# Stokab, a socio-economic analysis
## *Summary*

### 16 billion SEK in socio-economic return

For almost 20 years, the City of Stockholm, via Stokab, has strategically invested in the development of an open, operator-neutral fibre network for everyone. Many articles and reports have been written on this, but primarily from a journalistic perspective. However, no research studies were until now available on the economic effects which Stokab generates for Stockholm. Acreo Swedish ICT has therefore carried out a study. The study shows that these investments have achieved the desired effects on the city's IT development and the establishment of IT-related activities, but also that they have generated significant economic benefits for society, enterprises and citizens.

The final report *"Stokab, a socio-economic analysis"* describes the Stokab model and its effects on the different stakeholders, analysing Stokab's own economy, cost savings for the municipality and the county administration, as well as benefits for businesses and end users. Moreover, Stockholm is compared to Copenhagen, which has conditions similar to Stockholm, but where the municipality has not taken an active role in the city's fibre network.

The socio-economic return on Stokab investment in fibre infrastructure is estimated in this study to over 16 billion SEK, or €1.9 billion at the current exchange rate. This result is based on a few quantifiable effects alone and we expect the actual return to be considerably larger.

### Acreo Swedish ICT and study methodology

Acreo Swedish ICT is a research company that develops competence in electronics, optics and communication technology and has as a goal to turn research into commercially viable products and processes. Acreo is owned 60% by the Swedish government and 40% by the Swedish industry (hardware and software companies).

Acreo conducts several scientific socio-economic studies regarding fibre and broadband. One example is a study on the socio-economic impact of FTTH carried out on behalf of the Swedish government's Broadband Forum (*Bredbandsforum*). The study focuses particularly on fibre deployment impact on employment, the value of fibre for the individuals as well as the cost-savings made possible thanks to fibre. Recently, the European Commission has commissioned from Acreo a review of the Commission's *Guide for Broadband Investment*.

### The Stokab model

Stokab owns and is responsible for the passive fibre network, while market players operate and deliver services over the network. Stockholm city's basic idea is that IT infrastructure should be available to the whole society, public sector, telecom operators, and other businesses alike. Therefore Stokab's network is designed to facilitate competition and the fibre network is open to everyone on equal terms.

The aim of the network deployment is to create an ICT infrastructure that allows competition by giving telecom operators and other companies and organisations access to the infrastructure. This vision differs from the prevailing opinion in the rest of Europe where fibre and broadband networks are often considered as a network for telecom operators. Stokab, however, has now inspired several municipal and regional fibre networks throughout Europe and the world, and the open network model is becoming increasingly appreciated. Stockholm is often cited as an IT world-class city.

Besides passive fibre lines, Stokab provides physical space in nodes equipped with power, cooling, etc. Stokab's fibre network connects almost all multi-dwelling units and commercial properties in the Stockholm municipality: about 90% of households and almost 100% of enterprises have the possibility to sign up for a fibre-based connection.

An extensive backbone network connects industrial areas, all major healthcare facilities and urban centres in the region. The fibre network is available in all parts of the municipality and as an extensive interconnecting network in the region. With its 1.25 million kilometres of fibre, Stockholm is one of the world's most fibre developed cities.

Since the company's inception in 1994, the passive network structure and the business model have been designed to enable all stakeholders to define their own network structure. The lease of the network can expand as well as shrink based on a player's need.

In 2012, Stokab had over 100 telecom operators and more than 700 companies/organisations as customers. These can directly lease fibre from Stokab to deliver services in competition, without the services being related to the infrastructure. Virtually all telecom operators in Sweden have facilities in Stokab network nodes. National and international fibre connections reach Stokab nodes so that all operators can gain access to links throughout Sweden and the rest of the world, through virtually any operator.

### Stockholm, an IT-city
It is no exaggeration to state that Stokab had great importance for Stockholm's businesses and IT-development. Without Stokab's fibre network, science parks like Kista, north of town, would probably not have developed into what today's success: Kista Science City, for instance, has more than 1,000 ICT companies and around 24,000 employees, as well as 6,800 university students and 1,100 researchers within ICT. It is an attractive environment for ICT companies and developers so it is not surprising that all major IT and telecom companies have offices in Kista, as well as universities and research institutes like Swedish ICT.

The fibre network has also facilitated innovations and new enterprises such as Spotify, Klarna and Skype. Media companies have also being able to produce television in a whole new way.

