

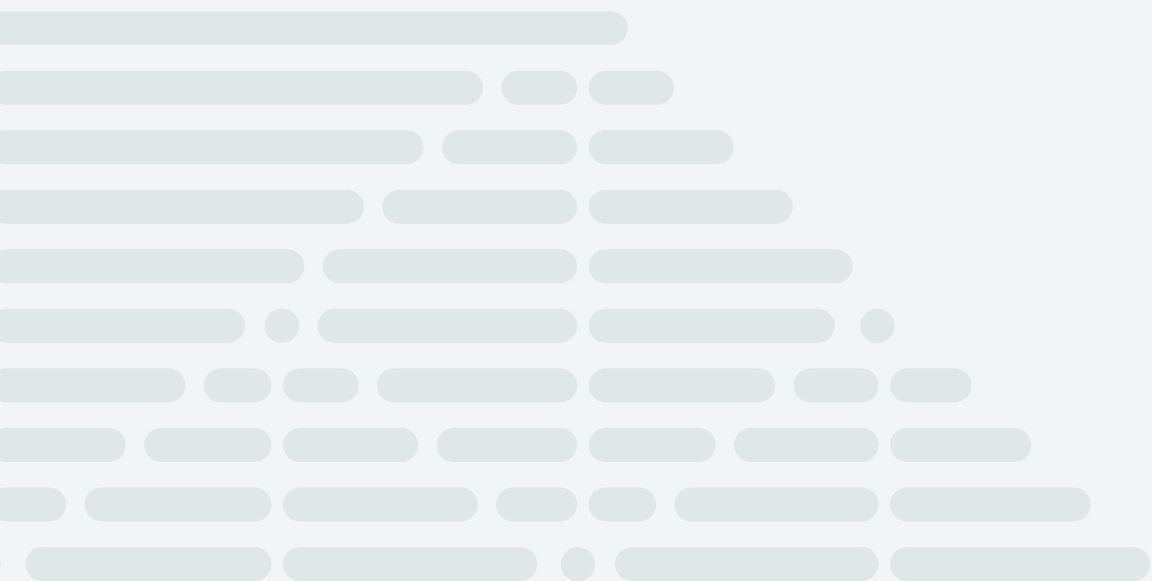
## REFERENCE GUIDE

# Connectivity Across Borders:

Global practices for cross-border infrastructure projects

February 2021





# Foreword

We live in a period of rapid and ongoing globalisation. Although the COVID-19 pandemic has at the time of this writing led to decreased physical connectivity, other connectivity has increased and become more important than ever before. Digital connectivity has reshaped daily life, and strong and secure trade links and regional cooperation have proven critical to ensuring supply chains remain operational and economies do not come to a standstill. In this sense, the pandemic has heightened awareness of the continued need for connectivity across borders.

Cross-border infrastructure plays an important role in facilitating economic and social connectivity. In addition to enabling physical and virtual/digital connectivity, cross-border infrastructure projects can be instrumental in achieving higher-level socioeconomic goals, giving rise to knowledge diffusion, technology transfer and cultural exchange. They also create value through integration of markets and communities beyond what could be achieved via a collection of national projects.

Given these benefits, it is not surprising that the G20 Development Working Group (DWG) has identified regional connectivity as a priority topic, with the aims of promoting dialogue on connectivity issues and raising awareness of bottlenecks and challenges.

Cross-border infrastructure assets are crucial in facilitating this regional connectivity, both physical and digital, but by the very nature of involving two or more countries, these projects face specific challenges. They generally have many of the same risks and require the same elements as national-level projects to achieve bankability, but cross-border project elements and risks are amplified by the scale of the project, the wider spectrum and increased number of parties involved and the need to harmonise the rules and regulatory frameworks of participating countries. Cross-border projects involve, in particular, higher transaction costs, more political risk and increased institutional coordination.

In line with our mandate to address information asymmetries and identify knowledge tools that will assist countries in dealing with frequently encountered but challenging issues in infrastructure delivery, the Global Infrastructure Hub (GI Hub) recently reviewed the cross-border infrastructure praxis. We found that, although there is a wealth of accumulated global experience on cross-border infrastructure, which is documented in literature that effectively highlights the challenges associated with cross-border project planning and delivery, very few sources distil key lessons on how to address these challenges. This Reference Guide seeks to fill this gap by providing infrastructure planners and policymakers with a document that:

- contains a complete overview of issues and complexities involved in the cross-border project lifecycle
- summarises learnings from the research on how these might best be dealt with
- illustrates the learnings through a series of deep-dives into actual cross-border projects.

Importantly, this guide seeks to complement the G20 DWG's work on this topic. The DWG has examined the economics, development strategies and cooperation required to support connectivity infrastructure. Here, we aim to share practical and project-level learnings through the project lifecycle to complement the DWG's strategic work. We also aim to address many of the G20 Quality Infrastructure Investment (QII) Principles, particularly Principle 1: Maximising the positive impact of infrastructure to achieve sustainable development and growth, through setting off a virtual circle of economic activities and promoting sustainable development and connectivity.

Mainstreaming regional connectivity through infrastructure is important for countries to achieve sustainable development goals and drive global economic growth. Our hope is that this Reference Guide will be a useful aid to infrastructure practitioners to manage the challenges associated with the successful implementation of cross-border infrastructure projects.

