



UCL

PROJECT PROFILE

Sweden

THE ORESUND LINK

omega centre

Centre for Mega Projects in Transport and Development

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A INTRODUCTION

Type of project

Öresundsbron (the Oresund link) is a four-lane motorway and rail (two tracks) bridge/tunnel across the Oresund between Copenhagen and Malmö, with associated motorway and railway connections.

The track width is 1435mm.

Figure 1: The Oresund link



(source: Bridgephoto.dk)

Principal transport nodes

Train: Kastrup international airport; Copenhagen central station (western Denmark, Hamburg); Malmö central station (Gothenburg - west coast, Lund - Hassleholm-Stockholm).

Roads: E6/E4 (Gothenburg/Oslo, Stockholm); E22 (Lund – Hassleholm – Kristianstad), E20 Trelleborg (ferry lines to northern Germany and Poland); E47/A1 (Copenhagen - Hamburg). E55/A19 (Rostock – central Germany); E20 (Western Denmark).

Major associated developments

Infrastructure

Malmö: Directly locally associated: *Yttre ringvägen* (the outer ring road) from Lockarp (this section of the connecting motorway was not part of the Oresund link contract). Upgrading of existing tracks from Malmö Central station to Lockarp. *Citytunneln* (the city tunnel), underground railway with three stations beneath central Malmö (construction began in 2005, was completed in 2010). Indirectly connected: Upgrading of the west coast mainline railway and the southern mainline railway connecting Malmö with Gothenburg and Stockholm.

Copenhagen: Directly locally associated: The Metro (driverless light rail system, construction commenced in 1997 and the first line was completed in 2002, one additional line was completed in 2007 and construction of more lines is currently ongoing or in the planning stage). Indirectly connected: Upgrading of railway between Odense – Hamburg (electrification and double tracks). Fixed link across the Fehmarn Belt.

Sources: Falkemark (1993), www.Jarnvag.net, www.m.dk,

Housing, retail and workspace development

Malmö: The area in direct proximity to the link south of the city was in the initial planning documents referred to as Bridge City (*Brostaden*, figure 2). It has since been divided into smaller entities but on an aggregate level this area is the site for major development plans, involving housing, working and retail space. In the comprehensive plan from 1994 it is estimated that 5,000–10,000 housing units and 7,000-10,000 jobs will gradually be created here between 1994 and 2015. In figure 4 the main exploitation areas are shown, the yellow areas outlined with boxes are the first to be developed while the other yellow areas indicate development in later stages.

Sources: Malmö City (1994), Malmö City (2004)

Copenhagen: Örestad – an entirely new urban area – is being built on the island of Amager. Development commenced in the mid-1990s and it is expected that some 80,000 jobs and 20,000 housing units will gradually be created here over the next 20 years. In figure 3 the current development proposal is shown. The figures on the map indicate sites where the Port & City Development Corporation has entered sales agreements with companies and other institutions and organisations.

Source: Facts on Örestad, available at www.orestad.dk

Figure 2: Örestad and Bridge City (Brostaden)



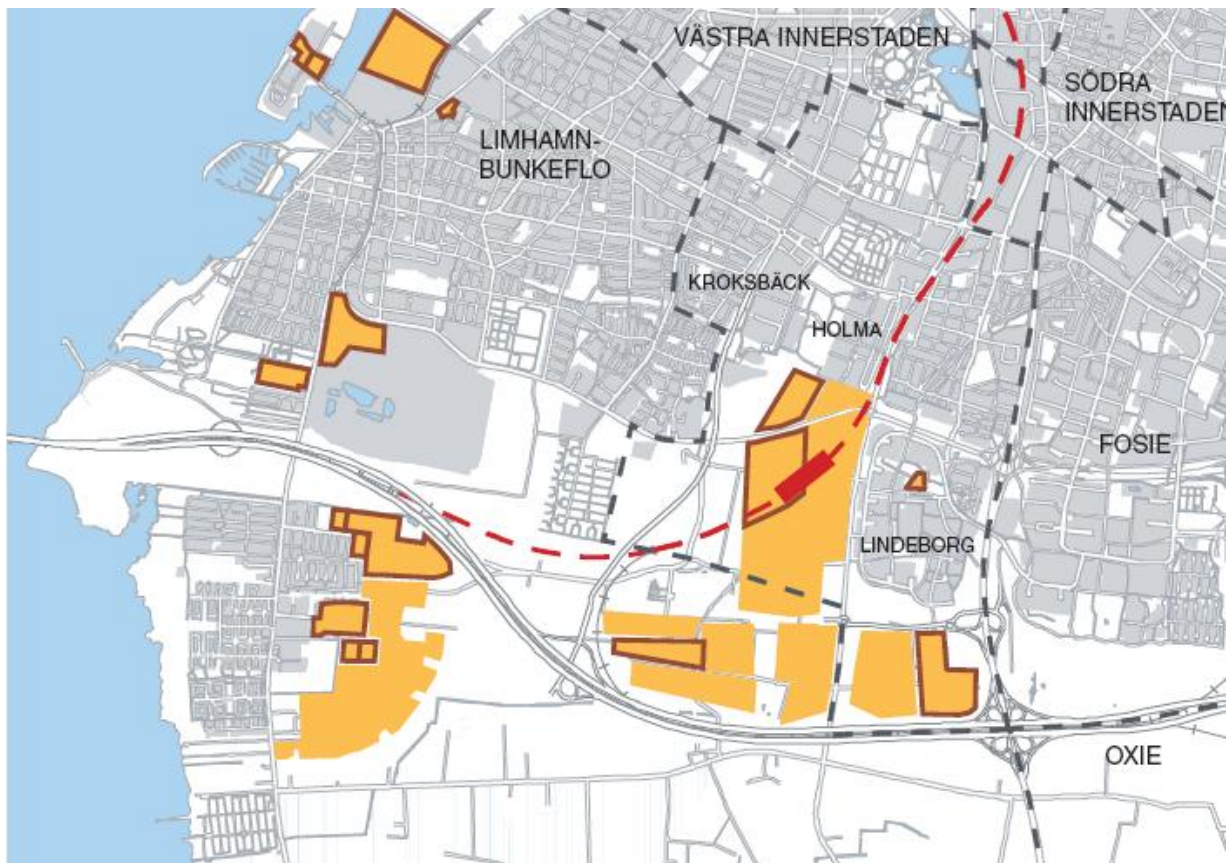
(Source: The Oresund region, available at www.orestad.dk)

Figure 3: The current development proposal for Örestad



Source: Port and City Development Corporation (2008)

Figure 4: The development plan for southern Malmö



Source: Malmö City (2004)

Parent projects

The Oresund link was one of the key projects of the EU's Trans European Network (TEN). It was also a major element of the Scanlink proposal forwarded by the European Round Table of Industrialists, which aimed to improve communications between the Hamburg region and the southern and central parts of Scandinavia.

Sources: Petersen (2004), Falkemark (1999)

Country/location

Bridge/tunnel between Copenhagen, Denmark and Malmö, Sweden.

Figure 5: The wider region



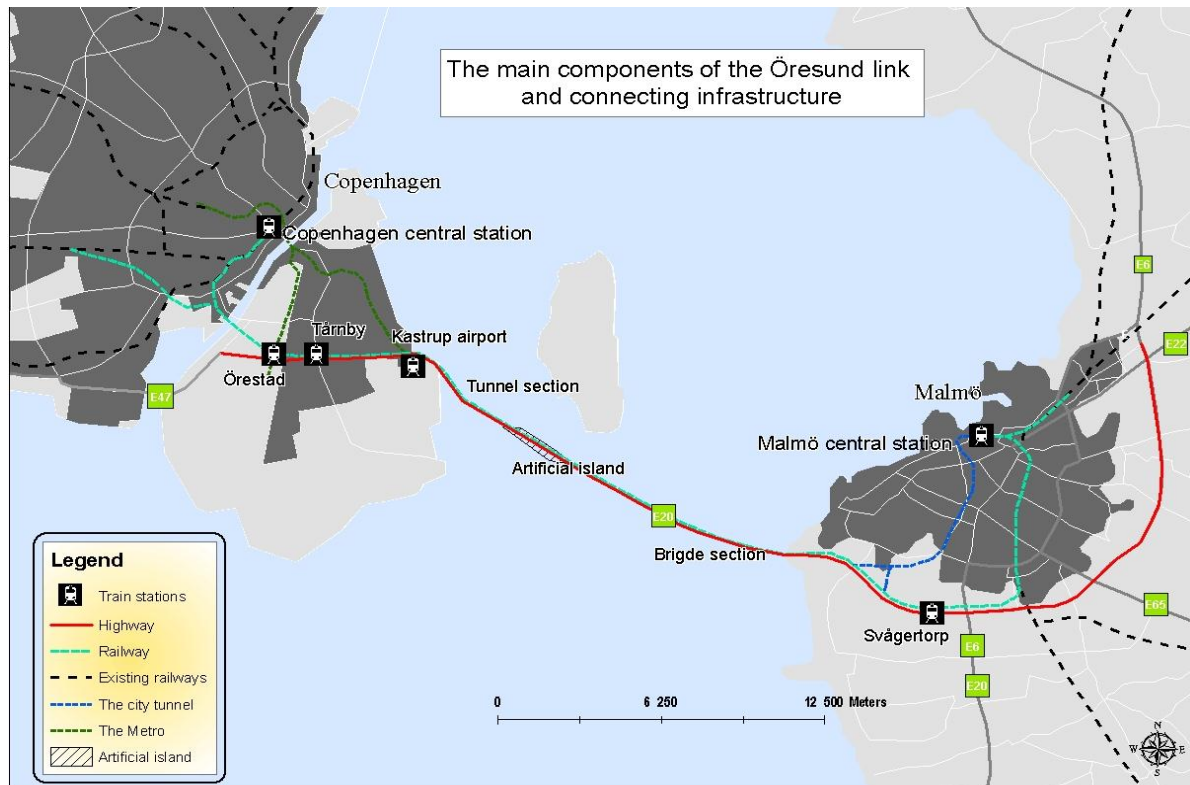
The Øresund Region.

The Øresund Region comprises Zealand, Lolland – Falster and Bornholm in Denmark and Skåne in Sweden. The region's two centres, Copenhagen on the Danish side and Malmö/Lund-Trelleborg on the Swedish side, both border Øresund.



Source: The Oresund Consortium (2005)

Figure 6: The main components of the Öresund link and connecting infrastructure



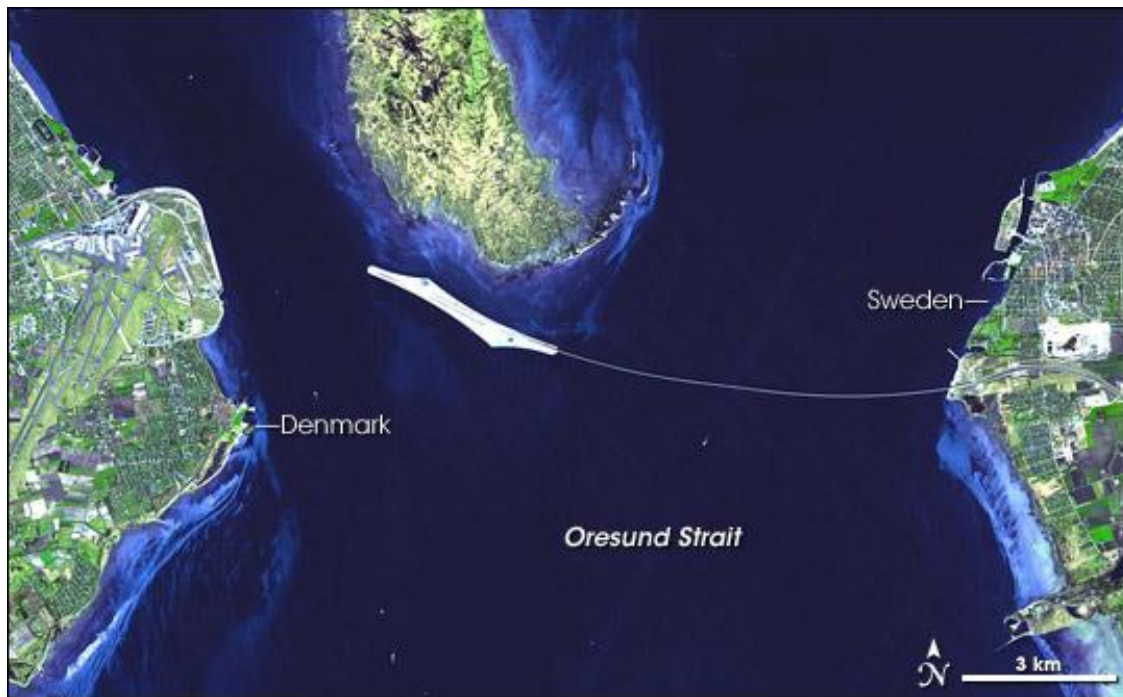
Source: Lantmäteriet

Current status

Sweden: *Yttre ringvägen* (Outer ring road) – motorway around Malmö (completed); railway tracks from Sege å to Malmö central station to Fosie – upgrading of existing railway (*kontinentalbanan*) (completed); A road and railway corridor from Fosie to Lernacken – motorway and double track railway and station at Svågertorp (completed); the City tunnel (completed).

Denmark: Motorway connection to E20/E47 (completed); double railway track from Kastrup to Copenhagen central station and Vigerslev marshalling yard (completed); the Metro – driverless light rail system (the section shown on the map in figure 7 is completed, further extensions of the system are currently under way).

Figure 7: Aerial view of the project



B PROJECT BACKGROUND

Principal project objectives

Several key objectives can be identified, it should however be noted that a primarily Swedish perspective is applied. It was probably the case that different actors had dissimilar objectives, Blomquist & Jacobsson (2002: 51) for instance identify a discrepancy between national and regional/local objectives in the Swedish debate. It is perhaps also possible to identify a shift in the perception of the function of the link over time. In the early 1980s the lobby organisation European Round Table of Industrialists (ERT), comprising several important business representatives, argued for a fixed link in its ScanLink proposal. The ScanLink proposal, which did not specify where in the region the link should be built, was met with scepticism from several directions since it was perceived as a highway project that would produce substantial amounts of heavy transit traffic. At this stage the perception of the character of the project could probably be described more as an international transportation route, connecting the Swedish part of the Scandinavian Peninsula with the European mainland. This vision was mainly criticised on environmental terms, but another reason for the unpopularity of the proposal was that the rationale of the ERT proposal was based on the concept of 'just in time' production in order to strengthen the competitiveness of European industry. An effective transport system, allowing for smooth road transport was the stepping stone of 'just in time', but this vision also implied outsourcing of production and consequently the loss of jobs from a national perspective.

In the later part of the 1980s a shift in focus can be noticed. The notion of 'a fixed link to the continent', alluding to the European mainland was still an important argument but the ideas of regional development and cross-border regions were becoming more important.

See for instance Andersson (1989) and Cavalli-Björkman (2004).

A broad summary of the key objectives:

- a part of the ScanLink proposal which meant to improve communications in northern Europe, from Hamburg to Oslo;
- regional development as an answer to the intensifying globalisation process and Sweden's decision to apply for membership of the European Community;
- connecting the two largest cities of the region, which were both experiencing economic difficulties;
- improving communications to Kastrup airport, the main flight transportation hub in the region.

Sources: Blomquist & Jacobsson (2002), Wieslander (1997)

Key enabling mechanisms and decisions to proceed

The decision-making process was very lengthy and complex. It is possible to trace the process back to the middle of the 19th century when the first proposals for a fixed link were presented. Since the 1950s a great number of investigations and reports (more or less realistic and/or politically feasible) about the benefits of a fixed link across the Oresund were produced in both Sweden and Denmark. An agreement to build a fixed link was signed by the governments in 1973, but the energy and economy crisis, as well as Denmark's decision to join the EC and increasing environmental awareness meant that the plans came to a halt. The description below only treats the decision process from the early 1980s to the

commencement of construction in 1995 and, given the complexity of the issue, it focuses chiefly on the main events of the Swedish decision process.

Description of key mechanisms which enabled the project to proceed

Several different factors on different geographical scales played an important part in enabling the project from the mid-1980s onwards. The economic problems in both Copenhagen and Malmö can be traced back to the globalisation process which caused lots of problems for the industrial sector. A fixed link between the two major cities in the region was viewed as a means of renewal by the leadership in both Copenhagen and Malmö. The end of the cold war and Sweden's negotiation for membership of the EC (Denmark had become a member in 1973) implied a new regional balance where the Oresund region could play an important part, not only in increasing trade with the new markets in northeastern Europe, but also as an important transportation route between Scandinavia and western Europe (the link was one of the prioritised infrastructure projects under the EC Trans European Network programme). The Danish decision to build a fixed link across the Great Belt and a commitment to a fixed link across the Fehmarn Belt in the future was thus very important.