### Profit enables investments
For the past 20 years, Stokab has invested an average of more than 250 million SEK per year, to total **5.4 billion SEK** up to 2012. This investment has been possible thanks to the profits generated by Stokab. The accumulated profit reached break-even in 2001 and has now passed **1 billion SEK**. The profit has until now been low compared with the investments, due to the heavy upfront investments required in the initial phase. From the year 2005, however, returns have increased steadily which has enabled further major investments. It is worth mentioning that the fibre network was built without tax funds and was instead financed via revenues and loans.

### A neutral fibre infrastructure stimulates the market
Through an extensive open fibre network provided by a neutral player, telecom operators can lease and design their own fibre networks without having to make costly investments or leasing from a competitor. Today, to lease fibre in Stockholm costs less than half (sometimes much less) than in other capitals around the world. This translates into lower costs not only for operators but also for all enterprises that have a need for fast and reliable communications. Lower prices also propagate down the value chain and stimulate new services and entrepreneurship.

The fibre network also delivers a wide range of indirect effects on society. It enables, for example, the use of cloud services, videoconferencing, healthcare, distance education, and other bandwidth-hungry services like HD-TV, video on demand and other streaming media. Moreover, innovation power is unleashed when both small businesses and households have the same access to broadband connectivity which previously was only available to large companies.

### Lower broadband prices to enterprises
Since telecom operators compete on equal terms, competition is fierce in Stockholm, which leads to lower prices for broadband, compared to cities where competition is weaker. Savings due to lower broadband costs for companies are estimated to approximately **75 million SEK per year** if compared to Copenhagen. The difference becomes even more significant when other European cities are used as benchmark.

## The role of housing companies in broadband development

Stockholm city's housing companies have had a major role in the development of broadband. Early on they adopted a broadband policy to connect their properties to Stokab's network and to install fibre all the way to each apartment. They are also installing home networks inside the apartments with outlets in every room. Through collaboration models, they have inspired other property owners of multi-dwelling units to join Stokab's network. The housing companies' accumulated investment now amounts to **nearly 2 billion SEK**.

   Building a property network has also other merits beyond the mere delivery of broadband services to the tenants. Since the property owners connect all parts of the property, the communications network can even be used for managing, monitoring and measuring the facilities.

## Increased property value

By connecting multi-dwelling units with fibre, property owners have been able to more effectively use the control and automation services, electronic locks, surveillance etc, while at the same time being able to raise the rent as the fibre connection has given tenants an added value. Until now, fibre connectivity has led to a use value for the tenants and a higher property value for municipal housing companies in Stockholm (nearly 100,000 apartments) of **1.85 billion SEK**, as well as increased rental revenues of over **30 million SEK per year**. These effects cover the housing companies' investments almost in full and are expected to grow in the coming years.

## 4G/LTE deployment

Generally, when building a 4G/LTE network, 70-80% of the total cost derives from deployment of fibre infrastructure. In principle, each base station needs to be fibre connected to sustain the high 4G/LTE capacity. Leasing the needed fibre connections instead of investing in an own backhaul network can significantly reduce the deployment cost for 4G/LTE. The world's first 4G/LTE network was installed in Stockholm. Net4Mobility (jointly owned by operators Telenor and Tele2) states that 4G/LTE would have never been launched in Stockholm if the necessary fibre had not been available to lease form Stokab. Today, four extensive 4G/LTE-networks are present in Stockholm.

## Savings for Stockholm's local governments

Since Stockholm City and Stockholm County have been able to connect their premises with fibre, it has become possible to purchase data and telecommunications services on an open market. This has generated a cost saving for the municipality and for the county of **about 2 billion SEK** in the years 1996 – 2012.