**"Globally, it is an important time for us to provide a resource devoted to the unique challenges of planning and delivering cross-border infrastructure. Increasing physical and digital connectivity between nations is vital to enlivening trade and improving the socioeconomic realities of populations worldwide, and ensuring fair distribution of benefits of projects across countries."**

**Marie Lam-Frendo**

Chief Executive Officer,  
Global Infrastructure Hub



**"This guide offers all countries a meaningful support in resolving challenges associated with planning and implementing infrastructure across national borders."**

**Peter Heymann Andersen**

Managing Director,  
Ramboll Transport



**Jukka-Pekka Pitkänen**

Global Division Director,  
Ramboll Smart Mobility



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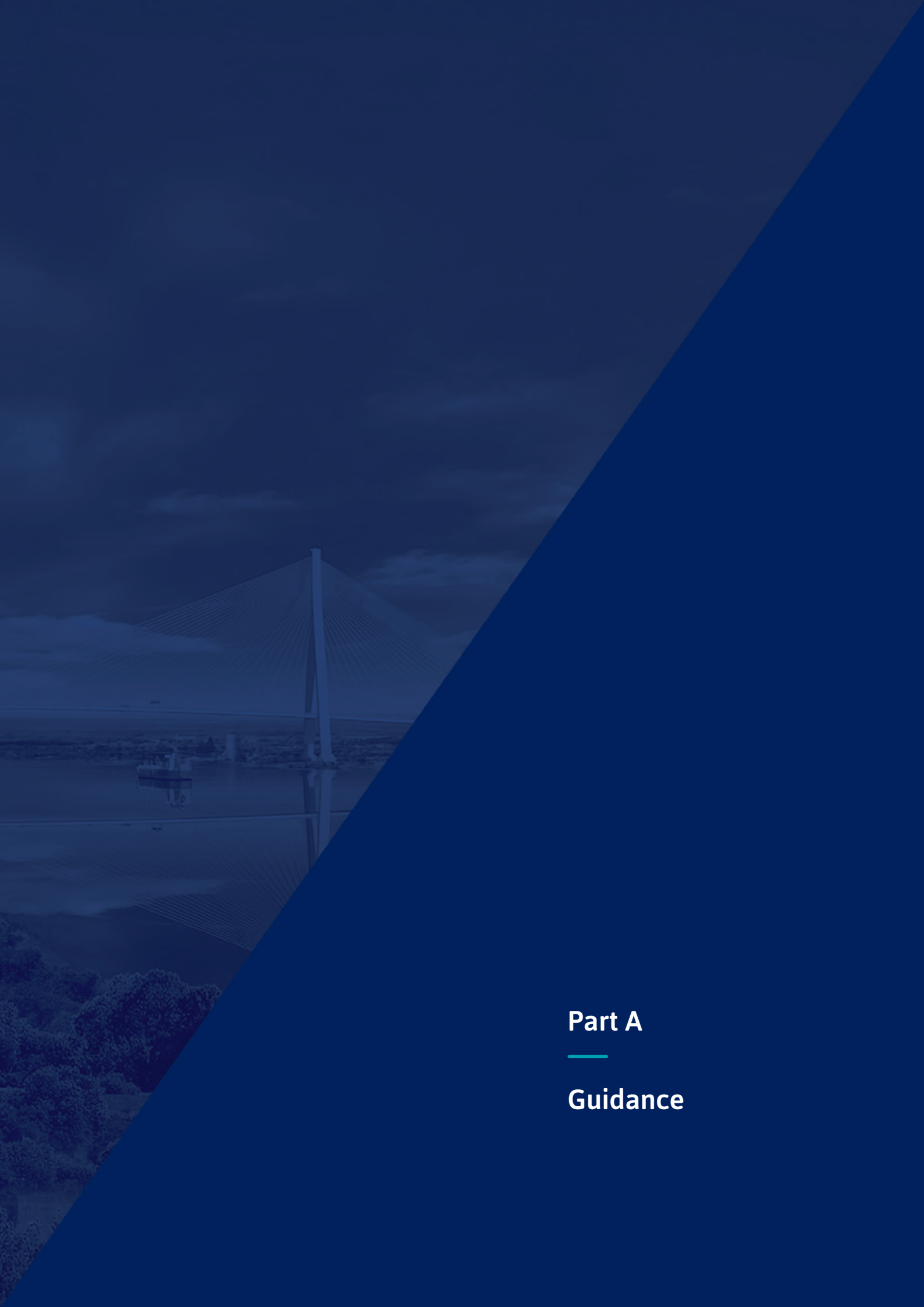
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**Part A**



**Guidance**

# 1. Introduction

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**Cross-border infrastructure projects are complex across many dimensions.**

**By their very nature of traversing the territory of two or more countries, cross-border projects are difficult to plan, manage, finance and execute. The jurisdictions involved may have significantly different policy, legal and regulatory frameworks as well as different financial models and operational rules and standards that must be harmonised. Typically, cross-border projects are also more extensive in scale, engage a wider range and greater number of stakeholders than national projects, and carry higher transaction costs and risks.**

Yet, cross-border projects are often important for countries to enhance physical, economic and social connectivity and attract infrastructure investment. They facilitate strong and secure trade links and regional cooperation, and can promote knowledge diffusion, technology transfer and cultural exchange.

The Organisation for Economic Co-operation and Development (OECD) has found a substantial projected investment gap in transport connectivity infrastructure in developing countries, with current spending levels (as of 2015) meeting only 42% of estimated investment need.<sup>1</sup> The GI Hub and EDHEC Infrastructure Institute's Annual Global Infrastructure Investor Survey (2019) highlighted that 80% of investors want to increase their investment in infrastructure, a number that is up from 65% in 2016, provided that they consider the projects to be bankable.<sup>2</sup> These numbers demonstrate a clear interest from a majority of investors in investing in more infrastructure but also reflect the need to improve how we develop and deliver cross-border projects to enable these investments.

The Global Infrastructure Hub (GI Hub) recently undertook a review of the cross-border infrastructure praxis, and found that although there is a growing library of material available on cross-border projects and supranational coordination, including a particular focus on establishing appropriate institutional frameworks, there is no central resource that distils key lessons on how to address the complexities of cross-border projects.

The purpose of this guide, developed by the GI Hub with research and development assistance from Danish engineering consultancy Ramboll, is to assist infrastructure policymakers and practitioners in managing the additional considerations that arise in projects that cross national boundaries. The guide presents global practices that aim to help answer the question of **how** to develop, manage and implement cross-border infrastructure. These practices are derived from a comprehensive literature review, the input of experts with practical knowledge and experience of cross-border projects, and a selection of case studies across a range of jurisdictions.