Nationally the decision to finance outside of the state budgets meant that a project of this magnitude could be carried out without consuming the entire budget grants for transport infrastructure investments. The findings from the environmental investigations were also of fundamental importance: to reach what was perceived to be a satisfying solution to environmental concerns was crucial to the decision-making process. The main environmental issues were the effects of a fixed link on the water flow from the North Sea to the Baltic Sea, the effects of increasing traffic and issues of land use. A number of investigations were carried out on each side of the Sound, but a fact that caused much conflict and criticism was that the actual environmental inquiry which tested the project against existing environmental legislation did not take place until after the agreement to build the link was signed¹. This meant for instance that the construction of the connecting land use interfaces on the Danish side started before the Swedish decision-making process was completed. This has led several commentators to reach the verdict that the environmental inquiry was symbolic, or mock processes rather than an objective inquiry of the actual environmental impacts.

Sources: Falkemark (1993), Falkemark (1999), Blomquist & Jacobsson (2002) and Wieslander (1997).

Processes/events leading up to decision and date of decision

In 1984 the ERT presented the report, 'Missing Links', arguing for extensive improvements to the European transportation network. According to the report a fixed link between Sweden and Denmark somewhere across the Oresund was essential to improve communications between Northern Europe and the Scandinavian Peninsula.

In 1984 an Oresund delegation (OD), consisting of political secretaries from the department of communications, the department of finance and officials from the national road and railway administrations, was appointed by the Danish and Swedish governments. The task of the OD was to review earlier investigations and reports produced during the 1960s and 1970s to see if it was possible to use this material as a basis for developing a new project proposal.

In June 1985 the delegation presented the first report, *Öresundsförbindelser*. It proposed a railway tunnel between Helsingborg and Elsinore in the northern part of the Sound, and a

¹ Differences between Swedish and Danish infrastructure planning procedures and environmental legislation meant that this was mainly the case in Sweden.

road bridge between Malmö and Copenhagen. Regarding financing it was agreed that the project had to be financed outside the state budgets and to be profitable on business economic (rather than socio economic) terms.

In May 1986 the OD started discussing the effects a fixed link would have on the water flow in the Sound. This issue would become central to the investigation work and the decision-making process.

In June 1986 the Danish Parliament decided to build a fixed link across the Great Belt, which removed a Danish domestic policy lock regarding an agreement on a fixed link across the Sound.

Sources: Falkemark (1993) & (1999), Blomquist & Jacobsson (2002)

Between 1987 and 1989 a number of reports were published by the OD, investigating and presenting different alternatives for building a fixed link between Sweden and Denmark. Altogether the OD produced 46 volumes between 1984 and 1991 (which are kept in the national archives), thus the investigation material was very substantial. One of the most important of these reports (at least from a Swedish perspective) was *Fasta Öresundsförbindelser* (SOU 1987: 41), presented in July 1987.

In this report different alternatives were singled out and compared. The first was a four-lane motorway bridge between Copenhagen and Malmö and a single-track railway tunnel between Helsingborg and Elsinore. The second was a combined four-lane motorway and double-track railway bridge between Copenhagen and Malmö. The third was a four-lane motorway bridge and a double-track railway tunnel between Copenhagen and Malmö.

The combined road and railway link was recommended by the OD on three grounds: it was the best solution from an economic viewpoint given the evaluation of traffic volumes at the time; it would connect the two main cities of the region with an efficient collective transport system; and it would improve communications with the international airport of Copenhagen.

The social democratic leadership of the Swedish government were strong proponents of the combined road and railway link between Copenhagen and Malmö, but there were deep rifts within the party and the issue caused lots of controversy. During the 30th social democratic party congress held in September 1987 the issue was hotly contested. Many within the party were highly sceptical toward the alternative favoured by the leadership, a commonly preferred alternative consisting of the railway tunnel between Copenhagen and Malmö. The referendum regarding the leadership's proposal was postponed and an internal study group responsible for further investigations was appointed.

Between 1987 and 1990 the OD continued investigations. In February 1989 another report (*Fasta Öresundsförbindelser*, SOU 1989: 4) was presented, narrowing down the alternatives to either a combined road and railway link or a railway tunnel between Copenhagen and Malmö. Two fundamental premises were guiding the investigative work of this report: the condition that no state budget grants should be used (business economic profitability); and that the structure of the link should not affect the water flow in the Sound. The OD did not reach a clear conclusion regarding which alternative to prefer given these premises, the tunnel alternative was judged to be somewhat better from an environmental perspective while the combined alternative was judged to be somewhat better from an economic perspective (although there was disagreement over the latter conclusion between the Swedish and Danish members of the delegation).

In April and May 1990 the social democratic party held referendums that finally settled the matter. On 20 April the party leadership (the government) voted in favour of the combined

road and railway link between Copenhagen and Malmö and the social democratic members of parliament followed suit on 15 May. This gave the government authorisation to begin negotiations with their Danish counterparts.

Sources: Falkemark (1993) & (1999), Blomquist & Jacobsson (2002), Prop 1990/91: 158, SOU 1987: 41, SOU 1989: 4, interview with Gunnel Färm 080124

Another important factor was negotiation with the Danish social democrats, who, although not in government at the time, were seen as crucial actors. Unless the Danish social democrats were positive about the project there was no way for the government in power to secure support for the proposal in the Danish parliament.

An important strategy of the Swedish social democratic leadership was to argue for the fixed link as a railway project. This was seen as the best way to challenge critics both within the party and in general, who were opposed to the project on environmental grounds. The railway was also an important argument to make the Danish social democrats change opinion in favour of the project.

The Swedish vision of a fixed link also included that a fixed link would later be built across the Fehmarn Belt. This was not seen as an urgent matter by the Danes since it would imply increased competition, and thereby a financial challenge to the link across the Great Belt.

One central issue of the debate concerned railway goods. For the officials within the Swedish National Railway Administration the fixed link across the Oresund would not imply any strategic improvement unless a promise of a link across the Fehmarn Belt was also discernable somewhere along the line. To send railway goods across the Oresund and then across the fixed link at Great Belt would entail a detour of some 160km, making transport to the Hamburg area around three hours slower than the transport routes in use at the time.

Apart from concerns over the economy of the Great Belt link there was also an outspoken dislike of a motorway link across the Oresund among the leadership of the Danish social democrats. The general opinion seemed to favour a railway tunnel, but the opinion would however eventually swing in favour of the combined road and railway link after intense pressure from the Swedish delegation. The main bargaining strategy of the Swedish delegation was to threaten to use giant ferries on the Trelleborg – Northern Germany route for shipping railway carriages, which would be a severe setback for the economy of the Great Belt link. The negotiations finally resulted in a compromise where the Danes agreed to the alternative with a combined road and motorway between Copenhagen and Malmö, while the Swedes agreed to guarantee a certain amount of railway goods transport through Denmark each year. The Danes also agreed to include a commitment to a fixed link across the Fehmarn Belt some time in the future. In early April 1990 a referendum held in the Danish social democratic leadership voted in favour of the combined road and railway link between Copenhagen and Malmö.

Source: Falkemark (1993)

In 1990/91 the parliaments in the respective countries processed propositions regarding financing of the fixed link and the adjoining infrastructure investments on land. It was decided that the latter must be financed by the surplus from the tolls on the former. No budget grants should be used in either country for the project.

During the same period the negotiations between the Swedish and Danish delegations were intensifying. Since informal agreements on the alignment and the rough shape of the link had been reached, the outstanding issues regarded financing. These were matters of hard negotiations, not only between the Swedish and Danish delegations but also between

different departments within the governments. In the Swedish government there was for instance deep disagreement between the department of communications (DOC) and the department of finance (DOF), in which the latter blocked many proposals and agreement texts. A principal issue was the pricing mechanisms for road and rail traffic. The Danes were adamant that the pricing mechanism for road traffic should be based on the ferry taxes. This was not a popular demand with the Swedish DOC or DOF. Regarding the fees for rail traffic, negotiations between the Swedish and Danish delegations resulted in a model with a fixed price paid by the two countries' National Rail Administrations. This model was also criticised by the Swedish DOF.

Within the Swedish administration there was also a conflict between the DOC and the DOF regarding how to deal with financial costs arising from the proposed state guaranteed loan model. The Swedish department of finance insisted that the guarantee fees that this model would entail should be added to the project cost, while the DOC disputed this since it would mean that the project cost would increase substantially. Finally the question was settled in favour of the DOC through a direct intervention by the Prime Minister.

Source: Falkemark (1993), interview with Jonas Bjelfenstam 080317.

On 23 March 1991 Kajlkast, the Danish minister of traffic, and Georg Andersson, the Swedish minister of communications, met in Copenhagen and signed an agreement obligating the Swedish and Danish governments to build a fixed link between Copenhagen and Malmö. The agreement stated that the two states agreed to construct a four-lane motorway and double-track railway link between Malmö and Copenhagen, which should consist of a combined road and railway bridge, an artificial island and a tunnel. The agreement also stated that the two states should each form a state-owned stock company. The two companies should in turn form a consortium responsible for projecting, planning, financing, constructing and operating the fixed link. The two states agreed to act as guarantors for loans taken by the consortium and pledged to share responsibilities towards creditors. The loans should be repaid by revenues from user fees. The agreement also explicitly stated that additional funding from the state budgets of the respective countries was not an option. Construction was set to commence in 1993 and be finished by the year 2000.

In summer 1991 both parliaments voted yes to the proposal to build a fixed link consisting of a combined road and railway bridge and tunnel between Malmö and Copenhagen. The agreement was ratified by both governments in August. Although the agreement was signed and ratified in both countries the project was still very controversial in Sweden. It was above all the fact that the agreement to build the link was signed and ratified before the actual EIA was carried out that provoked the opponents. The agreement did not give any detailed description of the design of the link or how construction work should be carried out; it only stated that construction must be carried out in a manner that is ecologically motivated, technologically possible and economically feasible.

Sources: Falkemark (1993) & (1999), Prop 1990/91: 158

In August 1991 the Swedish government decided on the procedures for the environmental assessment. The size and scope of the project implied that the government had to act as the final court of appeal regarding the applicability of the project vis-à-vis environmental legislation. This meant that in practice the Swedish National Board for Environment Protection (*Koncessionsnämnden för miljöprövning*) had to make a synthesis of the reports from the different authorities and other concerned actors and act as juridical instance for the application.

In the elections in September 1991 the social democrats lost power to a coalition under the moderate party. The minister of environment of the new government was the party leader of

the centre party, whose members and leadership were very negative towards the plans for a fixed link.

In January 1992 the Öresundsbros consortium (OC) was formed. Ownership was split equally between the Swedish and Danish states. The OC was responsible for performing the environmental impact assessment (EIA), projecting, financing, negotiating contracts, constructing and operating the fixed link.

In July 1992 the OC delivered an application for permission to build and operate the fixed link. The application, including the EIA, comprised some 40 reports, over 4,000 pages altogether.

The Swedish National Board for Environment Protection (SNBEP) rejected the application in January 1993 on the following grounds: the project might harm the ecologically sensitive Baltic Sea; it might also harm the immediately surrounding sea, which was an important fishing area of national interest; and finally it was viewed as counter-productive regarding strategies towards an environmentally adapted transport system. The competence of the SNBEP regarding the question at hand was however questioned and the government decided that the errand should be turned over to the Water Rights Court (WRC), a juridical instance that was deemed to have sufficient expertise in the area to make a decision on the issue.

In November 1993 the WRC approved the application on the condition that the finished structure did not affect the water flow between the North and Baltic Seas. This became known as 'the zero impact solution', and as a result the OC had to adjust the construction plans and submit these to the WRC again. An agreement between the parties of the government was made, which implied that if the WRC approved the application this time the project would be also be approved by the government. The centre party, whose leadership and members in general were very negative toward the fixed link, agreed to this on condition that they reserved the right to opt out without having to leave the government if the answer should be positive.

In February 1994 the OC handed over the revised plans and on 16 June that year the government gave permission for the project to proceed. As a result the minister of environment stepped down from his post, but the centre party remained in the government and thus a political crisis was averted. In September elections were held and the coalition lost power to the social democrats.

After the decision to proceed, the errand was once again handed over to the SNBEP and the WRC, who were responsible for establishing the technical specifications of the approval. In summer 1995 both authorities were finished and thus construction could commence in the autumn of that year.

Sources: Falkemark (1993) & (1999), Blomquist & Jacobsson (2002), Prop 1990/91: 158.

Key decision-makers

Sweden

National Government: Ingvar Carlsson – Prime minister 1986–1991 & 1994–1996; Sven Hulterström – Minister of communications 1985–1989; Georg Andersson - Minister of communications 1989–1991; Ines Uusmann – Minister of communications 1994–1998; Birgitta Dahl – Minister of energy (and environment) 1982–1991; - Carl Bildt – Prime minister 1991–1994; Olof Johansson – Environmental minister 1991–1994; Mats Odell – Minister of communications 1991–1994; Björn Rosengren – Minister of communications 1998–2000.

Local level: Lars Engqvist – member of the municipal executive committee in Malmö and chairman from 1990–1992; Nils Yngvesson member of the municipal executive in Malmö from 1970-1990; Joakim Ollén - member of the municipal executive committee in Malmö 1983–1994. Ilmar Reepalu - Chairman of the municipal executive committee since 1994.

Denmark

National Government: Poul Schlüter – Prime minister 1982–1993; Arne Melchior – Traffic minister 1982–1986; Frode Nør Christensen – Traffic minister 1986–1988; H P Clausen – Traffic minister 1988–1989; Knud Østergaard – Traffic minister 1989–1990; Kajlkast – Traffic minister 1990–1993; Helge Mortensen – Traffic minister 1993–1994; Jan Trøjborg – Traffic minister 1994–1996; Björn Westh – Traffic minister 1996–1994; Sonja Mikkelsen – Traffic minister 1998–2000; Svend Auken – leader of the social democrats 1987–1992, minister of environment 1993–2001 & energy minister 1994–2001.

Local level: Egon Weidekamp – Mayor of Copenhagen 1976–1989; Jens Kramer Mikkelsen – Mayor of Copenhagen 1989–2004.

Sources: Falkemark (1993) & (1999), Hedegaard-Sörensen (1993), Blomqvist & Jacobsson (2002); Ministry of Traffic (2007)

Feasibility studies

Öresundsförbindelser (1985), *Fasta Öresundsförbindelser* (1987) by the Öresund delegation. *Fasta Öresundsförbindelser* (1989) by the Danish ministry of traffic, *Miljö Öresund 1991* (1991) an assemblage of previous environmental investigations made in Denmark, *Miljökonsekvensbeskrivning för Öresundsförbindelsen* (1992) *Miljökonsekvensbeskrivning för fast förbindelse över Öresund* (1994) by the OC.

Sources: Falkemark (1993), Falkemark (1999), Hedegaard-Sörensen (1993) and Blomquist & Jacobsson (2002), Prop 1990/91: 158; Interviews with: Gunnel Färm 080126 and Jonas Bjelfenstam 080317.

Main organisations involved

Pre-construction phase

Although the central governments and parliaments in Sweden and Denmark were responsible for investigations, negotiations and signing of agreements, several other organisations were important during this phase. The idea of improving communications between northern Germany and Scandinavia originated from the lobby organisation the European Round Table of Industrialists (ERT). The ERT included representatives of some of the major European corporations as well as representatives from the European Community.

Sources: Falkemark (1999), Hedegaard-Sörensen (1993)

In the public sector on the Swedish side the county administrative board (then *Malmöhus länsstyrelse*) was another quite influential regional actor in this phase. This authority serves as a regional advisory and appeal body.

The municipalities of Malmö and Copenhagen were the main actors on the local level. The main tasks were planning related tasks such as land acquisitions for the connecting land infrastructure.

A private regional actor of great importance was the Chamber of Commerce and Industry of Southern Sweden which, together with its Danish counterpart, was very active in lobbying for the fixed link.

Sources: Blomquist & Jacobsson (2002), Cavalli-Björkman (2004), Alfredsson & Wimann (1997)

A wide array of different organisations opposed to the link were organised under the umbrella organisation *Stoppabron* (stop the bridge). The organisation comprised of over 30 individual organisations ranging from environmental NGOs to the labour union.

Sources: Falkemark (1999), Dekker-Linnros (1999)

The civil servants of the department of communications (DOC) and the ministry of traffic (MOT) in the Swedish and Danish governments respectively were responsible for background investigations and reports as well as negotiations below minister level in the early stages of the pre-construction phase. Representatives and officials from the Swedish Road Administration (SRA), the Swedish Rail Administration (SRIL), the Swedish State Railways (SSR) and their Danish counterparts (DSB) were also involved in the investigations and negotiations during this phase.

In the later stages of the pre-construction phase (1987–1991) the handling of the project was shifted towards the political sphere with the leading politicians in the Swedish and Danish social democratic parties as the main players.

After the Danish elections in 1990 the social liberal party (*radikale venstre*) left the government and the remaining conservative and liberal parties in government were in agreement with the Danish social democrats regarding the link.

After the 1991 elections Sweden's new government consisted of an alliance of middle, liberal and conservative parties, which meant that the question of the link was still controversial although an agreement to build already had been signed. The environmental minister of the new government was leader of the centre party which was very negative toward the link.