## Supplier industry activity

Stokab procures the deployment, operation, materials, planning, etc. from the private market. The procurement process and the large investments made over the years have generated an economic activity that is estimated to **over 5 billion SEK** in the supplier industry.
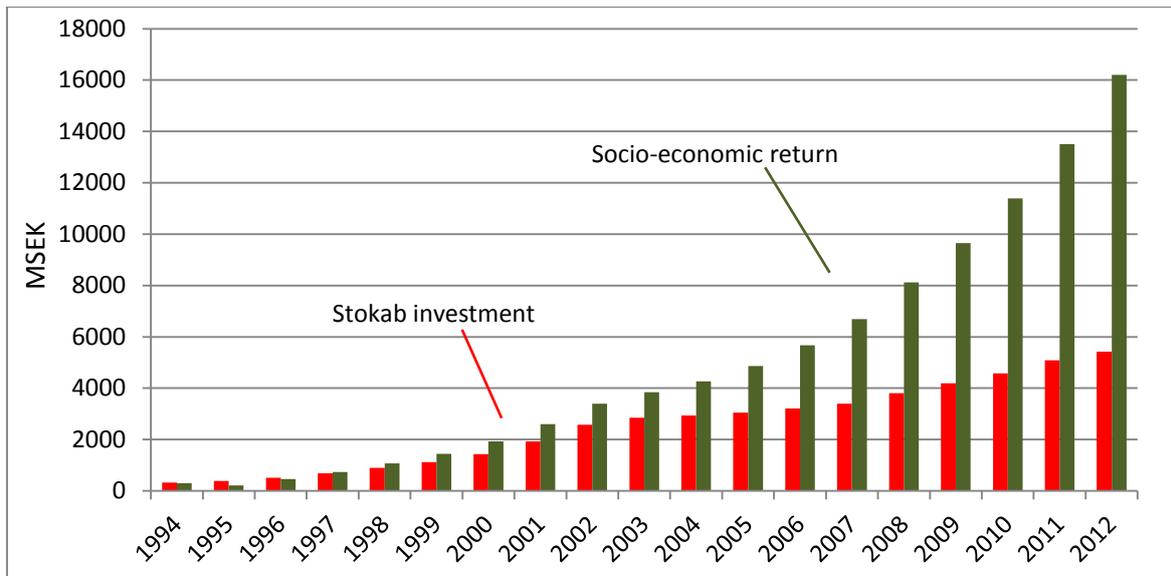
## Employment

Several studies show that high-capacity broadband leads to growth and jobs creation (beyond the above-mentioned short-term economic activity generated in the supplier industry), e.g. through the development and use of advanced services and products, as well as higher ICT competence, which in turn leads to increased productivity and entrepreneurship. According to Acreo's econometric model, the "job value" which the fibre network has created in Stockholm is estimated at about **7.7 billion SEK**.

## Returns three times greater than investments

Based on the effects discussed in the study, the benefits of Stokab sum up to nearly three times the investment. Since only a few factors have been calculated, the total return on the investment is likely to be considerably larger.

   The figure on next page shows, in million SEK, the accumulated investments (red) and the socio-economic return (green) calculated as the sum of: increased property value and revenues for the municipal housing companies, added value for their tenants, increased employment, Stokab's return, saving for local governments' ICT costs, as well as the increased economic activity in the supplier industry.

## Stockholm vs. Copenhagen

Stockholm and Copenhagen are relatively similar in terms of size, population and economy. It is particularly interesting to compare the broadband situation in the two cities, since diametrically opposite conclusions were reached in connection with the deregulation of the telecom market, as to who should own the ICT infrastructure and how this should be organised.

Stockholm chose, as already described, to view the ICT infrastructure as something that should be accessible to everyone and be delivered by a neutral player in order to create competition. Copenhagen opted, like most of Europe, to see the ICT infrastructure as the direct prerogative of the market and telecom operators. This has resulted in the incumbent player TDC being the one who owns and controls most of the ICT infrastructure in Copenhagen.

After about 20 years, it is interesting to see what differentiates the two cities. Regarding the development of the fibre network, barely 20% of multi-dwelling units in Copenhagen are connected, to be compared with more than 90% in Stockholm. This means that in Stockholm there are considerably more people that can get high speed broadband, and the cost for a broadband provider to reach customers is lower because the passive infrastructure (representing around 80% of total investment) is already there. Even the price of dark fibre, the basic ICT infrastructure, is significantly lower in Stockholm than in Copenhagen for both consumers and enterprises.

While in Stockholm all those who need fibre can design their network structure themselves, in Copenhagen the design possibility is heavily limited because the dominant player chose to build a the network frugally, and designed to meet their own service-delivery needs. The result is a fibre-poor network, which decreases flexibility and design possibility drastically for other operators.

The low level of fibre deployment in Copenhagen also affects the possibility of symmetric high-speed broadband connection. Hence, while broadband at 100 Mb/s speed both downstream and upstream is common for the majority of residents in Stockholm, it is virtually impossible for households in Copenhagen. Moreover, the price of an asymmetric broadband connection (with low upstream speed) in Copenhagen is almost twice the price of a symmetric broadband connection (with high upstream) speed in Stockholm.

This has also a strong impact on the business climate, as the possibilities for data communication are crucial for the business creation. It is symptomatic for instance, that more and more international enterprises have chosen to locate their Scandinavian headquarters in Stockholm: in 2009, Stockholm had 69% more establishments than Copenhagen (compared to 10% in 2006).

*marco.forzati@acreo.se*
*crister.mattsson@acreo.se*