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1 Enhancing Connectivity Through Transport Infrastructure: The Role of Official Development Finance and Private Investment, Kaori Miyamoto (January 2018) - <http://www.gica.global/sites/gica/files/Kaori-Miyamoto-GICA-Financing-Infrastructure-Slides.pdf>

2 This was an increase from 2016, but a decrease from the 2017 survey, which showed that 90% of investors wanted to increase their infrastructure investment allocation. The decrease from 2017 to 2019 can be explained by waning appetite to invest in emerging markets, perhaps due to a lack of bankable projects.



## 1.1 STRUCTURE OF THIS REFERENCE GUIDE

This Reference Guide consists of two parts:

- **Part A: Guidance** – This section provides readers with guidance on how to manage key challenges associated with the development of cross-border infrastructure, illustrated by real-world examples of global practices and lessons learned. It first outlines the methodology used to develop this Reference Guide, then discusses cross-border infrastructure projects conceptually and reflects on challenges related to the involvement of two or more countries in a joint undertaking. Next, this section explores in detail the key considerations in delivering cross-border projects and summarises global practices based on:
  - desktop review of about 70 literature sources
  - conclusions from seven in-depth case studies on cross-border energy, transport, and information and communications technology (ICT) infrastructure projects worldwide
- **Part B: Case studies** – This section provides readers with practical examples of successful cross-border projects that may be replicable, as well as lessons learned from these projects, to further illustrate the guidance provided in Part A.

*Appendix A is a glossary of terms, Appendix B lists the literature reviewed in the desktop review and Appendix C contains the reference list.*

## 1.2 ACKNOWLEDGEMENTS

This Reference Guide reflects practical project experience across various geographies, thematic fields and jurisdictions. This knowledge was contributed by project owners (government departments or public sector authorities), financiers and operators who granted the GI Hub permission to use their project content and who reviewed the case study reports.

During the drafting process, an online survey of a targeted group of stakeholders was also organised to supplement findings in the Reference Guide with additional cross-border project experiences. The stakeholders who contributed to the survey represent 20 countries and have backgrounds in transport, energy, water and waste, social infrastructure and ICT.

The final draft of the Reference Guide was available for further comment and inputs during an open consultation period in late 2020.

The GI Hub gratefully acknowledges the governments, organisations and individuals who contributed to this guide during the above stages of its development.

The GI Hub team responsible for preparing the guide comprised Morag Baird, Maud de Vautibault, Stephanie Barker and Michael Twycross. The Ramboll team who assisted in research and development of the Reference Guide included Wiktor Szydarowski, Erik Hedman, Karolina Wrona, Karen Wanner, Richard Sprosen, Von Lopez-Levine, Elodie Papin, Samy Porteron and Bok Wee Leow.





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## Methodology

## 2. Methodology

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This Reference Guide was developed based on desktop research of existing literature, inputs from experts and in-depth study of real-world examples of significant cross-border projects. The steps leading to the development of this Guide are presented in Figure 1 and discussed in detail in the sections that follow.

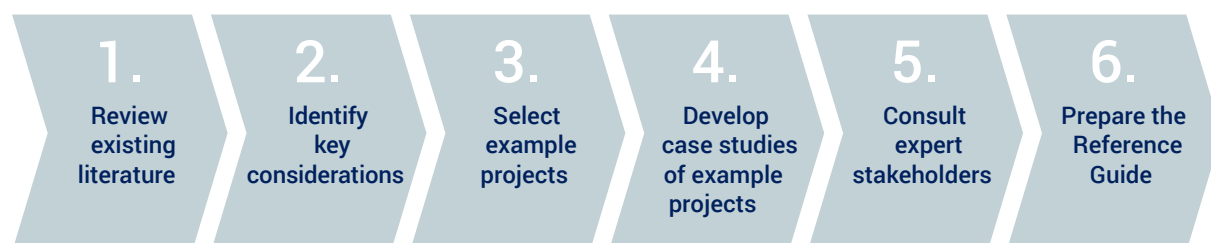


Figure 1: Reference Guide development process

### 2.1 REVIEW EXISTING LITERATURE

The development of this guide began with desktop research to identify existing literature on cross-border infrastructure, including all relevant guidelines, handbooks, toolkits, studies and reports that could be found (see Appendix B). These technical resources were analysed to accumulate practical guidance on the delivery of cross-border projects. The review included categorisation of findings according to characteristics such as publication date, cross-border context, sectoral coverage, geographical focus and thematic content.

### 2.2 IDENTIFY KEY CONSIDERATIONS

The findings from the literature review were then further analysed to ensure a comprehensive and systematic approach to collating and translating the findings into this new guide. The analytical framework applied at this stage incorporated five evaluation criteria: relevance, effectiveness, efficiency, impact and coherence. The team used filtering questions and studied various indicators to identify synergies, overlaps and gaps in the coverage of thematic fields between the sources. The analysis of those helped the team establish the set of key considerations for delivering cross-border projects.

### 2.3 SELECT EXAMPLE PROJECTS

Evaluation and analysis of the literature informed the selection criteria for example projects to be investigated in depth and used as case studies. Example projects were required to:

- offer future cross-border project initiators, owners and managers examples of good project practice, demonstrated particularly in difficult planning, procurement and delivery environments (e.g. due to significantly different legal or political conditions across borders)
- be operational or in an advanced construction stage, with close and realistic completion
- cover infrastructure sectors that fit the guide's definition of cross-border infrastructure
- collectively represent geographical diversity of cross-border projects
- collectively demonstrate coordination between countries of both the same and different types of legal jurisdictions (e.g. civil law and common law)
- offer sufficient access to information (e.g. literature, availability of stakeholders for comment).

The Reference Guide references 22 projects, programs and policies, and presents seven detailed case studies (refer to Table 1). In the guide, the boxes that highlight the example projects are colour-coded according to the issue types they deal with; aqua for project issues, blue for program issues and blue-grey for policy issues.