The WRC and the SNBEP were the two main juridical authorities for the Swedish EIA. In Denmark the parliament was the main juridical authority deciding on the appropriateness of the content of the legal act created for the project.

Sources: Falkemark (1993), Falkemark (1999), Blomquist & Jacobsson (2002), Hedegaard-Sørensen (1993).

A great number of authorities and consultants were involved in the EIA carried out by the OC. The Swedish Meteorological and Hydrological Institute (SMHI) and the Danish Hydraulic Institute (DHI) were deeply involved in hydrological investigations. The consultant VBB VIAK conducted investigations covering topics such as sedimentary analysis of the seafloor, shape and construction methods, mapping of environmentally polluted areas on land and mapping of resources and land interest in the bridge zone. A joint venture between the consultants COWI and VKI provided investigations and impact analysis regarding marine fauna and flora. Transek, another consultant, produced traffic models. The Swedish board of fisheries investigated the marine ecosystem on the Swedish side of the Sound. IVL, the Swedish Environmental Research Institute, carried out an investigation regarding air emission effects from the link.

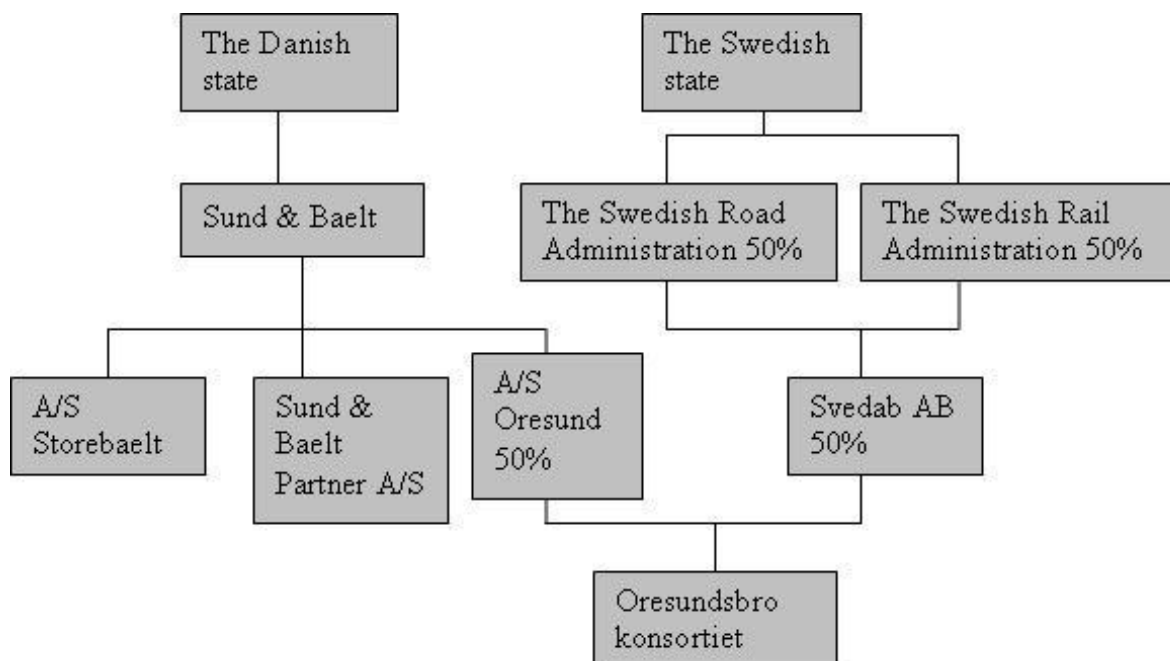
Source: The Oresund Consortium (1994)

Construction phase

After the agreement to build the link was signed and ratified by the respective countries' governments and parliaments, the OC was established. Figure 8 shows the ownership structure of the consortium. The OC was responsible for carrying out the EIA, which involved numerous consultants. It was also responsible for securing finance, projecting, construction and operation of the completed link.

Once the EIA was approved and construction commenced the Swedish Environmental Protection Agency and the County administrative board established a control and steering committee. The primary task of this committee was to monitor that the environmental impact of the construction works did not exceed the limits established in the EIA.

Figure 8: The ownership structure of the Oresund Consortium



Source: The Oresund Consortium (2007)

The OC was responsible for negotiations with the contractors. After negotiations held from July to November 1995, deals were signed with three consortia. The Öresund Tunnel Contractors, a consortium consisting of NCC AB (SE), Dumez-GTM SA (F), John Laing Ltd (UK), E. Pihl & Søn (DK), and Boskalis Westminster (NL), were responsible for the construction of the immersed tunnel section with two motorway lanes in each direction, a double-track railway and a service tunnel. The value of the contract was DKK 3.8bn.

The contract for constructing the artificial island and dredging was awarded to the Öresund Marine Joint Venture, a consortium of Per Aarsleff A/S (DK), Ballast Nedam Dredging b.v. (NL) and Great Lakes Dredge & Dock Co (USA). The value of the contract was DKK 1.4bn.

A third contract was signed with Sundlink Contractors, a consortium of Skanska AB (SE), Højgaard & Schultz (DK), Monberg & Thorsen (DK), and Hochtief AG (Germany), for the construction of the high bridge and the two two-level approach bridges with the motorway on the upper level and the railway on the lower level. The contract was valued at DKK 6.3bn.

Source: SVEDAB (2008).

In May 1997 Svedab signed a contract with the industrial division of the Swedish national rail administration and Peab AB respectively for the construction of the connecting land infrastructure on the Swedish side.

Source: Prop 1996/97: 161

Operations phase

The OC is responsible for operating the coast-to-coast link, while the Swedish road and rail administrations are responsible for maintaining and operating the connecting infrastructure on the Swedish side and the Danish counterparts are responsible for the Danish side.

Planning regime

The planning regimes in Denmark and Sweden were (and still are) in many ways different. In Sweden a unique feature of the planning system is the extensive power invested in the municipal level, often referred to as the municipal planning monopoly. However, given the size and high profile of the project, many of the relevant planning and decision-making processes were carried out on a higher political level. Given the complexity of the issue, dealing with both Danish and Swedish planning and legislation policy, the sections below will mainly focus on the Swedish planning regime, although some of the main differences between the national planning systems will be briefly dealt with.

One of the most distinct differences between the two countries' planning regimes concerned the formal procedure of the environmental inquiry. In Denmark a special law is usually passed for large projects. This law, which is formulated by the responsible ministry (in this case the ministry of traffic), regulates the entire project and consists of elements from the legislative framework which are deemed appropriate for the project. Denmark signed the EC directive regarding environmental impact assessments (EIA) in 1985, and in the preparations of the law concerning the fixed link a number of environmental investigations were carried out which were presented in the report *Miljö Öresund 1991*.

Source: Prop 1990/91: 158 p. 24

In Sweden the formal procedure implied that the project had to be tested against different legal frameworks in several juridical instances before gaining approval. This was however a long and complicated process, and given the reigning social democratic government's wish to sign the agreement before the coming elections the procedure was turned upside down. Georg Andersson, then minister of communications, explained that the environmental inquiry could influence the shape and design of the fixed link, but not the actual building of it. Thus the government deemed that this breach of the formal procedure was legitimate since the agreement only stated that a fixed link should be built but left the details for later. So while the environmental inquiry in Denmark was carried out before the decision to build a fixed link was taken by the parliament, in Sweden the proposal to build was presented and accepted by the parliament before the inquiry. This difference in formal procedure led to a strange situation in which construction on the Danish side began before the Swedish environmental inquiry was fully completed. This has led many commentators to question the fairness and independence of the Swedish environmental inquiry procedures.

See for instance Falkemark (1993 & 1999).

Outline of planning legislation and policy

According to the agreement struck between the Danish and Swedish governments on 23 March 1991, and approved by both countries' parliaments later the same year, the two countries were obliged to construct and operate a fixed four-lane road and double-track railway link between Kastrup outside Copenhagen and Limhamn outside Malmö. The agreement also stated that the link should start from an artificial peninsula at Kastrup airport, cross the Drogden strait in a tunnel, and connect to an artificial island southwest of the island Saltholm. The part of the link between the artificial island and Limhamn should be a bridge.

The agreement also states that the entire link, including connections to existing infrastructure on land, should be financed by users and that no funding from either country's state budgets should be necessary. The OC was given responsibility for projecting, carrying out the necessary investigations for the EIA, financing, construction and operation of the fixed link.

Source: Prop 1990/91: 158

Once the proposal was accepted, the government decided on how the environmental inquiry should be performed. It was decided that the eligibility of the project should be tested against the Environmental Protection Act (EPA), the Natural Resources Act (NRA) and the Water Act (WA).

Source: Blomquist & Jacobsson (2001)

On the local level in Malmö the issue of alignment was regulated by the general plan of Malmö. The municipal level has a very strong position in the Swedish planning system, and land use reservations for the link and connecting infrastructure were made as early as the mid-1950s.

Source: Översikts planen som styrinstrument i Malmö 1950 - 2000 (2002)

Environmental statements and outcomes

Concerns about the environmental effects of the link have been a central issue running through the project from the early stages until completion. Even though other issues such as the impact on traffic volumes and land use initially were seen as important, the main issue has been the question of how the structure would affect the water flow between the Baltic and the North Sea. The OD started discussing the question in May 1986 and many of the reports and investigations during the second half of the 1980s were concerned with this matter. The notion of a 'zero impact solution' – a solution in which the structure of the fixed link would not affect the water flow – would become a central environmental issue. It was also an issue of major relevance for the economic viability of the entire project since large scale dredging projects meant escalating costs.

In Denmark the report *Miljø Öresund 1991*, consisting of some 1,500 pages, was made public by the ministry of traffic in March 1991, only weeks before the agreement between the two governments to build the fixed link was signed. The report, which was based on earlier investigations carried out during the 1980s and complementary investigations during autumn 1990 acted as the main EIA on which the Danish government based its decision to allow construction of the link. The main finding of the report, which would have a big influence on the shape of the project, was that the dredging of some 9.2 million cubic metres of seafloor sediments was needed to make sure the inflow of water to the Baltic Sea was not affected.

The impact on the nearby ecologically sensitive island of Saltholm was also a matter of concern. It was deemed that the construction work would cause serious disturbance to

nesting bird populations. The existing seal population of the island was deemed to be in danger of being permanently removed from the area.

Regarding air pollution it was deemed that the link would have both negative and positive impacts, that air quality would be improved in some areas but worsened in other areas.

The timing of publication of the report has led to criticism, since it was only a few weeks later that the agreement between the two governments was signed. Moreover, it was published some days after the Danish political parties reached an agreement to build the link, which paved the way for the agreement between the two countries. Leading Danish politicians admitted that they did not have enough time to study the investigation carefully and thus it can be argued that the decision was made without proper knowledge of the environmental impacts of the project. It should also be noticed that the EIA only concerned one alternative CM 4:2, the combined road and railway link, while other proposals such as different proposals for railway tunnels were not included.

Source: Falkemark (1993) & (1999), Heedegard Sørensen (1993)

The Swedish EIA was carried out after the agreement with the Danish government was signed. The agreement also emphasises the importance of reducing the impact on the water flow into the Baltic Sea, and the other environmental concerns mentioned in the agreement are similar to the ones mentioned above from the Danish report. A distinguishing difference between the Danish report and the environmental statement of the agreement is that it is only deemed necessary to dredge 3–6 million cubic metres of seafloor sediment (compared to an estimated 9.2 million in the Danish report) in order to make sure the water inflow to the Baltic is not affected. It is not clear whether this difference is because the figure in the agreement only concerns dredging in Swedish territorial waters or if there was a difference of opinion in the estimates between the two countries. A third alternative could be that the figure was kept deliberately low in order to give the impression that costs would be lower than the actual estimates by the experts at the time.

Source: Prop 1990/91: 158

The effect of the dredging was one of the major concerns regarding the environmental impact of the project. The removal of seafloor sediment could potentially cause widespread permanent damage to the area, by way of dispersing large amounts of fine particle sediments and oxygen-using substances (released during dredging). This could in turn have a negative effect on important breeding grounds for several species of fish in proximity to the construction site. In order to limit the negative impact on the seafloor fauna and flora, an environmentally adapted dredging technique that entailed an average spillage of only 5% was recommended.

The dredging contractor was eventually awarded a financial bonus since it was estimated that the actual spillage during the dredging amounted to only some 4.2% on average.

Sources: The Oresund Consortium (1994) & The Oresund Consortium (1998)

Apart from concerns about the effects on the marine environment, the position of the connecting land infrastructure also entailed environmentally concerned action. Lernacken, the area where the link connected to the land, had for a long time been used as a dumping place for waste (both from households and industry). In 1996 a sanitation process was begun, resulting in the shifting and sealing of some million cubic metres of polluted soil in the area.

Source: Prop 1996/97: 161

Once the construction of the link had commenced, the Swedish Environmental Protection Agency and the County council board established a committee for the monitoring of the process from an environmental perspective. The purpose of this control and steering committee was to make sure that the environmental impact of the construction process did not exceed the limits established in the EIA.

Archaeology

In 1996 the county council gave permission to the municipality of Malmö to carry out extensive archaeological investigations before the construction of the connecting land infrastructure began. The results from these investigations have been presented in 29 reports, and other projects were started based on the knowledge from these investigations.

Source: Prop. 1996/97: 161 & Malmö City (2008a)

Regeneration

In the agreement signed by the two governments there are no specific figures or estimates regarding the number of jobs created by the link, but the rationale behind the project was ultimately to create new jobs and act as a growth promoter. The book *Sydsvensk framtid*, ordered by the Swedish Chamber of Commerce and written by Åke E Andersson in 1989, was very influential since it argued for the active creation of a new region transgressing national borders and transforming the traditional industrial-based character of the economy in Malmö. The new economy of the transnational region should be based on a common market in which the key concepts were defined as knowledge, culture, communications and creativity. In *Sydsvensk framtid* however no figures are given for the estimated impact of the link on jobs and housing.

These ideas also became very influential among the political leadership of Malmö. The city had been experiencing increasing trouble since the 1970s. The economic base was very oriented toward heavy mechanical industries, with Kockums shipyard the biggest and most prolific employer. Not only were the employment figures showing weak development but the population of the city actually decreased quite substantially between 1970 and 1985, which led to a further intensification of the economic troubles. This crisis would become even deeper in the early 1990s, when a deep recession hit Sweden and some 30,000 jobs disappeared in Malmö in a few years time. Copenhagen was also experiencing economic difficulties and, even though the economic base was nowhere near as narrow as in Malmö, the idea of a fixed link to revitalize the region gained ground within the local political and business establishment on both sides of the Sound. More detailed plans and visions for how the regenerative effects of the link should be utilized and channelled in the best way were being presented by local politicians on both sides of the Sound in the early 1990s (see 'Main and intermediate travel nodes' for a more detailed description).

The 1994 EIA presents a scenario for the future impact of the link on energy use and the environment, based on the premises that the link would bring about 40,000 new jobs on the Swedish side of the region by 2010. But this figure should probably be viewed more as a base for scenario calculations rather than an explicit prediction of the impact of the project.

Sources: Andersson (1989), The Oresund Consortium (1994: 167), Malmö City (2002)

The project did of course also produce job opportunities during construction. For example, in mid-1997 it was estimated that some 2,900 people were directly involved in the construction of the coast-to-coast section.

Source: Prop 1996/97: 161

Project appraisals

Despite the fact that it is common practice in Sweden to use socio-economic cost-benefit analysis as a basis for decisions regarding infrastructure investments, this was never the case for the Oresund link. The analyses that were carried out focused on economic profitability, since this was a prerequisite given the loan-based financing of the project. The funding structure based on user fees for road traffic as the main source of financing meant that the volume of road traffic and the price level of user fees in relation to the construction cost became the ultimate criteria for appraisals. For a more detailed description of financing issues and traffic predictions see below.

