindre kommuner i Norrbotten och Västerbotten = Smaller municipalities in Norrbotten and Västerbotten
 Övriga Sverige = The rest of Sweden
 Till fots, cykel = On foot, by bicycle
 Allmän kollektivtrafik = Public transport
 Bil = Passenger cars

Figure Fe! Ingen text med angivet format i dokumentet..1. **Percentage shares of work commutes made using various modes of transport, per municipality of residence.**

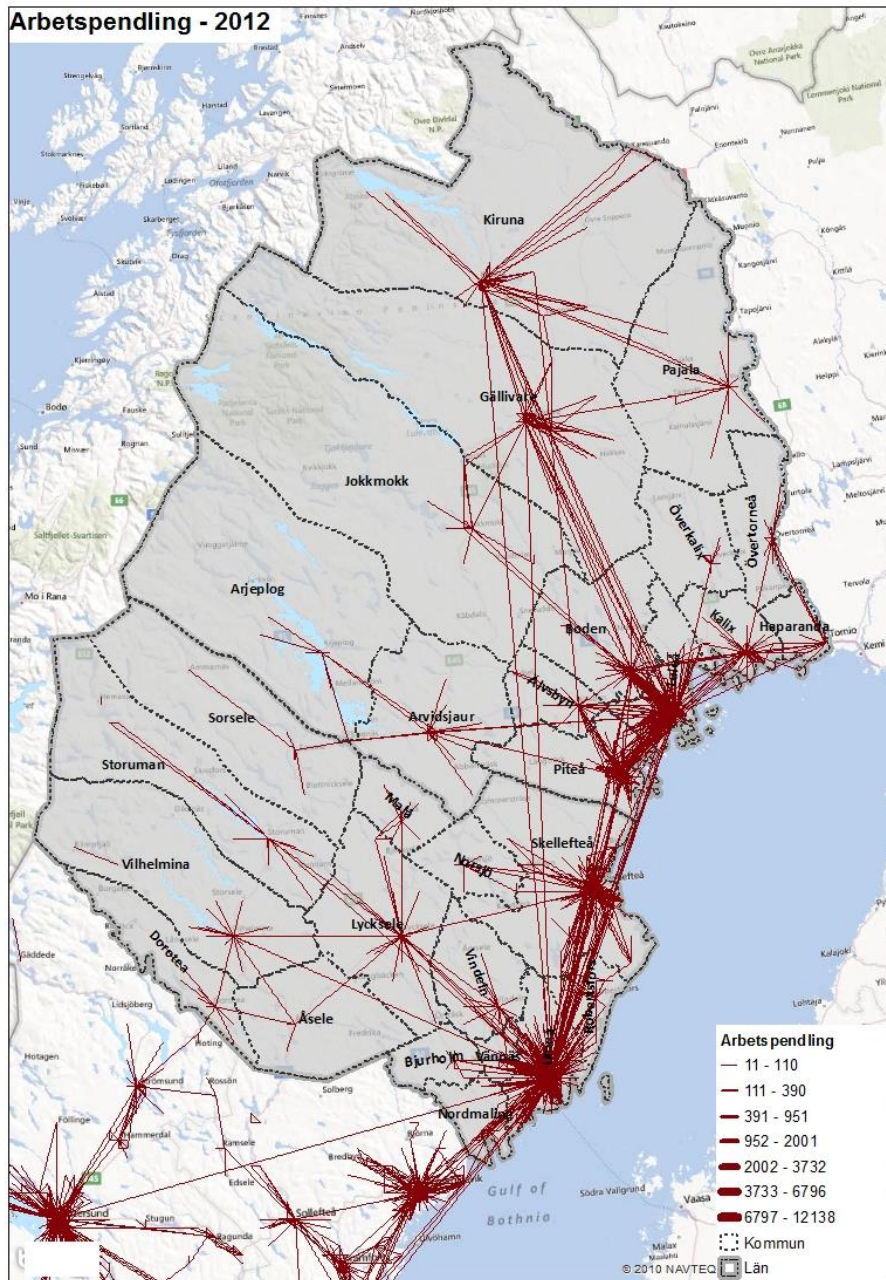
Note: The uncertainty of the estimates is expressed as a confidence interval.