**Table 1: Summary of the Reference Guide case studies**

Case study	Sector	Status
Øresund Fixed Link (Denmark and Sweden)	Transportation	Operational
Channel Tunnel (UK and France)	Transportation	Operational
N4 Toll Route (South Africa and Mozambique)	Transportation	Operational
Addis Ababa–Djibouti Railway (Ethiopia and Djibouti)	Transportation	Operational
Gordie Howe International Bridge (US and Canada)	Transportation	Under construction
Itaipu Hydroelectric Dam (Brazil and Paraguay)	Energy	Operational
Coral Sea Cable System (Australia, Papua New Guinea, and Solomon Islands)	Telecommunications	Operational



*Note that the lack of a detailed case study in Asia was the result of limited options and available resources during development of the Reference Guide. Nevertheless, the guide refers to several Asian examples.*

## 2.4 DEVELOP CASE STUDIES OF EXAMPLE PROJECTS

Case study development built on the desktop research described above, extended to source all available information on the project. The information was organised in a synopsis document by project lifecycle: development, financing and management. Phone interviews were then conducted with project owners, managers and/or team members to fill gaps and address any apparent inconsistencies. The research and interview findings were drafted into case study reports that followed the same overall structure as the synopsis document. The draft case study reports were circulated to the interviewed stakeholders for their validation and acceptance. Key learnings from the projects were then incorporated into the Reference Guide.

## 2.5 CONSULT EXPERT STAKEHOLDERS

Due to the outbreak of the COVID-19 pandemic, an online survey replaced the consultative workshop that had been planned as part of the communication and consultation activities on the draft findings. The purposes of the survey were to validate the draft findings in the Reference Guide and collect further key learnings and success stories from cross-border projects across the world. The online survey was distributed to a broad but targeted group of policymakers, industry experts and project stakeholders across public and private sector organisations. The International Transport Forum (ITF), OECD Infrastructure Governance network, Trans-European Transport Network (TEN-T) and the Global Infrastructure Connectivity Alliance (GICA) were among the panel of key interviewed stakeholders.

A public consultation period was also held, with industry stakeholders invited to provide feedback on the draft Reference Guide. Feedback and additional inputs from the public consultation were then integrated into the Reference Guide.

## 2.6 PREPARE THE REFERENCE GUIDE

Outcomes of the above efforts were inputs to this final Reference Guide. The sections of the guide are structured around five key considerations in managing cross-border infrastructure projects. These are illustrated by real-world policy and project examples, contained in text boxes for quick reference. The full project case studies found in Part B also illustrate these considerations.

Whilst the Reference Guide provides infrastructure policymakers and practitioners with key learnings from many jurisdictions and sectors, it does not offer strong recommendations on the implementation or delivery of cross-border projects and is not intended to be a step-by-step toolkit. Instead, it points toward global practices based on the learnings of governments, organisations and individuals worldwide, collated through this participative study.



### 3

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## Definition of cross-border projects

### 3. Definition of cross-border projects

Defining cross-border projects is not straightforward. At one end of the spectrum are projects where the physical infrastructure assets are located in more than one country. Opposite on the spectrum are projects that are physically located only in one country, but which have a considerable impact in another. In the middle are projects that have potential cross-dependencies and in which there is a cross-border element. The greater the inter-country dependencies, the more challenging the funding, financing and governance of such projects.

For the purpose of this guide, we adopt a functional definition which states that:

1. Cross-border projects have a physical footprint that traverses the territory of two or more countries (e.g. roads, railways, water systems, crossings, pipelines or transmission cables). This excludes projects that have a regional dimension but a footprint in only one country, such as airports.
2. Cross-border projects are characterised by distinct locational, development, cooperation and risk features. Table 2 summarises these features.

Table 2: Cross-border project characteristics

Location	They traverse the territory of two or more countries and enable their physical connectivity.
Development context	By connecting communities across country borders, they may boost growth opportunities as they give rise to knowledge diffusion, technology transfer and cultural exchange.
Cooperation	They require intergovernmental arrangements to generate wider economic benefits in the entire cross-border area and contribute to regional integration. They generally require a higher level of coordination than purely national projects.
Augmented risk profile	While they generally require the same elements as national projects to achieve bankability, and have many of the same risks, cross-border project elements and risks can be amplified by the scale of the project, the wider range and greater number of actors involved, and the need for harmonisation of the rules and regulatory frameworks of the countries involved.

#### 3.1 ADDED VALUE OF CROSS-BORDER PROJECTS

Cross-border infrastructure is necessary to provide international connectivity, enabling access to the global economy, trade, new ideas and education. Cross-border assets are equally critical in emerging and developed economies.

Several intergovernmental networks and international financing institutions – such as the Asian Development Bank (ADB), the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), the European Commission and Nordregio – have reflected on value-added aspects of cross-border projects:<sup>3</sup>

- They create value (so-called cross-border externalities) through integration of markets and by connecting communities beyond what could be achieved by a simple collection of national projects.
- They have the potential to generate spillover benefits for participating countries.
- They lead to interlinked production networks and facilitate international trade while allowing investments and ideas to travel across countries.
- They help enhance cross-border movement, extending academic and labour markets and enabling international infrastructure corridors for long-haul traffic.

3 See the reference list for the sources of information in the bullet points.



- They have direct and indirect links to poverty reduction. Direct beneficial links include the creation of employment and better access to markets, health services and education. Indirect links include increases in productivity and income growth.

For example, a landlocked country that is party to a cross-border project on a transport corridor can gain access to ports for its overseas trade, thereby becoming a part of the 'just-in-time' production and shipping network. Connecting to high-growth economies and global industrial chains can open doors for new and large export markets, which, along with access to new technology and ideas, can trigger industrial growth and job creation. The potential benefits of the cross-border project do not just rest with its parties but are expanded to all countries on the corridor.