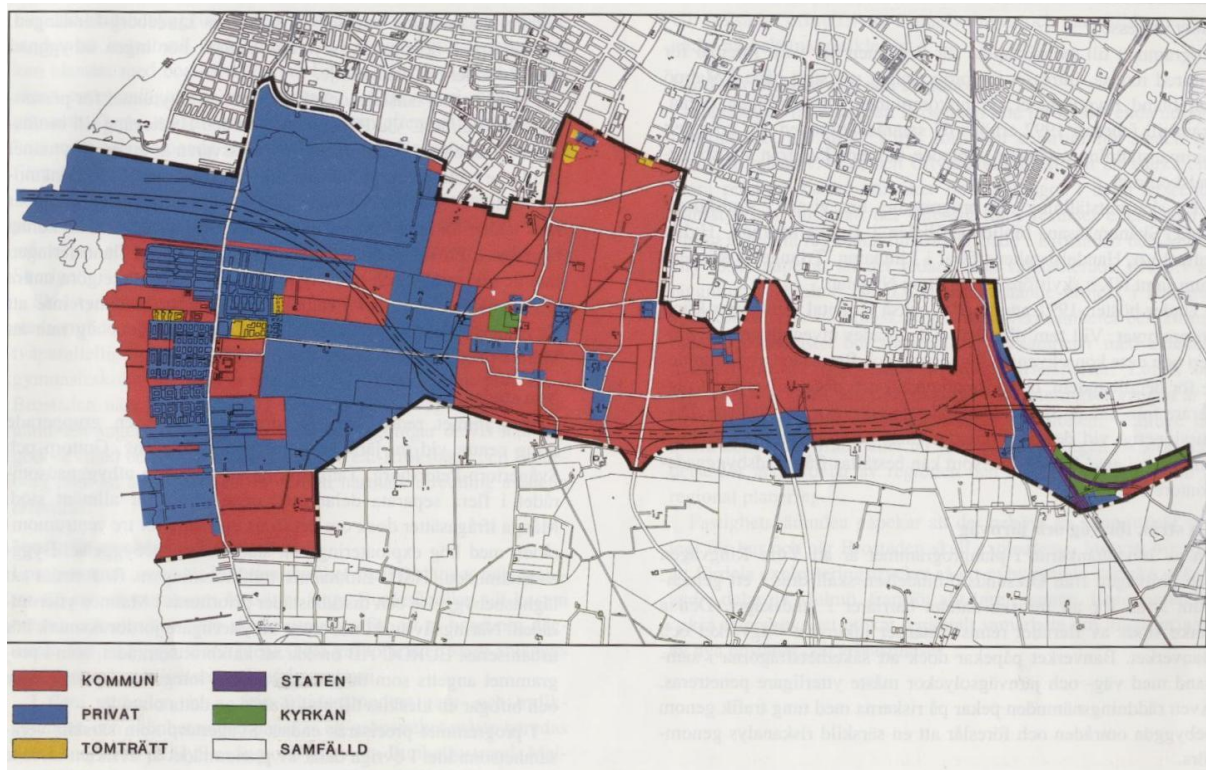
Source: Falkemark (1993)

Land acquisition

Since a fixed link across the Oresund had been a vision backed by the political establishment in Malmö for a much longer time than in Copenhagen the matter of land acquisition differs quite substantially between the two municipalities. In Malmö land for the connecting infrastructure had been reserved since the 1950s. In the 1956 general plan a zone was reserved for the connecting infrastructure (then thought of as a highway). At that time the areas south of the city were used as farmland and the municipality started buying land to ensure access to land, allowing the city to expand and for future infrastructure and industrial development. In total this process concerned some 35 farms and surrounding areas. The municipality was able to come to agreements with all but two of the stakeholders without resorting to legal measures and expropriation. On average the municipality paid around SEK 4.25/m² (value not adjusted for inflation) for the land in 1969. In comparison IKEA paid around SEK 1.3/m² in 2007 when buying some of the same land in Svågertorp industrial area from the municipality.

In the consecutive general plans from 1966 and 1980 until 1990 the land use zone for the connecting infrastructure was kept intact, which implied that no buildings or activities would be given permission to be established within or near this zone which could pose a problem if the fixed link became a reality. At the time of the decision in 1991 the ownership of the land comprising Bridge City was mainly split between the municipality and private actors. The blue area in the map in figure 9 represents privately owned land, most of which belonged to the company Euroc (the company has since been bought by Heidelberg Cement), while the red area indicates land owned by the municipality. Green indicates land owned by the church, and purple indicates state owned land.

Figure 9: Ownership of land



Source: Malmö City (1994)

Euroc, the main private stakeholder, was a company involved in the concrete business which had been excavating limestone from a quarry next to the proposed siting of the bridge head. A deal was struck between Euroc and the municipality, in which the company handed over the land to the municipality without cost. In turn the municipality was obliged to allow Euroc development rights to over 200,000m² in the surrounding area, by way of detailed planning mechanisms. The actual deal between the parties is very complex and thus very opaque, and what the deal will actually entail has only recently been made public. What can be said with certainty is however that Euroc has made at least some SEK 500m on the deal by selling land to contractors for the construction of housing and office space. The municipality has also made a good deal of money from selling land to shops in the area: the value of the land rights sold in Svågertorp industrial area amounts to at least SEK 335m so far, according to the news article from 080520.

Sources: Malmö City (1994), Malmö City (2002), SdS (2008a), SdS (2008b), SdS (2008c)

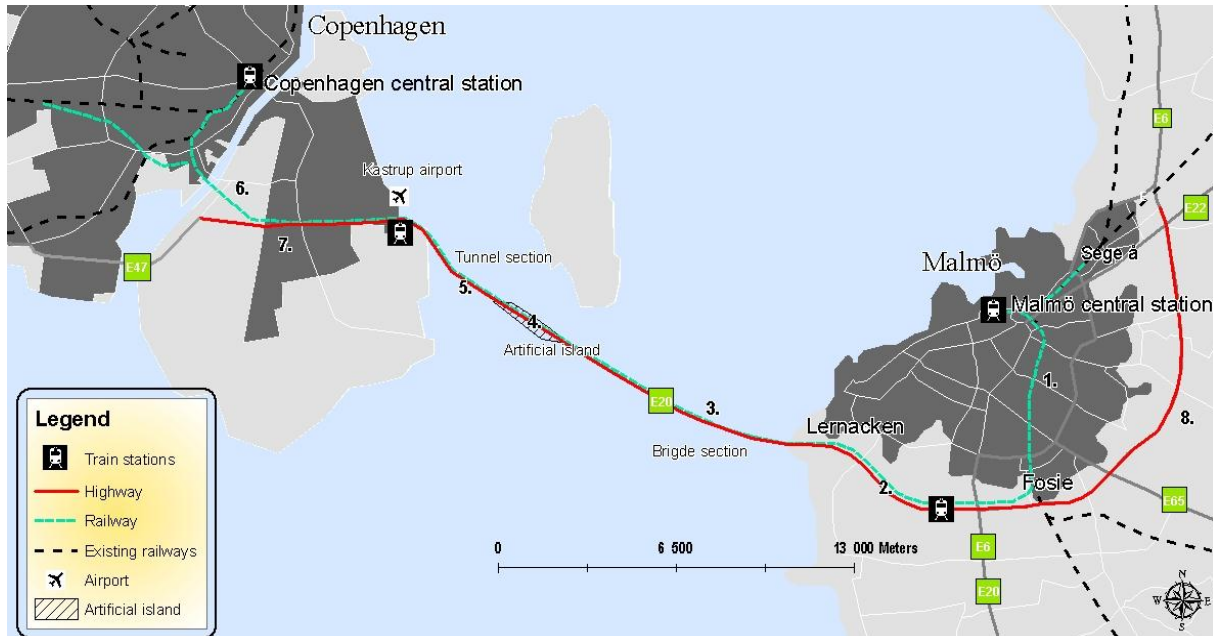
In Denmark the OC had to expropriate around 350 houses on the island of Amager, 140 of which were bought and demolished before the Swedish EIA process was completed.

Source: SVT archives, date unknown, clip available at <http://svt.se/svt/road/Classic/shared/mediacenter/index.jsp?&d=37591>

C PRINCIPAL PROJECT CHARACTERISTICS

Detailed description of route

Figure 10: The main components of the link and connecting infrastructure



Source: Lantmäteriet

Railway tracks from Sege å – Malmö central station – Fösie

The section from Sege å to Malmö central station is a 5km section of the southern trunk line and a number of capacity enhancing tasks were carried out here, ie. grade separation of intersections and new tracks at Malmö Central station. The section between Malmö Central station and Fösie serves traffic to and from Copenhagen, Trelleborg and Ystad. This section was in use before the construction of the link servicing Trelleborg (mainly goods traffic) and Ystad (goods and passenger traffic), but was substantially upgraded when the link was constructed. Around 8km of existing track was upgraded to double track, bridges and overpasses were built to ensure grade separation, noise reducing walls were built, and some 5,000 windows of nearby buildings were replaced in order to reduce noise.

Sources:

<http://www.jarnvag.net/banguide/Lockarp-Ystad.asp>,

<http://www.jarnvag.net/banguide/Malmo-Trelleborg.asp>,

<http://svedab.se/sida.php?sid=3&usid=22>, <http://svedab.se/sida.php?sid=3&usid=23>

Railway tracks and motorway from Fösie – Lernacken

The link includes 10km of new double-tracked railway (*Öresundsbanan*). The railway runs parallel with the motorway in a 90m wide corridor (see figure 10). The first stop on the route is Malmö Syd or Svågertorp.

The motorway runs from Fösieby, where it connects the outer ring road to the toll station at Lernacken. This section includes two major interchanges and several smaller overpasses (see figure 11). At Lernacken the Traffic Centre and the toll station for vehicles are situated (see figure 12). The Traffic Centre is responsible for operating the toll station, monitoring

motorway traffic and monitoring the technical systems. The toll station has eleven lanes in each direction with a capacity of 200 vehicles per hour per lane and ten toll booths in each direction.

Figure 11: The section Lernacken - Fösieby



Source: www.Svedab.se

Figure 12: The toll station at Lernacken



Source: The Oresund Consortium (2005)

The bridge section

This section consists of 7.845km of bridge between Lernacken and Pepparholm, the artificial island. The western approach bridge is 3.014km long, the high bridge 1.092km and the eastern approach bridge 3.739km. The 490m wide main span is suspended by 80 cables from four 204m tall pylons. Below the main span the 370m wide Flint channel is an important shipping route (although the majority of the traffic passes through the Drogden channel). The pylons are protected by underwater islands safeguarding against collisions.

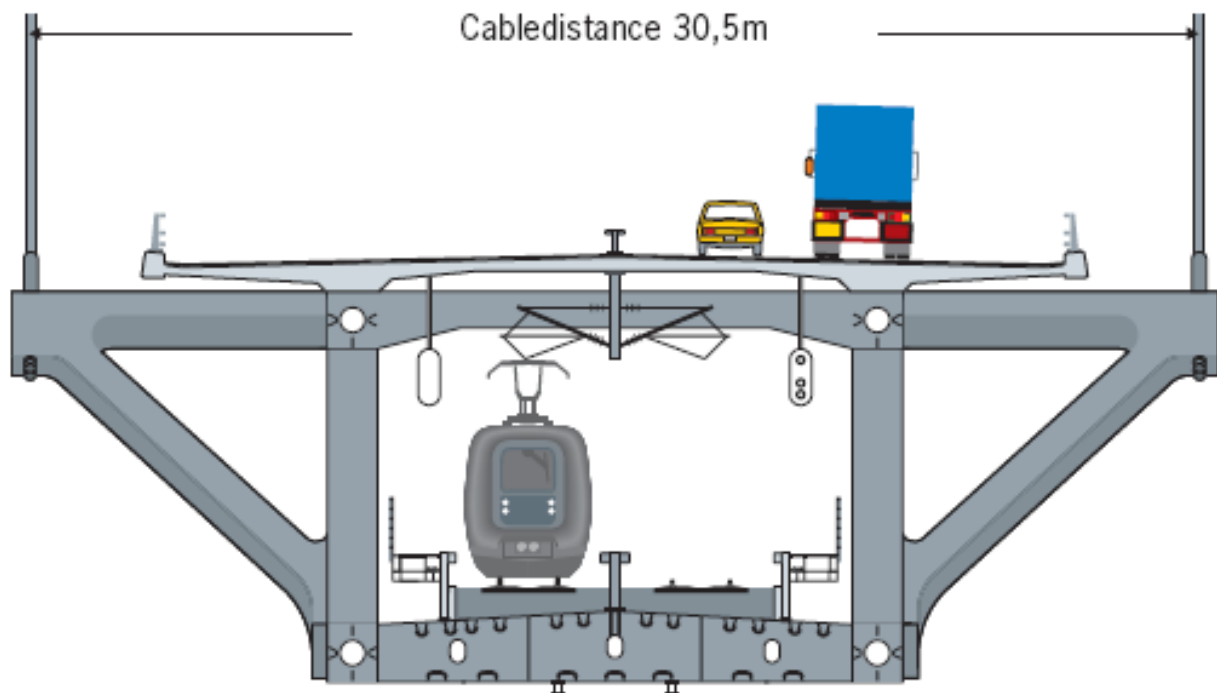
The railway track system on the bridge is a standard system with conventional ballasting and all tracks on the coast-to-coast section of the link have been designed for speeds up to 200km/h. The road surface consists of a 7cm thick asphalt layer and the crash barriers on the bridge are of extra high quality.

Figure 13: The western approach bridge and the high bridge



Source: The Oresund Consortium (2005)

Figure 14: Cross section of the high bridge



Source: The Oresund Consortium (2005)

Pepparholm – the artificial island

The island is 4.055km long and covers an area of 1.3km². It was created from 6 million cubic metres of seafloor sediment obtained during the dredging for the tunnel and the bridge piers, combined with 1.6 million tonnes of rocks shipped from the Swedish west coast. Here the road and railway run parallel again, allowing trains and cars to drive side by side into the tunnel entrance at the western end of the island. The shape of the island (see figure 15) reflects the fact that it should cause minimum interference to the water flow of the Sound.

The island also delimits the system border between the Swedish and Danish railway systems which use different power supply, signal and safety systems. A mobile Danish/Swedish ATC system shift component ensures that the trains passing this limit automatically switch between the Danish and Swedish ATC systems. The track system on the island is a standard system with conventional ballasting.

Figure 15: The artificial island



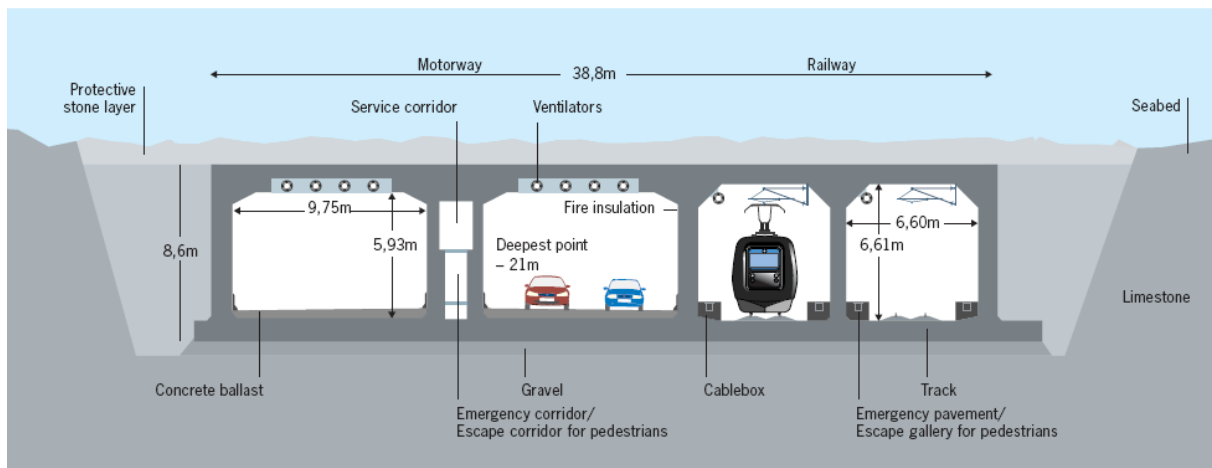
Source: The Oresund Consortium (2005)

The tunnel and the artificial island at Kastrup

The total length of the tunnel is 4.055km, of which 3.510km are submerged. At each end there is a 270m long portal building. The tunnel consists of two rail tubes, two motorway tubes and a service and emergency corridor. The tunnels consist of 20 prefabricated elements that were floated out from the construction facility on land and submerged into a pre-dredged trench on the seabed in the Drogden channel. On top of the tunnel a protective layer of rocks was placed. Normally the maximum speed for road traffic is 90km/h in the tunnel and heavy goods vehicles are not allowed to overtake.

The artificial island at Kastrup was built for the tunnel portal and covers an area of 0.9m² protruding 430m out from the coast. It consists of seafloor sediments obtained from the dredging and from granite shipped in from the Swedish west coast.

Figure 16: Cross section of the tunnel



Source: The Oresund Consortium (2005)

Figure 17: The artificial island at Kastrup



Source: Öresundskonsortiet (2005)

Kastrup airport to Copenhagen central station and Vigerslev marshalling yard

This section consists of 20km of newly built railroad tracks. Kastrup airport is the first stop on the Danish side when travelling from Sweden. In 2007 some 20.9 million passengers passed through the airport, making it the biggest node for passenger air transport in Scandinavia. Here it is possible to change to the Metro, a driverless light rail train. Before Copenhagen there are two more stations, Tårnby and Örestad (the latter is also a stop for the Metro).

Sources: <http://www.jarnvag.net/banguide/Fosieby-Kopenhamn.asp>, www.dsb.dk, <http://www.svedab.se/sida.php?sid=6&usid=33&PHPSESSID=0475f1ac3af36c1662556df63707d17a>, Region Skåne (2007)

The Öresundsmotorvej

Ten kilometres of motorway from Kastrup to the western side of Amager connect to the E47. At present daily traffic on this section of the link amounts to some 80,000 vehicles per day.

Source: Svedab, Det här är Öresundsförbindelsen, <http://www.svedab.se/sida.php?sid=6&usid=33>

The outer ring road

Approximately 10km of motorway from Fosie connects to the E6/E22 northeast of Malmö. This section was not included in the financial model for the Oresund link, but was financed by state budget grants and planned and projected by the Swedish National Road Administration.