“Larger municipalities in Norrbotten and Västerbotten” includes Umeå, Skellefteå, Gällivare, Luleå, Piteå, and Kiruna. “Smaller municipalities in Norrbotten and Västerbotten” includes the rest of the municipalities in Västerbotten and Norrbotten.

Source: RES [National Travel Survey] 2005/2006 and RVU Sverige [The Swedish National Travel Survey] 2011 and 2012.

These results are largely consistent with the settlement pattern and workplace locations. Shorter trips indicate local labour markets with short distances between homes and workplaces. Short distances also make it reasonable to choose walking and cycling as modes of transport. The travel pattern also indicates that the municipalities are located far from one another, i.e., at distances that cannot generally be spanned within reasonable travel times. The share of the workforce in Norrbotten and Västerbotten whose trips to work exceed one hour is also relatively small compared with the comparable share in the rest of Sweden.⁶ The share in the larger municipalities in Norrbotten and Västerbotten is 7.0%, while the share in the smaller municipalities is 7.5%, as compared with 10.2% in the rest of Sweden. Differences exist in terms of the average travel times for trips to and from work as well: the figure in Norrbotten and Västerbotten is 22 minutes (23 minutes for the smaller municipalities), versus 30 minutes for the rest of Sweden.

⁶ Travel time includes only the time actually spent travelling. If errands are done on the way to or from work, the time taken to do them is not included. On the other hand, waiting times, for example, for buses, are included.



Key: Arbetspendling = Commuting to work

Kommun = Municipality

Län = County

Figure Fel! Ingen text med angivet format i dokumentet..2. Total number of trips to and from work per commuter route in 2012, for women and men.

Source: Our own processing of data from Statistics Sweden [SCB].

Note: Travel to and from work both within and between municipalities in Northern Sweden is shown here.

At present, 85% of the counties' populations live in a string of larger towns along the coast, including both university towns and major industrial cities. The link tying them together is the E4, which is almost entirely a high-quality road. However, these cities and towns are far from one another, making the travel times long. This is also evident in the commuting statistics,

which indicate that the heavy commuting flows pass from the outlying municipalities toward the major urban centres, while commuting between the central locations in the region is relatively light (see Figure 1.2).

The public transport service by bus is relatively good along today's heavy commuting routes. As a result of the scope and low quality of the railroad system, it is unable to offer competitive travel times and is consequently not used for commuting to any great extent, except on the Bothnia Line along the Umeå–Örnsköldsvik and Umeå–Vännäs/Vindeln routes.

Little of the population lives inland, spread over what is clearly a large area. As a result, the distances travelled are often great and the commuter flows relatively light. The road system is of deficient quality, with poor traffic safety and reduced speeds. The road system is also crowded with numerous heavy goods lorries, which restrict the mobility of passenger traffic. The public transport service is meagre, which results in a lack of flexibility and long travel times, and as a rule it is not used for commuting to and from work. This leads to a heavy dependence on passenger cars, which works counter to equality, traffic-safety, and environmental initiatives. Air travel service to and from the inland areas is generally poor, regardless of destination, limiting the options for weekly commuting. This mainly affects the competence supply in specialised businesses, such as the mining industry.

These counties are also home to people who commute to work in the rest of the country, with weekly commutes to Stockholm being common. This makes the counties heavily dependent on air travel. People also commute from Västerbotten and Norrbotten to jobs abroad, mainly in Finland and Norway, with a distinct flow of commuters to and from Finland via Haparanda/Torneå. The commuting to and from Finland consists largely of daily commutes, while the commuting to Norway involves weekly commutes or commutes of other periodicity.

Regional enlargement is progressing slowly in both counties, and commuting is also changing relatively little over time. Infrastructure and great distances are major factors contributing to this slow change. There is also a clear conflict between the transport of people and the shipment of goods on both roads and railroads, a conflict that is limiting the growth potential and competence supply in the region. Compared with the rest of Sweden, these counties are consequently at risk of declining future competitiveness, as their labour market population is shrinking in relative terms. There is empirical evidence that productivity and employment growth are, in most cases, higher in labour market regions with large populations.

Travel patterns and choices of transport mode are also tied to considerations about moving versus continuing to commute, or moving versus acquiring a different commuting pattern than before. Individual decisions about commuting to work are the result of trade-offs between the residential environment, living space, job satisfaction, convenience of the mode of transport, and other restrictions. Such restrictions may pertain to housing prices, employment opportunities and compensation levels, costs and time expenditures associated with different alternative modes of transport, and time restrictions affecting the commuting individual and other members of the household. In other words, individual considerations in terms of commuting to work are affected by a host of factors, although the configuration of the transport system does play a key role.