There are numerous benefits for investors financing cross-border projects, including access to a bigger market and potentially a more attractive demand risk profile. Multiple empirical studies have shown that upgrading cross-border infrastructure brings trade and economic growth, triggering further demand for better

connectivity<sup>4</sup> and thus creating more opportunities for investment. To attract private finance, it is key to prepare well-structured projects and give investors reason to trust the regulatory frameworks of the countries involved. Multilateral development banks (MDBs) can sometimes act as trusted brokers in cross-border projects by bridging the gaps between parties and providing assurance on rules and regulations (refer to Section 4.1.3 for more detail on the role of MDBs).

Cross-border projects can also help address underlying issues of creditworthiness in a way that purely national projects cannot. For example, greater traffic flows arising from increased connectivity can reduce traffic demand risk associated with roads and railway projects if shared by more than one country, such as through a transport corridor. Similarly, regional power pools can reduce the reliance of independent power producers (IPPs) on a single off-taker,<sup>5</sup> increasing the market and decreasing the risk for investors while creating more robust systems with the potential to lower capital investment requirements and reduce system operating costs.

4 Cross-Border Infrastructure Connectivity: Needs, Facts and Challenges, ADB Institute (December 2016) – <https://www.oecd.org/daf/fin/private-pensions/Matthias-Helble-ADBI.pdf>

5 Mobilising Finance for Infrastructure: A Study for the UK Department for International Development (DFID) (August 2015)





## 4

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### Key considerations in delivering cross-border projects

## 4. Key considerations in delivering cross-border projects

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The following key considerations were distilled through our literature review, expert and industry consultation, and analysis of case studies. The summary below provides an overview of each consideration, and the remaining sections of the Reference Guide explore these in detail.

### 1. Adopting policy, planning and prioritisation frameworks for efficient regional cooperation

Cross-border infrastructure has a clear political dimension, and cross-border projects may raise politically sensitive issues like concerns about imbalance of power, unequal economic gain, project time and cost, or negative externalities. The literature shows that cross-border projects are often assigned a low priority by states, largely on account of the anticipated uncertainty associated with arduous planning processes and complicated coordination.

This section summarises global practices for frameworks and shares strategies to: help articulate a project vision based on mutual development goals, prioritise projects to achieve shared benefits and ensure appropriate institutional capacity.

### 2. Creating legal, regulatory and stakeholder alignment to enable cross-border delivery

The involvement of more than one jurisdiction multiplies risk and any complications. For example, a participating country might decide to reduce or suspend road tolls on a transnational highway. Or participating countries might have different regulatory frameworks that lead them to favour diverging approaches to tendering and procurement, causing serious delays at various points during a project.

This section highlights global practices that help ensure a coordinated enabling environment for cross-border project delivery through intergovernmental project agreements, targeted and broad stakeholder engagement, the assessment of mutual costs and benefits using a cost-benefit analysis (CBA), and the harmonisation of rules and regulations.

### 3. Optimising the financial structure to properly allocate risks and benefits

Cross-border projects are capital-intensive,

have high transaction costs and often encounter difficulties in financial structuring due to their augmented risk profiles. The financial challenges can stem from: asymmetries in the countries' economic strengths, sovereign ratings or regulatory frameworks; geopolitical risks; and exposure to different administrative and financing mechanisms in the countries concerned.

This section considers the various barriers to, and risks in, the financing of cross-border projects – focusing in particular on currency risk mitigation and the options available to ensure a viable financial structure.

### 4. Establishing effective governance structures

Without an agreed project governance structure to address the above challenges, it will be impossible to achieve durable benefits from a cross-border project. The governance body should reflect the project's context and the broader development goals to be achieved by building the infrastructure.

This section addresses assessment of the project landscape to choose the most appropriate governance format, establishment of the governance body and provision of adequate capacity to successfully deliver the project.

### 5. Managing efficiently throughout the project lifecycle

In a multi-stakeholder landscape involving the formal parties to the project, engaged organisations and interest groups, a cross-border project may face changing levels of commitment. Cross-border projects are also susceptible to changes in legal frameworks, competing priorities and agendas, and limited mandates and budget capacities. Some of these issues may result in disputes. Furthermore, cross-border project owners must strive to manage and maintain social licence throughout the project lifecycle, which is not easy, given the aforementioned risks and challenges.

This section discusses flexibility in governance structures, the resolution of operational risks and contractual disputes, and the consideration and mitigation of social, environmental and cultural impacts to achieve and maintain social licence.





## 4.1

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Adopting policy, planning  
and prioritisation  
frameworks for efficient  
regional cooperation

#### 4.1 ADOPTING POLICY, PLANNING AND PRIORITISATION FRAMEWORKS FOR EFFICIENT REGIONAL COOPERATION

Policy and planning frameworks are essential to enable efficient cooperation and the achievement of mutual goals and objectives. In particular, they help project parties to:

- identify national and regional goals and objectives, and articulate these into a political vision (Section 4.1.1.)
- prioritise projects that can help achieve this vision within the context of national and regional infrastructure plans and broader economic development strategies (Section 4.1.2)
- ensure the institutional capacity required to deliver projects or programs in line with the aforementioned development strategies (Section 4.1.3).

Such frameworks are particularly pertinent where multiple national laws, regulations and decisionmaking bodies are involved. Not only do they facilitate delivery of a successful project that achieves development outcomes for all countries involved, but they can also contribute to the achievement of broader economy-wide benefits and investment spillovers.

#### Summary of key learnings for policy, planning and prioritisation frameworks

Key learnings suggest that governments should consider the following:

- A cross-border project requires a shared vision that addresses mutual development goals. Project champions can help advocate for the project using this vision and can be effective avenues for developing the project.
- Higher-level frameworks should be utilised to identify priority cross-border projects for countries or regions within their respective development strategies. Such frameworks can work with bilateral and multilateral trading agreements to optimise coordination.
- Cross-border projects require dedicated resources and coordinated planning between countries. Institutional capacity and coordination need to be maintained throughout the project lifecycle. International bodies, such as MDBs and international organisations (IOs), can help supplement and develop the institutional capacity of countries to deliver cross-border projects.