Source: Prop 1996/97: 161

Main and intermediate travel nodes

Introduction

Malmö

Hyllievång & Bunkeflo/Vintrie: On the Swedish side the link and land use reservations for the connecting infrastructure have been long-standing elements in the comprehensive plans of the municipality. The plan for an extension of the city to the south has also been discussed since the 1960s and in the 1966 general plan Hyllie is presented as a future centre in the southern part of the city. It would however take until the signing of the agreement between the two governments in 1991 before a more detailed plan and vision of the development in the area was agreed and acted upon.

Bunkeflo and Vintrie are small villages with a long history. Under the development plans for Hyllievång, these former semi-rural villages will eventually be integrated within the city.

Source: Malmö City (2004)

Kalkbrottet is an open-cast mine previously used for lime extraction. The area is situated just northeast of the toll station of the Oresund link at Lernacken. The mine and the surrounding areas, which belong to a company, were in use until 1994. A more detailed description of the agreement between the municipality and the company is given under 'Land acquisition'. The area comprises some 200ha, of which 80ha is the area of the mine.

Source: Malmö City (2008b)

Bunkeflostrandis is a post WWII suburb previously dominated by detached housing, of which much was built during the 1960s and 1970s. Since the completion of the Oresund link the area has been the site of intense development.

Source: Malmö City (2000)

Svågertorp covers an area of 40ha which was previously farmland. In the initial planning stages it was proposed that the area should consist of a mix of offices, research-related activities, industries and warehouses. The proximity to the motorway of the Oresund link and the plans for a train station were seen as important factors that would attract enterprises to the area. The 1994 detailed comprehensive plan estimated that some 800 jobs would be created here between 1994 and 2005. In the longer term the creation of some 3,500 jobs was expected to be possible. In 2003 around 1,700 people were employed in the area.

Source: Malmö City (1994) & Malmö City (2004)

Copenhagen

Örestad is an area of 310ha, 600m wide and 5km long, on the western part of the island of Amager. This part of Amager was created in the 1940s by walling in a shallow section of the sea between the island and the mainland. With the exception of its use as training grounds for the military the area has not been used for anything since then. The area is divided into four sub-areas: Örestad Nord, Amager Fælled Kvarteret, Örestad City and Örestad Syd. The development of the area was initiated in the mid-1990s; construction started in 1999 and the development is expected to continue into the 2020s and 2030s. Fully developed, it is estimated that Örestad will have 20,000 inhabitants and between 60,000 and 80,000 jobs. Today there are 5,000 inhabitants and between 8,000 and 10,000 jobs. Over 50% of the total area is sold, mostly in the northern parts, and much of the continued development will thus take place in the southern areas.

Source: By & Havn (2007)

Planning context

In Malmö the development on an overarching level is regulated by the comprehensive planning function. The comprehensive plan can encompass the entire municipality or an area of it (detailed comprehensive plan). It is the main tool for physical planning in the Swedish system and the comprehensive plans must be accepted by the municipal council (*kommunfullmäktige*). According to the 1987 Planning and Building Act, every municipality must have an up-to date comprehensive plan that stipulates the land and water use of the municipality. The comprehensive plan is not legally binding but is nonetheless an important strategic planning instrument. In Malmö the municipal board is the institution responsible for preparing the comprehensive plan.

The detailed development plans and area regulations are the implementation tools for the municipality. The detailed development plan is a map of a smaller area with an attached document that regulates what can be built and what the structure may be used for. They are legally binding and their validity is often restricted to a certain period of time (often from five to 15 years). The implementation of the detailed plan is carried out by actors outside the municipality (for instance contractors).

Area regulations are used to ensure that a purpose of the comprehensive plan is achieved or that an interest stipulated in the environmental code is protected. Area regulations can only be used for areas which have no accepted detailed development plan.

The Town Architecture Committee (*Stadsbyggnadsnämnden*) or the municipal council is the preparatory and deciding authority regarding detailed development plans and area regulations.

In the earlier generation of comprehensive plans (called general plans) in Malmö from the 1960s onward, a central idea was to plan for the decentralisation of the city. The means to

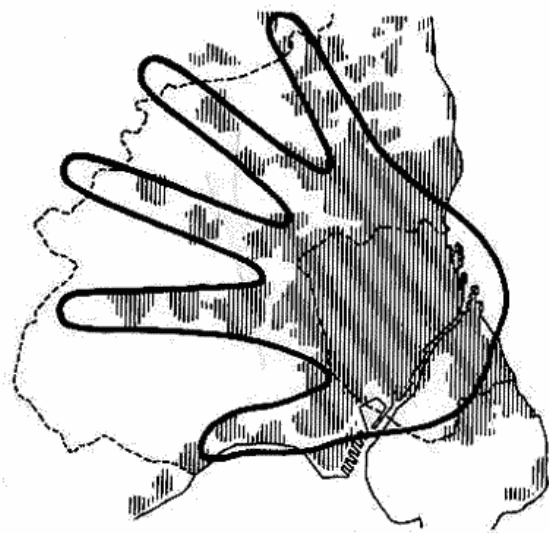
achieve this goal was the use of planning mechanisms to disperse service functions and retail to different parts of the city and thus create a multi-centred city structure. The Oresund link has been a major influence on the development in the southern part of the city and the new infrastructure has led to a concentration of regionally aimed activities in this area. The municipality presented a proposal for a plan of the development in proximity to the planned connecting infrastructure in the document *Översiktsplan för Brostaden ÖP 2010* in January 1994 (the plan was accepted on 22 June the same year). The main area of development in proximity to the link was referred to as *Brostaden* (Bridge City) in the early planning documents. *ÖP 2010* (Malmö City (1994)) presented a detailed comprehensive plan for the area. The purpose of this plan was to ensure that the infrastructure was aligned in a rational manner which ensured a good long term balance between the development areas, green areas, the surrounding countryside and the region at large.

Since then detailed comprehensive plans, detailed development plans and area regulations have been produced for the areas making up Bridge City (see figure 24): 1) Hyllievång & Bunkeflo/Vintrie, 2) Kalkbrottsområdet, 3) Bunkeflostrand and 4) Svågertorp. The diverse progress of the development in the different areas has entailed that the name Bridge City is no longer used in the planning process.

Sources: Alfredsson & Wiman (1997), Malmö City (1994), Malmö City (2000), Malmö City (2004) & Malmö City (2008c)

On the Danish side the main area of interest is the island of Amager where the link has resulted in the creation of an entirely new urban area – Örestad. Planning in the post WWII era in the Copenhagen area has been founded on the principle of the 'finger plan' established in 1947 (see figure 18).

Figure 18: The 'finger plan'



Source: Jensen (1998)

The idea behind this plan was that the future development of the city should take place in the palm and the five fingers. The fingers point in the direction of the larger population centres some 30–40km outside of Copenhagen. By concentrating development in these corridors it would be possible to have a good structure for the development of the infrastructure while simultaneously ensuring that the areas between the corridors could be used for farming,

forestry or recreational purposes. Even though the more specific details of the original 1947 plan soon were obsolete the underlying principles of the finger plan have remained essential.

The 1991 agreement to build the fixed link between Copenhagen and Malmö led to increased interest in developing the western areas of the island of Amager. The first step toward the development of this area was taken in 1991 when the traffic committee of the Danish parliament proposed that the state and the municipality of Tårnby should form a joint organisation for the development of the western part of the island. In 1992 the parliament accepted the Örestad which established the division of responsibilities and burdens between the involved actors. The same year the *Örestadsselskabet*, a joint non-profit organisation between the state and the municipality, was formed. The state and the municipality agreed to provide 45% and 55% respectively of the nominal capital. (In October 2007 the *Örestadsselskabet* was replaced by the non-profit organisation By & Havn). The development of Örestad and the Metro system on Amager have been financed by the sale of land belonging to the state and the municipality.

In 1994 a competition between architects was held in order to bring out the best overall vision for the development of the area. The competition was won by a Finnish team (ARKKI) and it is their overarching proposal that has provided the framework for the development.

Örestad, situated in the palm of the 'finger plan', is one of the biggest development projects in Danish history and an integral part of a strategy to strengthen Copenhagen's (and the Öresund region's) position in the European city-region network. Part of this strategy is to try to attract international business to the area. The proximity to Kastrup international airport and the well-developed infrastructure network of the region is emphasised as a fundamental element in this strategy of increased competitiveness in the (perceived) race between the metropolitan regions of Europe.

So far the established activities in Örestad consist of a mixture of companies and actors related to areas such as education (university and high school), pharmaceuticals, retailing, IT, media and design.

Sources: Jensen (1998) & Fakta om Örestad <http://www.orestad.dk/index/erhverv/fakta.htm>

Proposed development

Sweden

The long term vision for the areas comprising Bridge City in the early planning documents are quite grand: within the next 30 years there is an estimated potential to build 17,000 apartments, which could entail 40,000 new inhabitants according to a local politician.

Sources: Malmö City (2008d) & SdS (2007)

Hyllie or Hyllievång is a mainly undeveloped area which is planned to function as a new centre in the southern part of the city and to perform regional functions. The area comprises some 200ha of land owned by the municipality. A key element in the development of this new area is the planned railway station of the currently ongoing mega project, the City tunnel rail link which will connect to the Öresund link west of Hyllie. The following main features are planned or under construction (in 2008):

- Railway station;
- Arena (15,000 seats);

- Shopping mall with 50,000m² of retail space;
- An additional 12,000m² of retail space;
- 3,000m² of office space;
- Hotel (300 beds);
- 7,000 housing units;
- 7,000 jobs;
- 9,000 parking spaces;
- Water park;
- Theme park.

Accepted detailed plans: DP 4827 (the arena), DP 4707 (concerning the road structure of the area).

Ongoing detailed planning processes: DP 4828 (concerning the area around the railway station).

Sources: Malmö City (2004), Malmö City (2008d), Malmö City (2008f)

The railway station, the arena and the shopping centre are currently under construction. Recently land use agreement deals for the construction of 1,200 housing units between 2010 and 2013 in the central part of Hyllie were signed with the following contractors²:

- IKANO Bostaden AB;
- Midroc Property Development AB;
- NCC Construction AB, BoendeSyd;
- NevstenFastighets AB;
- Otto Magnusson AB;
- Reinhold FastigheterSyd AB;
- Riksbyggen;
- SBC Mark AB;
- Setra Group AB;
- Sundprojekt AB;
- VeidekkeBostad AB.

The planning of another 1,300 housing units is currently ongoing, but at present there are no further details regarding contractors.

Sources: Malmö City (2008g) & Malmö City (2008h)

Bunkeflo/Vintrie: The areas surrounding the small rural villages of Bunkeflo and Vintrie are also included in the plans for the Hyllievång area. There have been several investigations and proposals for the continued development of this area and as of 04-03-25 a detailed development plan allows for the construction of 43 detached houses, another 19 land lots assigned for construction and 12 apartments. As of summer 2008, 30 detached houses and

² A land use agreement deal between the municipality and a developer means that the land use rights are transferred from the municipality to the developer. The transfer is made under certain conditions: the developer gains the right to develop the land (within a certain amount of time, two years in the case of Malmö) and is in turn obliged to follow certain conditions. The conditions of the agreement must correspond to the detailed planning document of the area, but it can also regard other issues such as rent levels, construction techniques and providing service facilities for the area (such as day care centres for children and the elderly).

Source: Malmö City (2007c)

44 apartments were under construction. The developers involved were Peab AB and Hemgården AB.

Sources: Malmö City (2005) & Malmö City (2008i)

Figure 19: The development plans for Hyllievång



Source: Malmö City (2000)

Kalkbrottet. The plans for the area include construction of some 2,000 housing units and 37,000m² of office, retail and service space. The plans mainly concern the edges surrounding the mine. Previous proposals included plans for a theme park at the bottom of the mine and large scale exploitation turning the area into an office park. Since a government decision in 2002 the eastern part of the mine is however protected from exploitation as it was designated as a Natura 2000 area in accordance with the EU Habitats and Birds directives. The main reason for this designation is the existence of a rare flower species (*kalkkrassing*). The Natura 2000 status has affected the potential for development in the mine and at present the plan is to turn it into a recreational area open to the public.

In May 2008 the first detailed plan for the northwest of the area was accepted, which allows the construction of 295 apartments to go ahead. Construction was expected to commence in 2008/2009, the project being carried out by HSB Malmö, VeidekkeBostad and Sjaelsö.

Sources: Malmö City (2007a) & Veidekke (2008))

Figure 20: The proposed development in the Kalkbrotssområdet



Source Malmö City (2007a)

Bunkeflostrand: In the 1998 detailed comprehensive plan it was expected that the development would take place gradually, with a development rate of some 50 apartments per year. This was expected to lead to a doubling of the population to some 10,000 inhabitants within 30–35 years. The development rate has however been much higher. Between the turn of the millennium and 1 January 2007 the housing stock of the area increased by 1,423 units (of which 300 were detached houses), amounting to over 45% of the existing housing of the area. The population has almost doubled already, the number rose from 3,906 in 1991 to 7,390 inhabitants in 2007. The prognosis is that the population will increase to some 12,000 and that some 1,300 more housing units will be built in the period 2006–2011.

The following companies have been, or are, involved in the development:

- OBOS & Open House Produktions AB: A joint project building 1,500 apartments in Annestad, the northern part of Bunkeflo between 2004 and 2008.
- Skanska: Around 240 detached houses have been completed.
- Haga MKB: ten four-bedroom houses with 104 apartments have been completed.
- JM AB & Seniorsgården: Around 80 terraced houses and a senior citizen home with 48 apartments completed.
- Myresjöhus: In 2005 they had the development rights for 28 detached houses, probably completed.

Sources: Malmö City (1998), Malmö City (2000), Malmö City (2007b), SdS (2005)

Figure 21: The proposed development in Bunkeflostrand



Source: Malmö City (2000)

Svågertorp : The area comprises some 40ha and at present around 50,000m² of retail space, primarily used for large scale retailing. With the establishment of IKEA (see below) the retail space will soon be doubled.

Svågertorp is at the moment the only stop on the Swedish side for trains between Malmö and Copenhagen. Since there is no housing in the area the train station functions mainly as a park-and-ride facility for travellers destined for Kastrup airport and Copenhagen. The future of the train station is uncertain: once Hyllie station and the City tunnel are in operation, it is expected that the park-and-ride function will be shifted there.

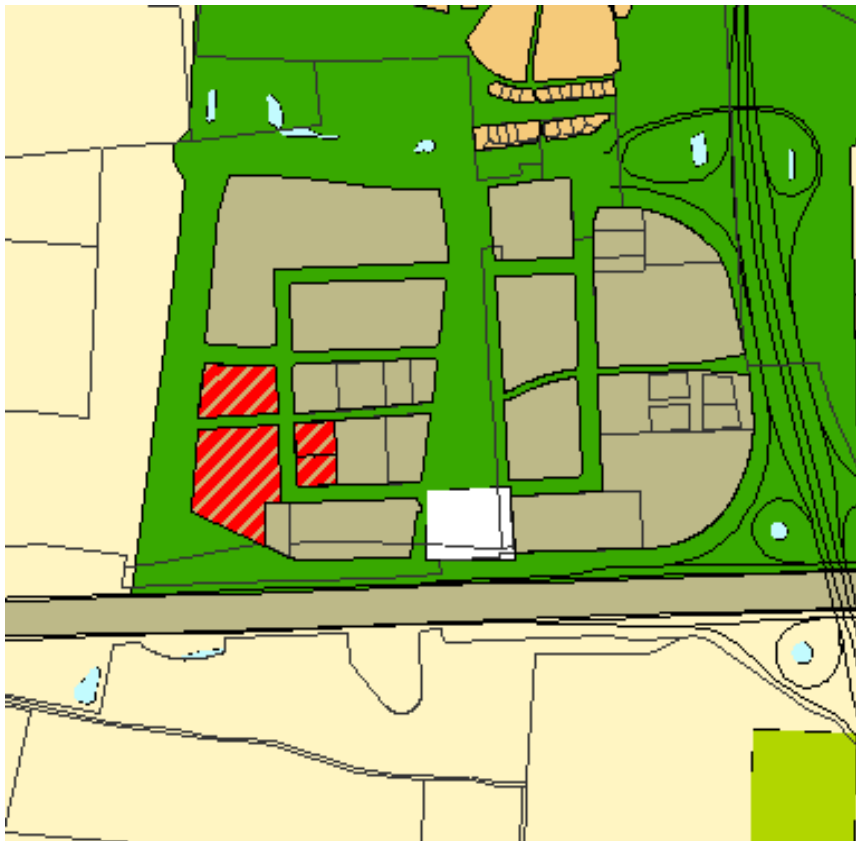
In the early planning stages the area was planned to house a mix of retailing, restaurants, offices, research facilities, industries and warehouses but today the area is primarily used by retailing outlets selling furniture, garden utensils and electronic equipment. Since IKEA recently signed a deal regarding the construction of a 48,000m² warehouse there is now very little land left for new establishments (altogether IKEA bought 100,000m² of land from the municipality). The white areas in figure 22 indicate available land while the striped red indicates reserved areas and grey occupied areas. At present the business activities in the area are mainly aimed at customers arriving by car, and this development is expected to continue and intensify once IKEA opens and therefore a reconstruction of the surrounding road network will also be necessary.