Labour market research has shown that the higher the pay, the lower the likelihood that an individual will leave his or her job.⁷ The likelihood of changing jobs also tends to be greater for individuals with long travel times (trip lengths) than for those with short travel times (trip lengths). This indicates that individuals make a trade-off between pay and travel time when

⁷ van Ommeren and Forgerau (2009), van Ommeren, van den Berg, and Gorter (2000).

deciding whether to look for new jobs. A model can thus be used to calculate the marginal willingness to pay for reducing an individual's travel time (i.e., the time value of trips to and from work).

The literature concerning movements in the labour and housing markets has focussed mainly on single-income households.⁸ Considerations concerning commuting and the choice of where to live differ somewhat for households with two incomes. In such cases, there are usually two different workplaces and thus two different commuting distances that the household must take into account when choosing where to live. The models consequently study *both* job mobility and housing mobility.⁹

The empirical evidence indicates relatively clear patterns.¹⁰ Housing mobility is lower among households with children than among those without them. One's partner's distance from his or her job appears to have a lesser effect on one's own job mobility in households with children. In addition, job mobility tends to be higher for women in households with children, possibly because women assume most responsibility for the children. Other results of the study indicate that the likelihood of moving or changing jobs decreases with the age of household members, and that the bigger the living space, the lower the likelihood that the household will relocate. Those who rent their housing are also more likely to move than are those who own their own homes.

The coastal areas of Norrbotten and Västerbotten offer attractiveness and few disadvantages, making it of interest to move there to take employment. Conversely, there appears to be little likelihood that the demand for labour in the inland areas will be met by people moving in. Important disadvantages include the difficulty of finding jobs in the same area if there are two specialised workers in a family, the lack of housing in central areas, and lower potential attractiveness as destinations other than work are limited in accessibility, being associated with long and costly trips. This reinforces the conception of the inland areas as dependent on expanded commuting options if the demand for labour is to be met in the short and medium–long terms. The primary task of the coastal area is to foster the potential for commuting that exists there by linking the towns by efficient transport solutions.

The biggest deficiencies

Table Fel! **Ingen text med angivet format i dokumentet.**¹ summarises the identified transport system deficiencies and their impacts on the feasibility of work commuting. However, several of these deficiencies also affect other types of travel, such as business trips, goods shipments, and leisure travel, for example, in the tourism industry. Some of these deficiencies could represent major problems for certain commuters, but here we describe only their impact on work commuting as a whole in the region. The assessment is qualitative, based on interviews and on knowledge retrieved from earlier studies and analyses. The assessment pertains to current deficiencies, and does not take into account planned initiatives or the anticipated potential needs arising from future growth and development. It should be noted that no assessments have been made as to whether it would be socio-economically feasible to remedy these deficiencies, although considerable evidence suggests that a number of

⁸ van Ommeren, Deding, and Filges (2009).

⁹ van Ommeren, Rietveld, and Nijkamp (1998) and the empirical analysis of van Ommeren, Deding, and Filges (2009).

¹⁰ van Ommeren, Deding, and Filges (2009).

initiatives would not be feasible – that is, such initiatives cannot be justified from a strictly transport policy-related perspective. It is instead up to policymakers to determine what may be justifiable from a public policy sustainability perspective.

Table F Ingen text med angivet format i dokumentet..1. **Identified deficiencies that limit opportunities for commuting to and from work.**

Deficiency	Effect	Impact on commuting to work			
		Coastal area	Inland area	To/from the rest of Sweden	To/from abroad
Inadequate road quality	Long travel times by car and bus, poor traffic safety	AVERAGE	HIGH	AVERAGE	AVERAGE
Inadequate quality and capacity of existing railroads	Long travel times, limited potential service, and high sensitivity to disruptions	HIGH	LOW ¹¹	AVERAGE	LOW
Goods shipments compete with passenger traffic on roads	Long travel times for cars and buses, poor traffic safety	AVERAGE	HIGH	LOW	LOW
Inadequate public transport service by bus	Lack of flexibility for passengers, long travel times for residents of smaller towns, and limited geographical coverage	LOW	AVERAGE	LOW ¹²	LOW
Inadequate air transport service ¹³	Lack of opportunity for competence supply in highly specialised businesses	LOW	AVERAGE ¹⁴	LOW	LOW
Train vehicle fleet poorly adapted to winter conditions	Cancelled trains, uncertain travel times	AVERAGE ¹⁵	LOW	AVERAGE	LOW
Lack of maintenance facilities for trains	Cancelled trains, uncertain travel times, and poor service	HIGH	LOW	AVERAGE	LOW

¹¹ The railroads in the inland areas have limited geographical coverage, which means that improving the quality of the existing railroads would have a limited effect.