##### 4.1.1 Identifying a political vision based on mutual development goals

It is critical that there is first a joint political vision for a cross-border project, built on the policies and priorities of the project partners (refer to Figure 2).



Figure 2:<sup>6</sup> Growth trajectory of cooperative governance arrangements in a cross-border project

6 Szydarowski W., Tallberg P. 2013, Multi-level governance. European experience and key success factors for transport corridors and transborder integration areas. Task 3.2 report. BSR TransGovernance project, amended, <https://scandria-corridor.eu/index.php/en/component/phocadownload/category/18-bsr-transgovernance>

In theory, the idea of a cross-border project starts with an individual (a champion) who has a vision and advocates for the development of a cross-border infrastructure asset, building support among top-level decisionmakers and other key stakeholders. This individual may be an employee in a government department or may be outside government. The vision and narrative used to build support are born from the project's purpose, whether that purpose is related to geostrategy, trade, the economy, political friendship or another theme (refer to Section 4.2.2 for further detail on champions). If there is sufficient support for the project vision among the right people from both countries, the project idea then enters the planning stage, where it is positioned against the backdrop of governmental and intergovernmental development priorities and perceived benefits.

In reality, the individual who creates the vision for a cross-border project is often not the eventual champion who helps bring the project to fruition. Like most other infrastructure projects, cross-border projects usually have long lead times and go through several iterations of design and purpose. This is particularly true of those projects that are transformative or 'futuristic'.<sup>7</sup> Good examples of this are the crossings of the English Channel and Øresund Sound (refer to Box 1: From vision to reality – The Channel Tunnel and Øresund Fixed Link).

A cross-border project may become transformative for several reasons. For example, it may:

- enable economic growth of the partner country or countries (refer to Box 2: Joint opportunities in the Coral Sea)
- be a catalyst for development in a wider geographical area (refer to Box 3: Bilateral cooperation on the Øresund Fixed Link) or a spatial development corridor (refer to Box 9: The corridor context of the N4 Toll Route)
- significantly boost the national income of the partner country or countries, provided the investment effects are strengthened by regulatory reforms and improvements to ancillary infrastructure (refer to Box 4: Economic opportunities for Lao PDR and China through high-speed rail link).

## PROJECT

### Box 1: From vision to reality – The Channel Tunnel and Øresund Fixed Link

Although these two projects were completed near the turn of the millennium, visions for both the Channel Tunnel and Øresund Fixed Link were first proposed in the 1800s.

The Channel Tunnel was first proposed in 1802, with Napoleon III and Queen Victoria even approving a design in 1867 and attempting construction in 1880, before dropping the project due to safety concerns. Several more proposals were raised over the next 150 years before François Mitterrand and Margaret Thatcher championed the idea again in the 1980s. Construction was completed in 1994.

The Øresund Fixed Link we know today could have been very different if the first proposal given to King Karl XV of Sweden in 1865 was pursued, as it was solely a tunnel instead of a bridge and tunnel. The Fixed Link that operates today was developed through proposals first sought in the 1930s and 1950s. The First Nordic Council meeting in 1953 saw political support for the project, and in 1973 an initial agreement to construct the link was signed between Denmark and Sweden. However, due to economic, energy and political crises affecting both countries, plans to construct the Fixed Link came to a standstill. It was not until 1991 that the two governments signed a new agreement to build the project. Construction was completed in 2000.

*See the Channel Tunnel and Øresund Fixed Link case studies in Part B for further detail on these projects.*

Source: [http://www.omegacentre.bartlett.ucl.ac.uk/wp-content/uploads/2014/12/SWEDEN\\_ORESUND\\_PROFILE.pdf](http://www.omegacentre.bartlett.ucl.ac.uk/wp-content/uploads/2014/12/SWEDEN_ORESUND_PROFILE.pdf)

<sup>7</sup> For a detailed look at the future of infrastructure and the megatrends shaping the industry, refer to the GI Hub's Infrastructure Futures Report.

## PROJECT

### Box 2: Joint opportunities in the Coral Sea

For Papua New Guinea and Solomon Islands, the Coral Sea Cable System (CS<sup>2</sup>) has the potential to be transformative for economic growth. By providing cheaper, faster and more reliable internet service, it is expected to boost development opportunities for local businesses and communities in the two countries.

Through a complementary domestic network in Solomon Islands, key provincial centres should also benefit from the international cable system, extending the economic and social benefits of high-speed internet to more of the highly dispersed population.

In Papua New Guinea, the CS<sup>2</sup> is part of the vision to improve domestic connectivity and stably connect the country to the international network.

*See the Coral Sea Cable System case study in Part B for further detail on this project.*

## PROJECT

### Box 3: Bilateral cooperation on the Øresund Fixed Link

Denmark and Sweden decided to work together on the Øresund Fixed Link, sharing a vision of the investment as a catalyst for development in the entire region.

The joint investment led to benefits on both sides of the border. The Danish economy gained from an influx of labour, and the Swedish economy took advantage of the reduced unemployment and influx of capital to develop housing near the Swedish footprint of the Fixed Link.

*See the Øresund Fixed Link case study in Part B for further detail on this project.*

#### 4.1.2 Using frameworks to prioritise projects and achieve mutual development goals

To formulate and achieve the mutual development goals established in the vision for a project, higher-level cooperation frameworks are an important component. These frameworks usually work with bilateral and multilateral trading agreements, multi-target action plans, and implementation and funding programs, which underpin broader multi-country cooperation arrangements. They should therefore be

based on a common development vision or common set of objectives.

In many cases, higher-level cooperation frameworks with a stated goal of increasing regional integration and connectivity have proven important in overcoming countries' reluctance to develop cross-border projects. These frameworks establish a coordinated method of prioritising infrastructure projects and sustaining commitment, with due attention to the soft dimension of investments, including procedures, regulations, tariffs and other rules applicable to trade and logistics services (refer to Box 4: Economic opportunities for Lao PDR and China through high-speed rail link).