The following companies are currently established within the area:

- Bauhaus;
- OnOff;
- Rusta;
- Dormy;
- Siba;
- Norsk Hydro;
- Pengar i Sverige AB;
- Biltema;
- K-Rauta (Kesko);
- Plantagen;
- Jysk;
- Harald Nyborg;
- Stoff & Stil;
- ILVA;
- Värme Ekonomi Syd;
- Meca Service;
- Stadium;
- VVS Agenturer AB;
- IKEA (opening planned in 2009);
- Vestas-koncernen.

Sources: Vägverket (1999) (planeringssit.), Malmö City (2008j), Malmö City (2008k)

Figure 22: Svågertorp, the present situation



Source: Malmö City (2008j)

Copenhagen

Örestad: The area comprises 310ha in a previously undeveloped 600m wide corridor stretching south from the edge of the city in the north halfway across the island of Amager. The plan for the area over the next 20 years includes 60–80,000 jobs and 20,000 housing units.

When fully developed the plan is that the area will contain 60% commercial space, 20% housing and 20% for other purposes (culture, service, retailing and public institutions).

At present around 50% of the total area has been sold to developers and roughly 20% of the development has been completed. The relative share of the developed space looks as follows: 37% commercial use, 39% housing, 11% retail space and 14% public institutions. Currently there are some 3,000 housing units and 5,000 inhabitants in Örestad and around 20,000 students attend the educational facilities in the area.

There are four individual development areas (Örestad Nord, Amager Faelled Kvarteret, Örestad City and Örestad Syd). So far the northern areas have had the highest rate of development, but the two southern areas are also sites for extensive development. The area surrounding the Örestad station where the railway of the Oresund link crosses the track of the Metro comprises Örestad City (see figure 23). This is the only development area that will be presented in any detail as the others (and arguably Örestad City also) are associated more with the metro than the Oresund link (although they certainly can and should be seen as 'bundled' projects).

Figure 23: Örestad City



Source: Örestad (2008)

- Numbers 7, 35 & 39: KLP Ejendomme A/S – developer of three office complexes totalling over 100,000m². The first building of 29,000m² was inaugurated in 2003 and current tenants include: Hi3G Denmark, Atkins, Handelsbanken, Dansikring, Medicon Valley Academy, Medtronic-Vicare A/S, UCB Pharma, Novo Nordisk Scandinavia, Dell, Accenture and GlaxoSmithKline.

The construction of a second building totalling 26,100m² is expected to be complete in 2008 while the construction of a third building of 50,000m² is expected to commence simultaneously.

- Number 5: Telia – telecommunication: Telia's 1,900m² technological centre is a main hub for international data traffic. It was inaugurated in 1999.
- Number 4: Ferring: A 20-storey building housing the pharmaceutical company's headquarters (inaugurated in 2002) totalling 15,000m².
- Number 3: Fields: Since its inauguration in 2004, Fields is Scandinavia's largest shopping centre. It consists of around 150 shops totalling 178,000m².
- Number 10: Company Park: Aberdeen Property Investors Denmark A/S owns this 5,300m² office building (inaugurated in 2002). Its current tenants include Masterfoods, Bearing Point, Biogens, Broged Idec. Denmark, Nikon, Shell Gas (LPG Denmark) and Rae Systems Europe.
- Number 16: Örestad Gymnasium (senior high school): The 12,400m² building was inaugurated in August 2007. The school has capacity for 800 students.
- Number 17: Parkhusene: 120 apartments built by Aktivgruppen and Lejerbo totalling 15,100m² and café and convenience store (inaugurated 2005).
- Number 18: VM husene: 212 apartments totalling 24,500m² in two 4–12 storey high buildings (inaugurated in 2005).
- Number 26: Signalhuset: 288 housing units in a nine-storey 8,300m² apartment block built by Lejerbo (inaugurated in 2006).
- Number 24: Brohuset: 123 apartments totalling 12,000m² (inaugurated in 2007).
- Number 25: Sejlhuset: 128 apartments and a day care centre for children totalling 12,000m² (completion expected by the end of 2007).
- Number 27: City Husene: 12,800m² of apartment housing built by Arkitekt Gruppen (inaugurated in 2007).
- Number 31: Örestadshuset: 127 apartments totalling 12,600m² built by SjaelsöGruppen A/S (inaugurated in 2007).
- Number 30: Det Flexible Hus: 12,000m² of housing totalling 124 apartments built by Kuben Byg A/S (inaugurated in 2007).
- Number 37: Copenhagen Golfpark: Nordbornholms Byggeforretning and Cargill have constructed 148 apartments totalling 16,000m² in the northwestern section of the area (inaugurated in 2007).

- Number 22: Porthuset: 165 apartments totalling 14,100m² built by Porthuset A/S (completion expected by the end of 2007).
- Number 4a: Norrporten – office complex: Norrporten has bought construction rights to 10,500m² of office space.
- Number 49: Copenhagen Towers: A complex of buildings with three 20-storey towers (85m high) and a number of buildings seven to nine stories high. Construction began in 2008 and when the project is completed it will consist of some 129,000m² of commercial space (business, hotel, restaurant, conference facilities and shops).

Source: Copenhagen Towers (2008)

- Number 40: Örestad Down Town & Örestad Business Centre: NCC Property Development and ODC have entered an agreement regarding the construction of a total of 205,000m² (half north and half south of the motorway) of commercial buildings over the next five years. The plans include:
 - two towers for housing and office space – 37,400m²;
 - Cab Inn – a 12,700m² hotel with 700 beds (construction began in 2007).

Source: Örestad Down Town (2008)

- Number 52: SEB Pension/Ramböll: A 40,000m² office complex being built by the two companies. Production start was expected 2008–2009.
- Number 53: Hannemannsparken: 85,500m² planned, to combine dwellings with a commercial around-the-clock activities area. The project is developed by Nordkranen A/S and construction was expected to commence in 2008.
- Royal Golf Centre: An exclusive golf facility with one 18-hole and one nine-hole course, plus driving range, helipad, shops, restaurants and club house is gradually being built to the northwest of Örestad City. Altogether the facilities comprise 120ha.

Sources: Örestad (2008), Örestads homepage: www.Orestad.dk

Key features

Hyllivång: A greenfield development area comprising 200ha. The key features of the current plans are:

- 15,000 seat arena;
- 62,000m² of retail space (of which 50,000m² will be in a shopping mall);
- 3,000m² of office space;
- 7,000 new housing units;
- 7,000 jobs;
- Hotel (300 beds);
- 9,000 parking spaces;
- Water park;
- Theme park.

Kalkbrottet: Brownfield development area comprising 200ha of which the mine comprises 80ha. The key features are:

- 37,000m² of office, retail and service space;
- 2,000 housing units;
- A recreational park in the mine.

Bunkeflostrand: Greenfield development connected to a previously existing suburb. The key features are 3,000 housing units of which more than half are completed.

Svågertorp: Greenfield development area comprising around 40ha. The key features are 50,000m² of retail space, which will be doubled after the completion of the IKEA warehouse.

Total plans for Bridge City in July 2008:

- Commercial and public service: around 200,000m²;
- 12,000 housing units;
- 7,000 jobs.

Örestad City:

Built or currently under construction:

- 77,000m² of office space;
- 178,000m² of retail space;
- Around 1,400 housing units (totalling more than 150,000m²);
- School (12,400m²);
- 120 ha of golf course (developed in stages).

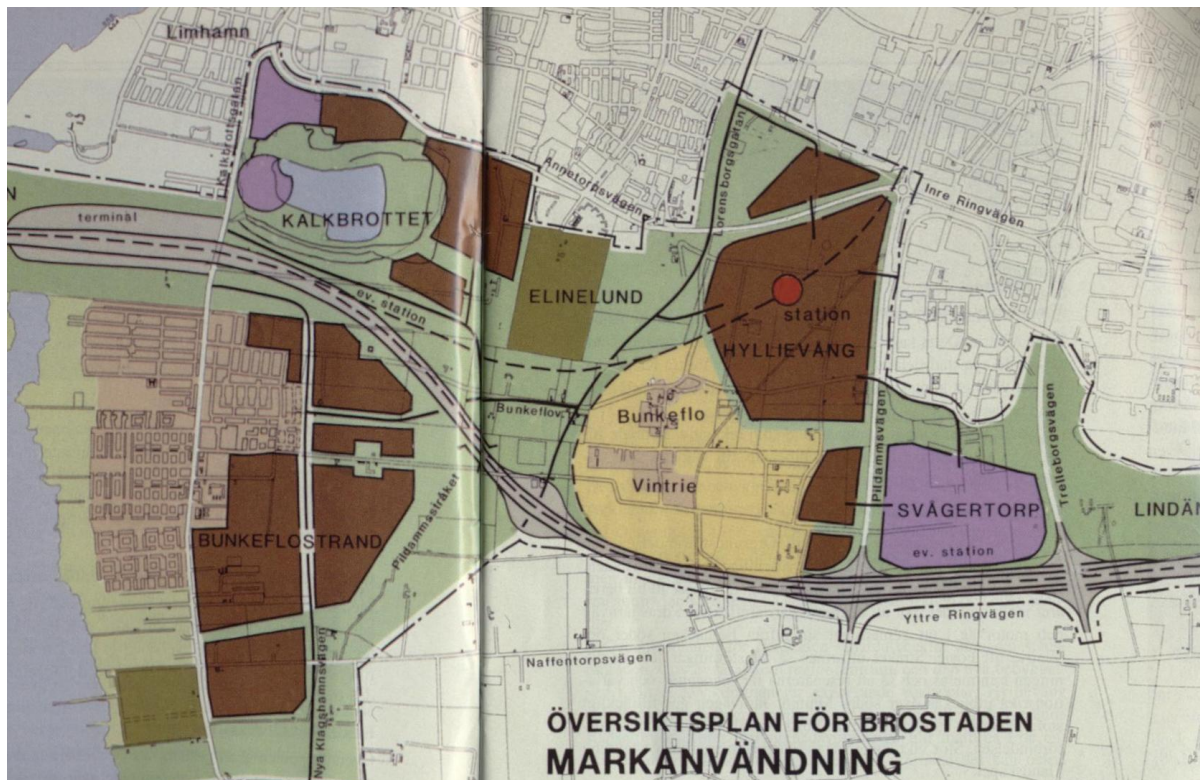
Planned or in the initial construction phases:

- 138,000m² of office space;
- 129,000m² commercially assigned space (at the moment not specified in detail);
- 85,000m² of combined commercial and housing space (relative share at the moment not specified);
- A 700 bed hotel (12700m²).

In total (built and currently planned):

- 215,000m² of office space;
- 1,400 housing units;
- 178,000m² of retail space;
- Hotel (700 beds);
- An additional 214,500m² of development plans for mixed purposes (commercial and housing);
- Golf course (120 hectares).

Figure 24: The comprehensive plan of Bridge City



Source: Malmö City (1994)

Figure 25: Kalkbrottet and Bunkeflostrand



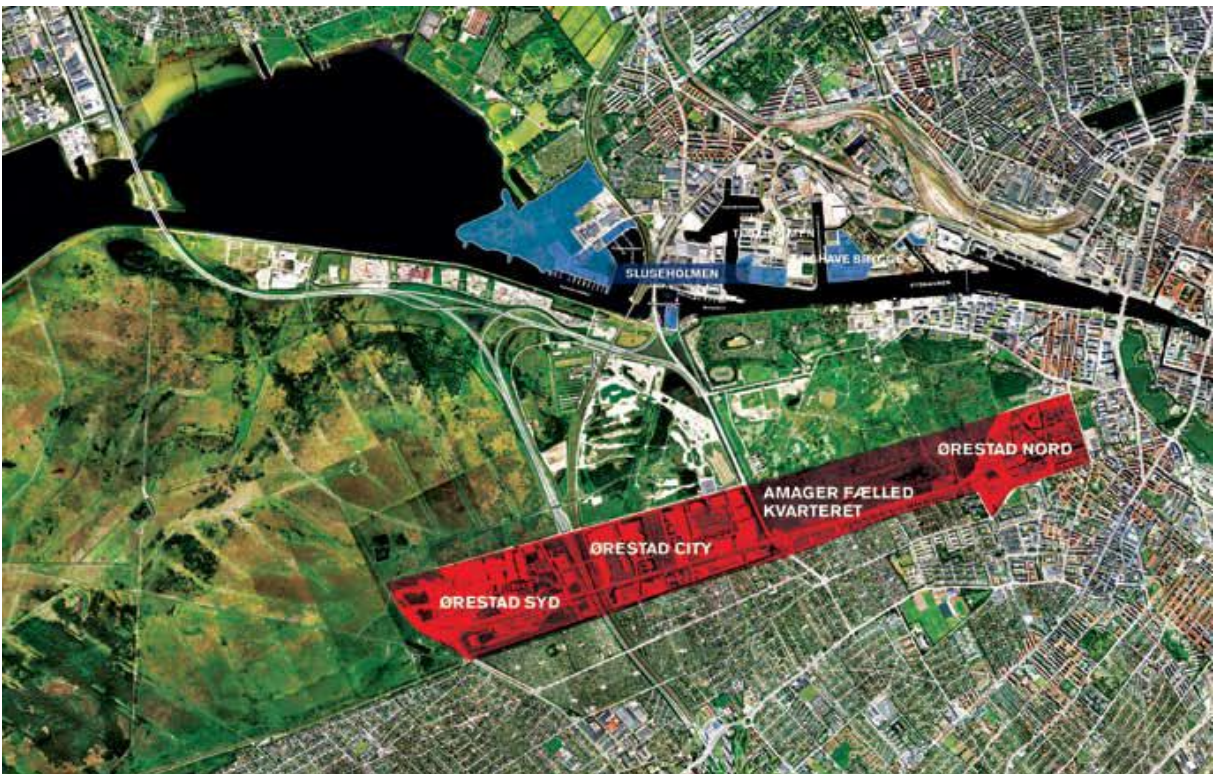
Source: Malmö City (2007a)

Figure 26: Hyllie station and surrounding areas



Source: Malmö City (2008I) Planering i Malmö 1/2008

Figure 27: The areas of Örestad



Source: By &Havn (2007)

Project costs

The prediction of costs has not only differed over time, but also between the Danish and Swedish estimates. Consequently it is very hard to get an overview of the development of cost estimates; not only are matters confused by estimates being made in two different currencies but additional problems are often caused by missing information as regarding whether or not prices are adjusted for inflation. Moreover, depending on which adjoining infrastructure projects are included it is possible to reach different verdicts regarding whether or not the project was delivered within budget. Thus different sources will give different information, but in general it seems that the Danish estimates were somewhat higher than the Swedish estimates, and that the Link, like many other mega projects, has been subject to escalating costs during the decision-making and construction phases. A low estimate would imply a 25% cost overrun for the finished project compared to the estimates made at the time the project gained parliamentary consent. The main source of cost overrun is the connecting infrastructure on the Danish side, which was close to 70% higher than the estimates made in 1991, but the actual coast-to-coast link and the connecting infrastructure on the Swedish side were also subject to substantial cost overruns.

Source: Flyvbjerg (2003)

Predicted costs and actual costs

In the 1987 report *Fastaförbindelser*, the later chosen alternative was predicted to cost SEK 9.3bn in 1986 prices (equivalent to around EUR 1.74bn in 2007).

In early March 1991, only weeks before the agreement to build the link was signed, a memorandum (not made public at the time) from DOC estimated the cost at SEK 15.825bn (roughly EUR 2.1bn in 2007 prices)³. The same memo stated that the Danish estimates were SEK 17.725bn (roughly EUR 2.4bn in 2007 prices). According to the Danish estimates the costs for the actual coast-to-coast facilities were some SEK 1.4bn higher, while the costs for the connecting railways were expected to be SEK 500m higher.

Source: Falkemark (1993: 45-46 & 55)

In the proposition presented to the Swedish parliament later the same year (prop. 1990/91: 158) the construction costs for the link were estimated at SEK 15bn (1991 prices, equivalent to EUR 2.06bn in 2007 prices).

In November 1995 a report presented to the government estimated the construction cost, including a buffer, at DKK 14.175bn. In May 1997 the estimate had escalated to DKK 14.75bn, equivalent to SEK 17.353bn (all figures in 1990 prices).

Source: Prop 1996/97: 161

The 1997 annual financial report from the OC, presented in March 1998, states that the revised budget of DKK 14.75bn (1990 prices) is equivalent to SEK 19.9bn in 1997 prices⁴. This sum is roughly equivalent to EUR 2.39bn in 2007 prices. The escalating costs are attributed to maritime safety efforts, environmental protection and a third category simply labelled 'other'. Maritime safety efforts account for around 42% of the escalation, while the other two categories account for 34% and 24% respectively.