¹² Train connections adapted for work commutes to neighbouring counties are available.

¹³ Important mainly for weekly commutes within Sweden.

¹⁴ High impact on competence supply for the mining sector.

¹⁵ High impact on those towns that have train traffic (primarily Umeå, Nordmaling, and Vännäs).

Many of the roads used for commuting are of poor quality for commuting by car and impose restrictions on bus traffic as well. The European roads are narrow compared with similar roads elsewhere in Sweden and often lack median barriers. The robust growth in the region combined with more routes for heavy goods shipments passing through the region has encumbered many main arteries with large numbers of heavy goods lorries, which wear down the roads. These heavy goods lorries also drive more slowly than do passenger cars and buses and are difficult to pass, often because the roads are narrow. Passing is therefore associated with accident risk. When cars and buses become stuck behind goods lorries, they experience longer travel times. Overall, this leads to less favourable conditions for commuting to work by bus or car than would otherwise be the case.

The railroads in Västerbotten and Norrbotten are consistently single tracked. With the exception of the Bothnia Line, the quality of the railroads is also relatively low, as manifested in low speeds and high capacity utilisation. The combination of single tracks and high capacity utilisation also renders the railroad traffic susceptible to disruptions. The means of coping with delays that arise are limited, and the consequences of, for example, derailment, may consequently be extensive.

In contrast to the E4, which runs along the coast, Stambanan (the main line) does not run directly to the cities, but rather slightly out in the countryside. This means that train traffic takes a roundabout route between the cities, resulting in longer travel times. There is no daily train service to Skellefteå or Piteå; passengers are instead referred to buses that run from Jörn and Älvsbyn to reach Skellefteå and Piteå, respectively.

The goods traffic in the region is extensive, and expansion in, for example, the mining industry indicates a need for increased service. The high capacity utilisation means that the goods traffic competes with passenger traffic for idle railroad capacity. This also limits the growth potential for passenger traffic, which may ultimately be forced out.

The deficiencies exhibited by public transport in the studied counties are often related to deficiencies in the existing road system and to the long distances involved. The public transport services are generally good along the major commuter routes in the area around the Norrbotten and Västerbotten coasts, i.e., commutes where the distances are reasonable and there is sufficient demand. However, the services are intended for commuting based on business hours, which means that certain occupational groups have difficulties commuting to and from work using public transport if their commutes involve travel outside ordinary rush hours.

In most cases, public transport services are failing to meet the demand for work commuting in the inland areas. The low population density and large distances between the towns make it highly cost-intensive to design services for commuters, and the public transport system is at present configured almost exclusively to meet the demand for travel to and from school.

Public transport by rail is available along certain routes, but along many routes exhibits deficiencies related to the low quality of the railroads. These deficiencies lead to low departure frequencies and long travel times, and train service is consequently not a competitive alternative to travelling by bus or car on many routes.

The towns along the coast of Norrbotten and Västerbotten counties generally offer air travel service that meets the demand in terms of weekly and less frequent commuting. However, the air travel service for the inland towns is deficient. A lack of housing and the need for specialised competences, including limited-time needs in connection with investments/expansions in, for example, the mining industry, entail a demand for ways to

commute weekly from Mälardalen to the region's mining towns. However, the cost of air travel on many commuting routes is perceived as too high for it to be realistic for private individuals to make their weekly commutes by air. The low capacities of the aircraft used in this service mean that they are often full and it is difficult to get a seat, especially at the start and end of the work week, which limits weekly commuting. Small aircraft also mean longer flight times to Stockholm.