## PROJECT

### Box 4: Economic opportunities for Lao PDR and China through high-speed rail link

The Lao-China high-speed railway is part of China's Belt and Road Initiative (BRI). A study by the World Bank estimates that the link could increase Lao PDR's aggregate income by up to 21% over the long term if the Lao Government implements regulatory framework reforms and improvements to ancillary infrastructure. These include developing logistics services, removing restrictions to entry and competition in the transport market, allowing access to rail infrastructure, and improving customs and border crossing procedures to reduce border delays.

Additionally, if the reforms are successfully implemented, the project could result in significantly lower land transport prices for both countries, with reductions of 40–50% between Vientiane and Kunming, China.

Source: <https://www.worldbank.org/en/country/lao/publication/transforming-lao-pdr-from-a-land-locked-to-a-land-linked-economy>

Cooperation frameworks may have a global dimension (refer to Box 5: The Belt and Road Initiative), a continental dimension (refer to Box 6: Projects of common interest by the European Commission), or a regional dimension (refer to Boxes 7 and 8 on COSIPLAN and the West Africa Power Pool).

Two of the major corridor network programs in Europe are the aforementioned TEN-T program and its counterpart the Trans-European Networks for Energy (TEN-E) program. These programs aim to improve, respectively, connections between different modes of transport and energy infrastructure within the European Union.

## PROGRAM

### Box 5: The Belt and Road Initiative

The Belt and Road Initiative (BRI) is a framework initially aimed at improving infrastructure links in participating economies, which collectively represent more than one-third of global GDP and over half of the world's population.

While it is considered to be an initiative focused on attracting further investment into infrastructure, President Xi of China has stated that the overall objectives and scope are much broader, encompassing the achievement of mutual benefits like shared development goals and better global integration, saying: "... we hope to achieve policy, infrastructure, trade, financial and people-to-people connectivity and thus build a new platform for international cooperation to create new drivers of shared development."

Source: <https://www.oecd.org/finance/Chinas-Belt-and-Road-Initiative-in-the-global-trade-investment-and-finance-landscape.pdf>

Development in these corridors will connect regions currently isolated from European transport connections or energy markets, strengthen existing cross-border interconnections and help integrate renewable energy. Figure 3 depicts the core TEN-T network, comprising nine corridors.

Projects on the TEN-T and TEN-E networks are eligible to receive EU grants, typically in the form of co-financing. For example, funds for TEN-T projects can come from:

- the TEN-T Annual Work Programme and Multi-Annual Work Programme
- cohesion funds
- other supports such as the Connecting Europe Facility (CEF) and European Investment Bank.

The Trans-European Transport Network Executive Agency (INEA), established by the European Commission, is responsible for managing the technical and financial implementation of the TEN-T program.

A list of 30 common priority infrastructure transport projects has been established by the EU member states. The Øresund Fixed Link was one of the flagship projects of the TEN-T program.

## POLICY

### Box 6: Projects of common interest for the European Commission

The European Commission and its executive agencies adopted the term 'project of common interest' (PCI) to denote key cross-border infrastructure projects that link the energy or transport systems of EU countries. They are intended to help the EU achieve its transport, energy and climate objectives, such as those in accordance with the Paris Agreement.

For example, to be denoted a PCI in the energy sector, a project must:

- have a significant impact on energy markets and market integration in at least two EU countries
- boost competition in energy markets and help the EU's energy security by diversifying sources
- contribute to the EU's climate and energy goals by integrating renewables.

The selection process gives preference to projects in priority corridors, as identified in the TEN-E and TEN-T programs.

PCIs may benefit from:

1. accelerated planning and permit granting
2. a single national authority for obtaining permits
3. improved regulatory conditions
4. lower administrative costs due to streamlined environmental assessment processes
5. increased public participation via consultations
6. increased visibility to investors
7. the right to apply for funding from the CEF.

The Celtic Interconnector between Ireland and France is an example of a PCI project that has benefited from CEF funding during the feasibility, initial design and consultation, and detailed design and construction phases. It had received a total of EUR537.5 million in funding as of October 2019.

Source: [https://ec.europa.eu/energy/topics/infrastructure/projects-common-interest\\_en](https://ec.europa.eu/energy/topics/infrastructure/projects-common-interest_en)