Source: The Oresund Consortium (1998)

³ The exchange rate between SEK and EUR is calculated at SEK 9.3/EUR.

⁴ The exchange rate between DKK and SEK is calculated at DKK 86.31 for SEK 100.

In the 1997 government proposition the escalating costs are described in more detail.

The safety efforts attributable to the escalating costs include:

- Demands from Danish authorities regarding the Drogden channel: DKK 70m;
- Demands from Swedish authorities regarding the Flint channel: DKK 110m;
- Searching for bombs in the area: DKK 30m;
- Improved fire security in the tunnels: DKK 31m.

The environmental demands attributable to escalating costs include:

- Documentation of digging, reporting to the control and steering committee: DKK 89m;
- Sanitation of Lernacken: DKK 61m;
- Railway chock suspension: DKK 43m.

The construction cost escalations (referred to as 'other' in the report from the OC) include:

- Escalating costs for the construction works at the artificial peninsula near Kastrup airport, soil deposition, geotechnical investigations: DKK 90m;
- Escalating costs for the contractor organisation: DKK 51m.

Summary: DKK 575m.

Additionally the buffer, or reserve in the original budget had been used up which was attributed to the following costs:

- Escalating costs due to the icy winter in 1995/96, speeding up of construction process, demands from contractors: DKK 188m
- Escalating costs for contractors: DKK 6m.

Source: Prop 1996/97: 161

The total cost of the finished project was estimated at DKK 30.1bn by the OC in 2000 prices. After first converting to SEK (at a 1.2 exchange rate) then adjusted for inflation and finally converted into EUR this would be equivalent to EUR 2.885bn in 2007 prices.

Source: The Oresund Consortium (2007: 19)

Timeline of Project Cost Estimates

1987	1991 internal memo	1991 official report	1997⁵	2000
EUR 1.74bn	Swedish estimates: EUR 2.1bn Danish estimates: EUR 2.4bn	EUR 2.06bn	Figures from the annual report of the OC: EUR 2.39bn	The OC estimates the finished project to have cost EUR 3.097bn

⁵The Oresund Consortium (2007)

Timeline of project delivery

1993: September: Preparations for construction of the Danish land infrastructure commence.

1994: June: The Swedish government approves the application to construct the link on Swedish territory on the condition that certain environmentally related demands are met.

1994: July: The Danish ministry of traffic approves the main features of the form, alignment and environmental conditions of the link on Danish territory.

1995: July: The agreement with the Öresund Tunnel Contractors for construction of the tunnel section is signed. The agreement with Öresund Marine Joint Venture for dredging and construction of the artificial island is signed.

1995: October: Construction of the coast-to-coast link begins with dredging in the Sound.

1995: November: The contract with Sundlink Contractors is signed.

1995: December: Work commences on the Swedish land infrastructure.

1996: July: The government grants SVEDAB permission according to the environmental protection code to redesign, extend and operate the existing railway (*continentalbanan*) in Malmö. Construction of the bridge pylons commences in Malmö.

1996: December: Manufacturing of the tunnel elements commences in Copenhagen.

1997: July: The Water Rights Court grants permission to Svedab regarding lowering of the groundwater in proximity to four overpasses along the outer ring road. The first of 51 bridge pylons is put in place.

1997: August: the first of 20 tunnel sections is put in place.

1997: September: The motorway extension between Kastrup and E20/E47 opens for traffic.

1997: November: The first of 49 bridge sections (for the connecting bridges) is delivered from the manufacturer in Cadiz, Spain and is transported by barge to Malmö.

1998: June: The first of eight sections for the high bridge is put in place.

1998: September: The railway between Kastrup and Copenhagen Central station is opened for traffic. The Danish land infrastructure is finished.

1998: October: The modified railway through Malmö (*kontinentalbanan*) is opened for traffic.

1998: December: The dredging in Oresund is completed.

1999: January: The last tunnel section is put in place. The first of the pylons for the high bridge is put in place.

1999: March: The first car passes through the tunnel.

1999: June: The last section of the bridge is completed.

1999: December: The railway tracks are completed.

2000: March: Sundlink Contractors hand over the bridge to the Öresundsbro consortium.

2000: June: Öresund Tunnel Contractors and Öresund Marine Joint Venture hand over the tunnel and the artificial island to the Öresundsbro consortium.

2000: July: The link is inaugurated.

Source: Svedab (2008)

Main engineering features

Details of engineering and construction

The bridge section

Dimensions:

- Main span: 490m;
- Total length: 7.845km;
- Suspended length: 1.092km;
- Clearance: 57m;
- Deck width: 23.5m;
- Pylon height: 203.5m.

Quantities used in construction:

- Structural steel: 82,000 tonnes;
- Concrete volume: 320,000m³;
- Reinforcing steel: 60,000 tonnes;
- Steel for cable-stays: 2,300 tonnes.

Source: <http://en.structurae.de/structures/data/index.cfm?ID=s0000333>

The tunnel section

Dimensions:

- Total length: 4.050km;
- Tunnel length: 3.750km;
- Length of immersed tube tunnel section: 3.51km;
- Number of tunnel units: 20;
- Tunnel unit weight: 57,500 tonnes.

Quantities used in construction:

- Concrete volume: 660,000m³;
- Reinforcing steel: 20,000 tonnes.

Source: <http://en.structurae.de/structures/data/index.cfm?ID=s0004167>

The artificial island:

Dimensions:

- Length: 4.055m;
- Width: 500m;
- Area: 1.3m²;
- Material: 1.6 million tonnes of stone and 6 million m³ of sand and seafloor sediment.

The artificial peninsula at Kastrup airport:

Dimensions:

- Length: 430m;
- Area: 0.9km²;
- Material: broken stone, granite, moraine clay.

Source: The Oresund Consortium (2005)

Main Contracts

The bridge:

Aerodynamic studies	Danish Maritime Institute
Consulting engineers	Ove Arup & Partners Gimsing & Madsen A/S ISC Consulting Engineers A/S Setec TPI
Co-contractor	COWI Consulting Engineers and Planners AS Hochtief AG Højgaard & Schultz a/s Monberg & Thorsen Skanska AB VBB Anläggning
Subcontractor	Alpin Technik und Ingenieurservice GmbH
Cables	Freyssinet International
Prestressing	Freyssinet International
Stay cable steel supplier	Trenzas y Cables de Acero PSC, S.L.
Bearings	magebasa
Formwork	PERI GmbH STREIF Baulegistik GmbH

Source: <http://en.structurae.de/structures/data/index.cfm?ID=s0000333>

The tunnel:

Civil engineering	Symonds Group
Co-contractor	Dumez E. Pihl & Søn A.S. John Laing Construction NCC International Royal Boskalis Westminster N.V.
Subcontractor	DYWIDAG-Systems International Ltd. Mooser-Schwingungstechnik GmbH
Formwork	PERI GmbH

Source: <http://en.structurae.de/structures/data/index.cfm?ID=s0004167>

D PROJECT TIMELINE

Year	Month	Type of decision/event	Decision/Event
1984		Project initiation	The ERT presents the report 'Missing Links'.
1984		Project initiation	The Öresunds delegation (OD) is appointed by the Swedish and Danish governments.
1985	June	Alignment & financing	The OD presents its first report, recommending a railway tunnel in the northern part of the Sound and a bridge for road traffic between Malmö and Copenhagen. The report also recommends that the project should be financed outside the state budgets.
1986	May	Implementation	The OD starts discussing the effects a fixed link would have on water flow in the Sound. This issue would become central for the investigation work and the decision process.
1986	June	Implementation	The Danish parliament decides to build a fixed link across the Great Belt.
1987	July	Implementation & alignment	The OD presents the report, <i>Fasta Öresundsförbindelser</i> (SOU 1987: 41) which presents and compares different alternatives.
1987	September	Implementation	The Swedish social democratic party's 30 th congress is held, the issue of a fixed link is a central topic.
1989	February	Implementation & alignment	The report <i>Fasta Öresundsförbindelser</i> (SOU 1989: 4) is presented, in which two alternatives are singled out and compared.
1990	April	Alignment & implementation	The Danish social democrats vote yes to the combined road and railway link between Copenhagen and Malmö.
1990	April – May	Alignment & implementation	The social democratic government and members of parliament vote yes to the combined road and railway link.
1990 - 1991		Implementation & financing	The parliaments in the respective countries process propositions regarding the financing of the project. It is decided that the connecting infrastructure must be financed by user fees for the coast-to-coast link. No government grants should be used for the project.
1991	March	Implementation	The report <i>Miljö Öresund</i> is presented to the Danish parliament.
1991	March	Implementation	On 23 March the Swedish and Danish governments sign an agreement to build a fixed link between Malmö and Copenhagen.
1991	June - August	Implementation	Both countries' parliaments vote yes to the proposition regarding the construction of a combined road and railway link consisting of a bridge, an artificial island and a tunnel. Both governments ratify the agreement in August.
1991	August	Implementation	The Swedish government decides on EIA procedure.
1992	January	Implementation & financing	The OC is formed.
1992	July	Implementation	The OC delivers an application for permission to build and operate the fixed link to the government.
1993	January	Implementation	The SNBEP rejects the application. The government decides that the errand should be handed over to the WRC.
1993	October	Implementation	Construction of the Danish connecting infrastructure begins.
1993	November	Implementation	The WRC approves the application under the condition that the proposal is adjusted so that it meets the criteria for a zero impact solution.

Year	Month	Type of decision/event	Decision/Event
1994	February	Implementation	The OC delivers an adjusted application to the WRC
1994	May	Implementation	The WRC turns down the revised application since the zero impact solution still cannot be guaranteed.
1994	June	Implementation	After consulting two independent consultants assuring that the zero impact solution is possible with the revised application, the government grants permission to the project.
1994	June - August	Implementation	The OC begin negotiations with contractors.
1995	July	Implementation	The OC signs contracts with two consortia. Öresund Tunnel Contractors landed the contract for constructing the tunnel while Öresund Marine Venture landed the contract for dredging and construction of the artificial island.
1995	October	Implementation	Construction of the coast-to-coast section of the link begins with dredging.
1995	November	Implementation	The OC signs a third contract with Sundlink contractors regarding the construction of the bridge.
1995	December	Implementation	Construction of the connecting infrastructure on the Swedish side begins.
1996	July	Implementation	The government grants SVEDAB permission according to the environmental protection code to redesign, extend and operate the existing railway (<i>kontinentalbanan</i>) in Malmö. Construction of the bridge pylons begins in Malmö.
1996	December	Implementation	Manufacturing of the tunnel elements begins in Copenhagen.
1997	July	Implementation	The Water Rights Court grants permission to Svedab regarding lowering of the groundwater in proximity to four overpasses along the outer ring road. The first of 51 bridge pylons is put in place.
1997	August	Implementation	The first of 20 tunnel sections is put in place in the Drogden straight.
1997	September	Implementation	The motorway between Kastrup airport and E20/E47 opens for traffic.
1997	November	Implementation	Construction of the bridge begins.
1998	September	Implementation	The railway between Kastrup airport and Copenhagen central station opens for traffic. The Danish land infrastructure is completed.
1998	October	Implementation	The modified railway through Malmö (<i>kontinentalbanan</i>) opens for traffic.
2000	July	Implementation	The link is inaugurated

Key timeline issues

One of the most important events in the process leading up to the decision to build the fixed link was the publication of the report *Öresundsförbindelser* in June 1985. This report recommended that the project should be financed outside the state budgets and that the viability of the project should be measured in business economic rather than socio-economic profitability. This recommendation was followed and it became one of the central issues by which the different alternatives featuring in the investigatory stages were measured. As Falkemark (1993) points out, it is quite surprising that this did not cause much controversy given that the viability of infrastructure investments, according to a paragraph in the budgetary law, should always be accounted for by using socio-economic cost-benefit analysis models. The demand for economic viability in a business economic sense clearly

had a huge impact on the final choice of solution for the fixed link. According to Falkemark (1993 & 1999) this unusual evaluation model favoured alternatives including road traffic over the railway-only options.

The timing of the signing of the agreement between the two governments in March 1991 was arguably a result of several events played out in both domestic political arenas, as well as overarching political events in the international arena. Firstly, since Denmark is a nation with many islands, fixed links are a matter of high regional political relevance, and in the 1970s it was agreed that there could be no fixed link across the Sound before the link across the Great Belt. The Danish decision to build a fixed link across the Great Belt in June 1986 thus removed a domestic policy lock regarding a fixed link across the Sound to Sweden.

Another domestic political matter in both countries regarded the need to get approval for the project within the social democratic parties. Initially there was widespread resistance to the project amongst the social democrats in both countries. The September 1987 social democratic party congress in Sweden marked the start of a long and drawn out internal political struggle that would not end until spring 1990, when the social democrats of the Swedish government and the parliament concurred with the combined road and railway option. The Danish social democrats also agreed to give the combined road and railway option their support in April 1990, which enabled ruling government support for the project in the Danish parliament.

The readiness to reach agreement regarding the form and shape of the link in spring 1990, after the issue had been debated for decades, has arguably also something to do with events in the international political arena. The fall of the Berlin Wall and subsequent collapse of the Iron Curtain and the Soviet bloc probably meant that the idea of a cross border infrastructure project in the former northeastern outpost of the west bloc gained more political support.

The controversy surrounding the EIA procedures in the respective countries is also reflected in the timeline. In Denmark the main EIA document, *Miljö Öresund*, was presented to the parliament in March 1991, only weeks before the agreement was signed with the Swedish government. In Sweden the agreement with the Danes preceded the EIA and the actual permission to go ahead with the project was not given until June 1994, after the application had been rejected several times by two different juridical instances.



E PROJECT FUNDING/FINANCING

Introduction

The Oresund link was the first infrastructure project in Sweden entirely financed outside the state budget. According to a paragraph in the budgetary law, infrastructure should normally be paid for by state grants using state revenue as the only source of funding. There is however a possibility for the parliament to decide on alternative ways of financing if necessary reason is deemed to exist.

Background to funding/financing

Financing outside the state budget was a central thought from the first investigations and reports presented by the OD in the mid-1980s. The 1991 agreement between the two governments clearly states that the construction of the link and connecting infrastructure should not burden the state budgets of the two countries. The financing model agreed upon was a user fee charge model, in which the upfront costs would be met by loans on the national and international credit markets. The loans would be repaid by revenues from user fees, for which road and train traffic are the sources. The train traffic generates a sum of DKK 429m per year (roughly equivalent to EUR 58m, 2007 prices), amounting to more than a third of the revenues for the Oresund Consortium. This fixed sum was agreed upon in the 1991 agreement and is shared equally between the two countries' national railway administrations. The railway administrations in turn charge the train operators for using the link.

The loans for the coast-to-coast section of the link are the responsibility of the Oresund Consortium. The loans were taken on the international credit market and the two states act as guarantors through their main financial institutions (the Swedish National Debt Office and Denmark National Bank). When the link opened for traffic in July 2000 the debt for the coast-to-coast section amounted to DKK 19.6bn (2000 prices), roughly equivalent to EUR 2.6bn (conversion rate EUR 1 = DKK 7.46).⁶

The construction of the connecting land infrastructure on the Swedish side was financed by loans taken by SVEDAB directly from the Swedish National Debt Office, which amounted to some DKK 2.6bn (2000 prices), roughly equivalent to EUR 349m. It is however important to note that this figure does not include the cost of the outer ring road, which was financed by the Swedish National Road Administration via state budget grants. The only figure available for the cost of this section is a pre-construction estimate of SEK 1.2bn (1997 prices) amounting to roughly EUR 130m. Consequently the figure for the cost of infrastructure on the Swedish side is considerably higher than the SEK 2.6bn often mentioned.

The loans for the connecting land infrastructure on the Danish side taken by A/S Öresundsförbindelsen amounted to DKK 7.9bn (2000 prices), equivalent to EUR 1.05bn.

A central element of the financing model is that the loans taken by SVEDAB and A/S Öresundsförbindelsen for the connecting infrastructure will be repaid with the revenues the Oresund Consortium extracts from road and rail traffic once the loans for the coast-to-coast section of the link have been repaid. Given the high initial financial costs in the form of interest rates this model entails, it is expected (according to the latest estimates by the Oresund Consortium) that the first payments to the owner companies will be made in 2014.

⁶Conversion rate based on Denmark National Bank's history of currency exchange rates. In 2000 the average exchange rate was DKK 7,4631 to EUR 1.

SVEDAB's only source of income until this stage is reached is a standard fee paid by the Swedish National Rail Administration for use of the railroad on the link. SVEDAB will thus continue to finance operations by lending money and it is expected that the loan will peak at some SEK 6bn before the surplus from the Oresund Consortium will be available to pay off the debt.

Meanwhile the running costs for the owner companies are financed through loans and capital infusion from the national road and railway administrations of the respective countries. Maintenance of the connecting road and railway infrastructure is for instance carried out by the national road and railway administrations and paid for by state budget grants.

A clausal in the 1991 agreement also exempts the construction of the project from VAT.

The coast-to-coast section of the link also received financial support from the EU's TEN programme. By the completion in 2000 it was estimated that this support had amounted to some DKK 780m (1990 prices).