Train service is dependent on the ability to maintain the fleet. Proximity to maintenance facilities is important in terms of keeping repair times short, thereby limiting the amount of time trains are out of service. There are no maintenance facilities in Norrbotten or Västerbotten counties for the train service operated by Norrtåg. The closest facility is in Västerås, which is where the trains are taken, for example, for wheel lathing. This means that trains that need maintenance must be taken out of service for long periods and, in the event of a need for urgent maintenance, this can often result in lengthy service disruptions in which many departures have to be cancelled.

In the case of train service in cold climates, it is also important that de-icing facilities be available. Because the distances in the region are long, the train car circulation routes may be long, with the result that cars may be away from their stationing depots for long periods. Nevertheless, there is only a single de-icing facility for Norrtåg trains, in Umeå, which causes problems if trains running to Luleå ice up en route.

Commuting to mining towns

Most of the mines in Norrbotten and Västerbotten counties are located in clusters. This creates opportunities to develop a joint transport system for work commuting in which most mining works can share. At the same time, access to labour within a 45-minute commute of the mining works is limited. Access to labour increases for most active mines if the commuting time is extended to 60 minutes, particularly in Västerbotten County, often because such expansions will also encompass the municipal centres of the mining regions in the catchment areas. There may consequently be reason to continue strengthening the transport system to enable work commuting between the sites of the active mines and the municipal centres in the surrounding areas, increasing the potential workforce and the possibility of finding appropriate workers locally. The structural challenge that the mining and mineral industry faces is that active mines and any future mines are and will be located in the inland parts of the counties, far from the more populated coastal regions of Norrbotten and Västerbotten. Shorter commuting times will probably be necessary to establish extensive commuting from the mining towns to the coastal areas.

At present, commuting by car is probably the option that most will choose, as public transport currently entails significantly longer travel times in many cases. The public transport option requires that the transport system enable travel between the coastal areas and the mining towns that is better coordinated in terms of scheduling. The train is an option for commuting to work in the municipalities of Gällivare and Kiruna. Other mining towns have no rail connections, so the train is not a commuting option. However, there is bus service to all the mining towns, although the buses do not go all the way to the mines in most cases. Another problem is that schedule coordination is lacking between county-wide and local public transport services.

All the mines in Norrbotten County have airports located nearby, while most mines in Västerbotten County are located significantly farther from the nearest airport. Here again there are good reasons to review the transfer system between airports and mines, so that those

commuting long distances by air do not waste time because of poor intermodal scheduling. Reviewing the departure times for flights from Stockholm to airports in the mining counties is, in many cases, also necessary to create realistic ways of commuting long distances to work. Commuting from Norway and Finland to the mines in Sweden should be considered an option. There are many potential commuting destinations for the mines in Norrbotten in particular. Here, from a national travel perspective, considerable initiatives would be necessary to achieve the coordination and cooperation between transport system actors that would make the scheduling of commuting to work at the mines feasible.

Initiatives for further analysis

This analysis has identified what is, relative to the country as a whole, a small share of commuting across municipal boundaries, deficient road quality, a railroad system with high capacity utilisation, and a shrinking and ageing population base in the inland areas. However, there are positive aspects worth noting as well, such as a growing population base along the coast, an expanding mining industry, and growing tourism, all of which are predicated on high accessibility.

The present analysis has identified a number of deficiencies that should be taken into consideration in facilitating commuting. Actions can and should be taken at various levels. The national level has its particular tools, as do the regional and local levels. It is mainly action at the national level that will be discussed below, from the perspective a transport policy whose objectives are to ensure that the design, function, and use of the transport system will help provide everyone with basic transport of high quality and usability, and to bolster growth potential throughout the country. No socio-economic profitability assessments of these actions have been performed. The list should therefore be viewed more as a list of starting points for future analyses, perhaps from a public policy sustainability perspective.

- Review the consequences of reduced speed limits on the road system. This could potentially lead to a conflict between accessibility and traffic-safety goals.
- Research the conditions for expanding the railroad system.
- Consider more flexible funding of various travel solutions.
- Consider increased funding for the expansion of flexible public transport solutions.
- Consider increased funding for unprofitable air travel services if they can be adapted to meet the demand for work commuting.
- Review the intermodal coordination of the transport system for the region's particular conditions and assumptions in the regional transport supply programmes.



Transport Analysis is a Swedish agency for transport policy analysis. We analyse and evaluate proposed and implemented measures within the sphere of transport policy. We are also responsible for official statistics in the transport and communication sectors. Transport Analysis was established in April 2010 with its head office in Stockholm and a branch office in Östersund.