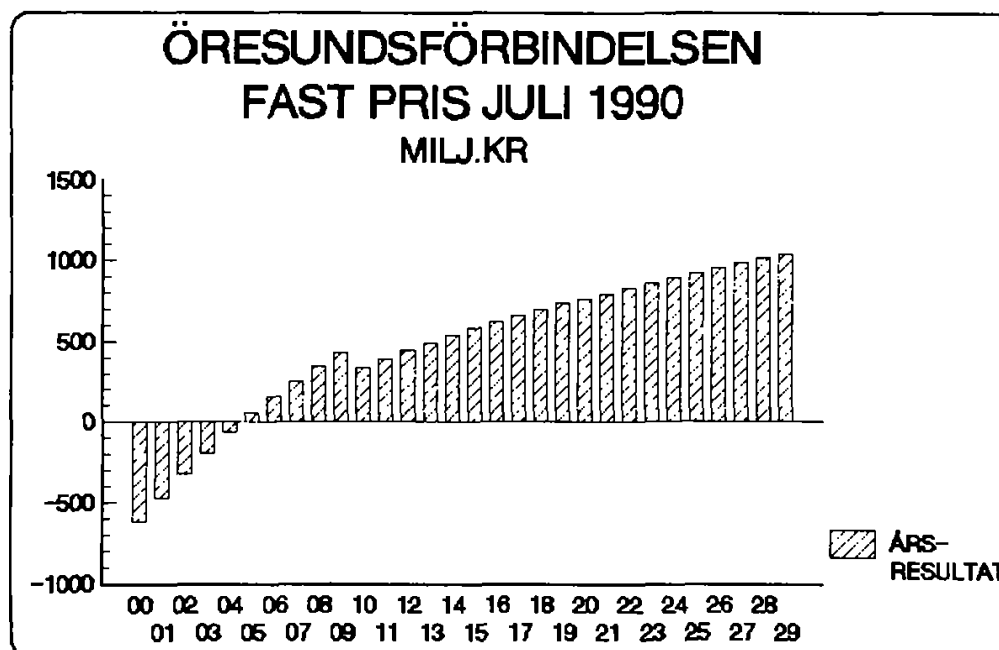
Source: Prop 1990/1991: 158, Riksdagensrevisorer (2000), The Oresund Consortium (2007), The Oresund Consortium (2008a), The Oresund Consortium (2008b), SVEDAB (2008b).

Revenue

Due to the pricing mechanism of the project, revenues are closely associated with the volume of road traffic crossing the link. Two other factors that have a great influence on revenues are the level of user fees and the development of financial costs (mainly interest rates). The level of user fees for road traffic are regulated by the Oresund Consortium but according to the 1991 agreement between the governments the price for crossing the link must be set using the price of the ferry route between Helsingborg and Elsinore as a point of departure. The reason behind this, from an economic point of view, somewhat peculiar pricing mechanism was political. This clausal in the agreement was above all pushed for by the Danes since they wished to protect the ferry route in the northern part of the Sound. Thus there is no explicit figure regarding user fees in the agreement but in the calculations regarding the financial soundness of the project a user fee for road traffic of SEK 160 (1990 prices) is used.

Figure 28 shows the result of the net result prediction calculation (in July 1990 prices), presented in the proposition regarding the agreement between the Swedish and Danish governments in 1991. The horizontal axis shows the year after completion and the vertical axis shows the predicted annual result (in SEK m). After a few years of negative results initially it is expected that a turning point will be reached after five years, when revenues will increase steadily from a small surplus in the fifth year of operation to a surplus of SEK 1bn in the 29th year of operation.

Figure 28: The net result prediction of the Oresund link in 1991



Source: Prop 1990/91: 158

In May 2000 the Oresund Consortium made the following prognosis for the year 2007 (2007 prices): 15,732 vehicles per day paying an average user fee of DKK 272 per crossing would generate DKK 1.25bn in revenue and the financial cost of interest rates would amount to DKK 1.078bn.

The outcome for 2007 was the following: 18,432 vehicles per day paying an average fee of DKK 173 per crossing generated DKK 934m in revenue while the cost of interest rates amounted to DKK 827m.

The net result for 2007 was a loss of DKK 89m: the Oresund Consortium was however expecting to show a positive net result for the first time in 2008.

During the first year of operation the volume of road traffic was substantially lower than the estimates before completion. This led the Oresund Consortium to reduce user fees in order to attract more traffic. The prices are now differentiated with the possibility for commuters to sign agreements, making the cost substantially lower than the average one-way fare. The options range from the standard one-way ticket of SEK 325 per crossing for a car to about SEK 78 per passage if one signs a monthly or annual agreement with the Oresund Consortium and crosses the link 50 times in one month. There is also a possibility for commuters working in Denmark and living in Sweden to make tax deductions equalling DKK 50 per crossing (if they go by car or motorcycle). The price differentiation for road traffic has a major impact on the Oresund Consortium's revenues, given that this is the main source of income. The large proportion of commuters in the daily road traffic (accounting for around 36% of the daily crossings) on the link means that the price differentiation strategy will have a substantial impact on revenues from the link. This is reflected in the comparison between the prognosis for 2020 made in 2000 and the revised prognosis for the same year made in 2007. The earlier prognosis estimates that the average price per crossing in 2020 would be DKK 282 (2007 prices) while the revised prognosis estimates it at DKK 149 (2007 prices). Revenues are still expected to be higher for 2020 compared to the initial estimates, as the traffic volumes for 2020 are expected to be almost double the estimates made in 2000.

Table 1: Actual revenues (in DKK m) since year of opening

Year	2001	2002	2003	2004	2005	2006	2007
Revenue from road traffic	503	556	598	668	729	820	934
Revenue from railway	384	393	403	408	412	421	429
Other	19	20	20	11	13	10	16
Total revenue	906	969	1021	1087	1154	1251	1379

Source: The Oresund Consortium (2005), (2008a) & (2008c)

The figures in the above table show actual revenues since year of opening divided into sub categories. The revenues from road traffic have increased substantially although, due to the reduction in prices, not as much as the increase in traffic volumes (see 'Traffic volume'). The revenues from the railway are adjusted upward each year to allow for inflation. The category of 'other' is mainly attributable to revenues from allowing other actors to use the fibre optic cables and mobile phone systems of the link.

Sources: Öresundsbrokonsortiet (2008a), Öresundsbrokonsortiet (2008b), Öresundsbrokonsortiet (2008c nyhetsbrevetjuni), Öresundsbrokonsortiet (2005)

Funding costs

The 1991 agreement between the governments guarantees that the loans taken by the Oresund Consortium, SVEDAB and A/S Öresundsförbindelser through the Danish and Swedish national financial institutions (the Swedish National Debt Office and Denmark National Bank) should not be subjected to guarantors' fees. The main source of funding costs is thus the payment of interest rates on the loans taken during construction and the initial period of operations. Table 2 shows the development of financing costs since the opening year, on which the low interest rates during 2004 and 2005 had a substantial effect. In 2007 the interest rates increased, entailing increasing costs. The full extent of real interest rate increases are however not reflected since about 50% of the loans are fixed rate loans not affected by rate fluctuations. The level of the real interest rate is however very important given the financial structure of the project.

Table 2: Net financing costs since opening year

Year	2001	2002	2003	2004	2005	2006	2007
Net. financing costs	808	757	780	676	697	759	872

Source: The Oresund Consortium (2005) & (2008b)

Because the Swedish and Danish states are acting as guarantors for the loans of the Oresund Consortium, the credit ranking of the company is treated as essentially the same as that of the two states, which ensures advantageous deals for the loans.

Sources: the Oresund Consortium (2005) & (2008b)

Overview of key stages in funding approach

- 1985: the delegation appointed by the two governments proposes that the project should be financed outside the state budgets, the profitability of the project to be judged on business economic, rather than socio-economic, grounds;
- 1991: the agreement between the Swedish and Danish governments is signed. The chosen alternative of a combined road and railway link between Sweden is viewed as the best alternative from an economic perspective. The agreement also states that the connecting infrastructure should be funded by revenues from the coast-to-coast section of the link.

Traffic forecasts and financing/funding response

The chosen financing model, in which user fees from road traffic are paramount, have meant that forecasts of the economic viability of the project and traffic predictions have been intimately connected. At the time of opening the forecasts for road traffic had been increased (see 'Traffic volume') and expectations were high. The first few years of operation did however prove to be a big disappointment regarding road traffic, while train traffic fared better (although ridership was still lower than estimates made shortly before opening). The success of the train traffic did however, given the financial structure of the project, not have any positive impact on the economic situation. This entailed a rather bleak financial situation in which the date of repayment of the loans was pushed several years into the future. The OC's main response to this problem was to lower the taxes. In 2003 a number of pricing changes were made, including price differentiation involving subscription schemes aimed specifically at car commuters, multi-trip cards and combined tickets for the Oresund link and the ferry crossing between Rödby-Puttgarden aimed at the not-so-frequent traveller and holiday-makers. Another strategy that has been implemented is aimed at business customers, providing a similar subscription scheme as that for commuters.

Sources: The Oresund Consortium (2008a), the Oresund Consortium (2005b), the Oresund Consortium (1999)

Funding sources

Apart from DKK 50m in funding capital for the Oresund Consortium forwarded from SVEDAB and A/S Öresundsförbindelser, there are two main financial sources for the project – the loans taken by the Oresund Consortium, SVEDAB and A/S Öresundsförbindelser and the EU funds from the TEN programme.

The loans of the Oresund Consortium are taken on the national and international finance markets with the two governments acting as guarantors, while SVEDAB and A/S Öresundsförbindelser have lent money directly from the Swedish National Debt Office and Denmark's National Bank.

The agreement with the guarantors stipulates that the currency of the loans can only be DKK, SEK and EUR. At the end of 2007 the majority of the loans were in EUR, with a small proportion in DKK and about 1% in SEK.

Sources: Prop 1990/91: 158, the Oresund Consortium (2008a), the Oresund Consortium (2008b)

Perhaps the agreement between the municipality of Malmö and Euroc regarding the land use agreement deal for the connecting infrastructure (see 'Land acquisition') can be viewed as an indirect form of funding. This deal, struck between the Oresund Consortium and municipality of Malmö on the one hand and Euroc on the other, must certainly be of great value for the involved parties. Even though it is not possible to say how much this deal meant for the funding of the project it is at least clear that it must have meant a substantially lower cost for land acquisitions.

Commentary on financing/funding

The decision to finance the project outside the state budget by a user fee structure can arguably be seen as the most important decision in the history of the project. This decision, which also prescribed that the project had to be viable on business economic, rather than socio-economic, terms had a huge influence on the outcome of the project since it greatly affected the choice between the alternatives in the early decision-making process.

Source: Falkemark (1999)

The close connection between traffic volumes and the financial viability of the project has been a central theme since the beginning of the project and this premise



F OPERATIONS

Traffic volume

In 2007 the link was used by almost 25 million passengers, around 15 million of whom travelled by car and the remaining 10 million by train. This equals roughly 67,200 persons crossing the link daily (40,600 by car and 26,600 by train). Compared to 2001 the number of crossings has increased by almost 100%. While the traffic increase was rather modest during the first years of operation, quite drastic increases have occurred from 2004 onwards.

Table 3: Railway: goods and passenger traffic

Year	No. of loaded carriages	Tonnes of goods	No. of passenger trains	No. of passengers	Increase of passengers from previous year	Increase of passengers since first full year of operation (2001)	Average daily traffic
2000	43,882	1,580,647	15,628	2,677,000			14,668
2001	83,575	2,990,697	54,025	4,919,000			13,476
2002	85,162	3,170,411	53,921	5,372,000	9%	9%	14,718
2003	88,278	3,402,680	50,914	5,692,000	6%	16%	15,594
2004	90,170	3,467,661	49,840	6,232,000	9%	27%	17,074
2005	98,171	3,692,598	47,502	6,617,000	6%	35%	18,129
2006	98,790	3,699,093	47,470	7,766,000	17%	58%	21,277
2007	98,300	3,775,000	46,960	9,704,000	25%	97%	26,586

Source: The Oresund Consortium (2008a)

Apart from the 46,960 passenger trains crossing the link in 2007, there were also crossings of 8,850 goods trains. This amounts to around 140 trains per day or an average of six trains (three in each direction) crossing the link every hour. The majority, 60%, of passengers on the trains are commuters, which causes problems with rush hour traffic. The solution to this problem has been to double the traffic during rush hour to six trains in each direction.

An interesting observation to be made from table 3 is that the number of passenger trains has decreased since 2001 from 54,025 to 46,960 while the number of passengers simultaneously has risen by 97%. The reason behind this is not clear but a possible explanation is the introduction of longer train sets.

Source: The Oresund Consortium (2008a)

Table 4: Annual average daily traffic (AADT) on the link

Year	Motor cycles	Cars	Vehicles 6–9m.	Buses	Trucks	Total	Relative increase from previous year	Relative increase since 2000
2000	129	8,333	266	124	350	9,204		
2001	67	7,290	204	103	420	8,085	- 12%	- 12%
2002	71	8,510	203	114	496	9,393	16%	2%
2003	74	9,365	234	113	571	10,360	10%	13%
2004	92	10,707	258	160	632	11,848	14%	29%
2005	82	12,328	300	152	737	13,602	15%	48%
2006	89	14,323	389	159	840	15,801	16%	72%
2007	107	16,831	465	153	927	18,482	17%	100%

Source: The Oresund Consortium (2008d)

The figures for the year 2000 are somewhat misrepresentative since the link opened for traffic on 1 July: the value for AADT for this year has been calculated by dividing the annual total by 182.5.

Traffic predictions by mode

Traffic predictions, especially the ones for road traffic, vary considerably between the many reports produced before and after completion of the link (see table 5).

In the 1985 report *Öresunsförbindelser*, road traffic volumes are predicted to be between 6,800 and 12,000 vehicles per day depending on the price of crossing.

Source: Falkemark (1993: 14)

A 1991 report by the consulting firm Transek concluded that the number of crossings would vary considerably depending on the pricing. With fares comparable to the cost of bringing the car across on the ferry from Helsingborg to Elsinore (which was set as a point of departure in the 1991 agreement), it was expected that some 5,700 cars per day would cross the link. The report shows that this price level would entail a modest profit margin that would imply financial difficulties for the project. If on the other hand the price level was reduced to a quarter of the present ferry price, it was expected that some 30,700 cars per day would use the link, which in turn would guarantee a good profit margin and a financially sound project.

Source: Falkemark (1993: 48)

In the proposition presented to the Swedish parliament in 1991 (Prop. 1990/91: 158) road traffic was estimated to be between 8,000 and 10,000 vehicles per day. Train traffic was estimated at about 7 million one-way trips per year, amounting to roughly 18,000–20,000 trips per day. Goods transport was estimated at about 10 million tons annually, half by train.

Source: Prop 190/91: 158

In a 1999 report, the Oresund Consortium estimated the daily number of trips across the link at 21 million per year after opening, of which 12 million were predicted to be made by road,

and the remaining 9 million by train. These estimates implied that 13,606 cars, 979 trucks and 24,658 rail passengers would cross the link each day.

Source: The Oresund Consortium (1999: 7, 8)



Table 5: A summary of some predictions made before and after the completion of the Link

Year of estimate/ source	Year estimate referring to	Estimate road traffic(AADT) /premises	Estimated train passengers(A DT)	Estimated railway goods	Outcome vs prediction
1985/Öresundsdel egationen Cited in Falkemark (1993)	Immediately after opening	6,800, low alternative – same price as the ferry.	n/a	n/a	Above (9,204)
1985/Öresundsdel egationen Cited in Falkemark (1993)	Immediately after opening	12,000, high alternative – fee amounting to 50% to price of ferry.	n/a	n/a	below (9,204)
1991/ Transek (1991)	2000	5,700, low alternative – same price as the ferry.	n/a	n/a	above (9,204)
1991/ Transek (1991)	2000	30,700, high alternative – fee a ¼ of the ferry price.	n/a	n/a	below (9,204)
1991/ Prop 1990/91: 158	“Some years after opening”.	8,000 – 10 000	18,000 – 20,000	5,000,000 tonnes/year	Road: correct (between 8,000 – 10,000) Rail: Passenger – below (roughly 14,500) Goods – Below (roughly 3,000,000 tonnes/year)
1999/ The Oresund Consortium (1999)	2000	14,500	24,000	n/a	Below: road (9,204) train (14,668)
1999/ The Oresund Consortium (1999)	2005	16 000	28 000	n/a	Below: Road (13 064) Train (18 129)
2000/ The Oresund Consortium (2008a)	2007 2020	15,732 22,250	 n/a	 n/a	Above (18,482) n/a
2008/ The Oresund Consortium (2008a) & (2008c) (middle scenario)	2017 2020 2025	39,000 42,889 49,000	n/a n/a 51,000	 n/a	 n/a
2008/The Oresund Consortium (2008c) (growth scenario)	2017 2025 2031	47,000 56,000 60,000	 n/a	 n/a	 n/a

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