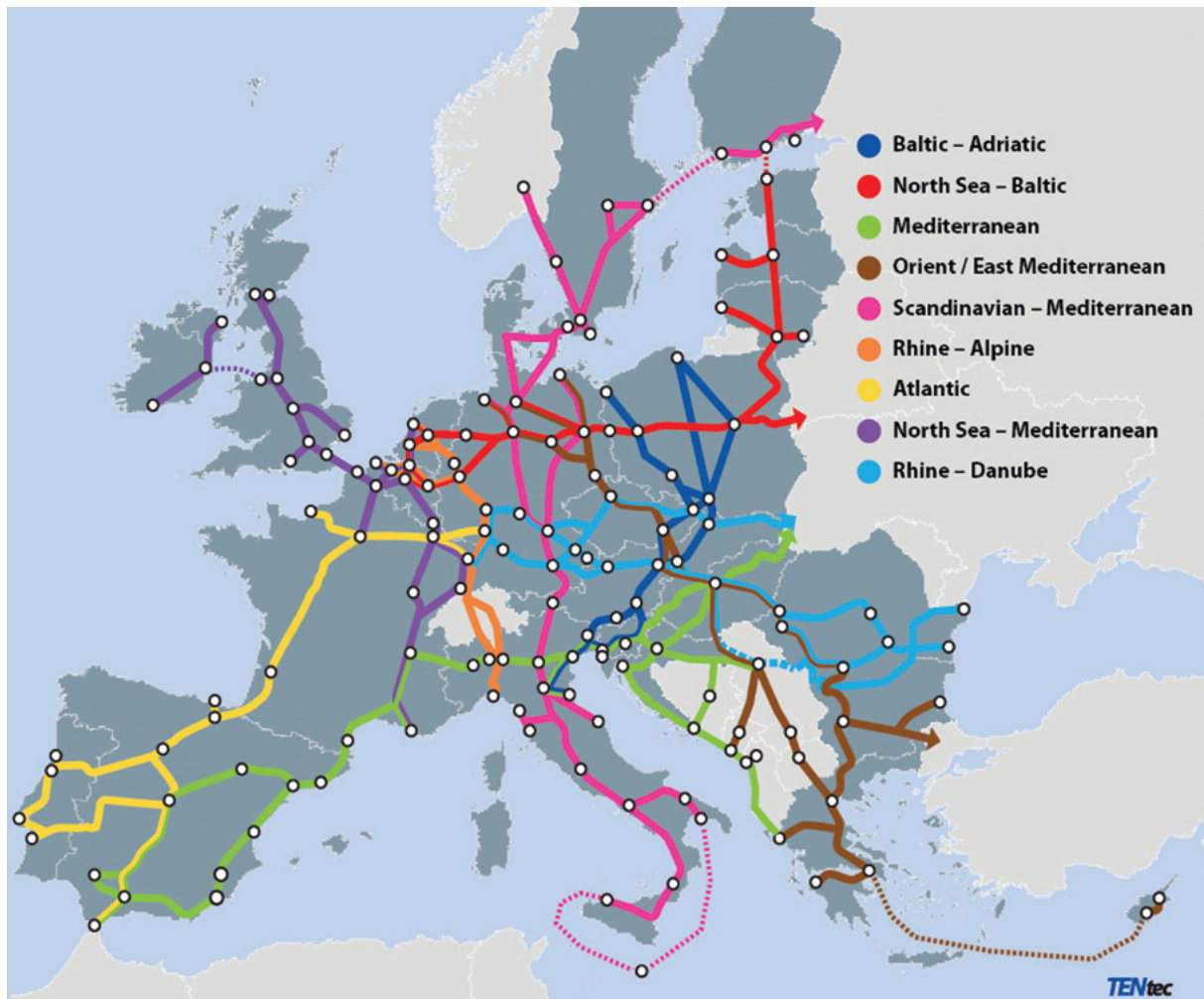


Figure 3: TEN-T core network corridors (Source: <http://www.ec.europa.eu>)

Projects on TEN-T and TEN-E networks can apply for project of common interest (PCI) status and thereby benefit from an accelerated permit granting process and improved regulatory treatment (refer to Box 6: Projects of common interest for the European Commission).

#### POLICY

### Box 7: Cooperation in South America through COSIPLAN

The South American Council of Infrastructure and Planning (COSIPLAN) is the cooperation forum among the 12 member states of the Union of South American Nations (UNASUR). The Council aims, among other things, to:

- promote regional connectivity by building infrastructure networks
- design regional planning strategies for the development of infrastructure
- identify and encourage the execution of priority integration projects.

To accomplish the objectives, COSIPLAN designed its first Strategic Action Plan for 2012–2022. The plan outlines a series of actions executed through annual work plans approved by the COSIPLAN Ministers.

Source: <http://www.cosiplan.org/>

#### PROGRAM

### Box 8: The West Africa Power Pool

The West Africa Power Pool (WAPP) was created to coordinate power exchange among 15 member countries of the Economic Community of West African States (ECOWAS).

The WAPP aims to integrate the states' national power systems into a unified regional electricity market, with the ultimate goal of providing citizens of the ECOWAS region with regular and reliable energy at competitive costs.

The CLSG Interconnector Project – which runs through Cote d'Ivoire, Liberia, Sierra Leone and Guinea – was accelerated as a priority project within the 2012 ECOWAS WAPP Master Plan, based on its anticipated ability to foster regional economic growth.

Source: [www.ecowapp.org](http://www.ecowapp.org)

One prominent type of cooperation framework is the implementation of corridor management bodies, such as that adopted on the Maputo Corridor Spatial Development Initiative (refer to Box 9: The corridor context of the N4 Toll Route project). Corridor management bodies can add value by positioning the cross-border investment in a broader geographic context. This is particularly valuable for landlocked countries, as they generally rely on cross-border infrastructure investment, or even investment along the relevant corridor in another country, to access international markets and products.

#### PROJECT

### Box 9: The corridor context of the N4 Toll Route project

The N4 Toll Route enhances economic cooperation between the neighbouring countries South Africa and Mozambique, but also has wider ramifications for other regional Southern African Development Community (SADC) countries.

The rehabilitation of the N4 Route was contextualised as a rehabilitation of a development corridor, with the project being an essential element of the Maputo Corridor Spatial Development Initiative (SDI). The SDI program used public resources to leverage private investments in regions with a high potential for economic growth.

*See the N4 Toll Route case study in Part B for further detail on this project.*

#### 4.1.3 Ensuring appropriate institutional capacity to deliver a project vision

A conducive enabling environment for infrastructure investment is often a key differentiating factor in the successful delivery of a cross-border project, and creation of a conducive enabling environment depends significantly on institutional capacity and the ability of public institutions to prioritise, plan and deliver infrastructure projects.<sup>8</sup>

To help optimise institutional capacity to deliver projects, governments can look to use frameworks to prioritise strategically important projects, as discussed in the section above. Many governments create a centralised agency tasked with the translation of medium- to long-term infrastructure plans into a prioritised pipeline of projects. In other cases, the function of preparing medium- and long-term plans

<sup>8</sup> For more information on leading practices in achieving a conducive enabling environment for project preparation, see the GI Hub's Leading Practices in Governmental Processes Facilitating Infrastructure Project Preparation Reference Guide at <https://www.gihub.org/project-preparation/>



is vested with external specialised organisations. These agencies can be established for cross-border specific purposes. For example, one of the specific objectives of COSIPLAN (refer to Box 7: Cooperation in South America through COSIPLAN) is to “consolidate the Project Portfolio for the Integration of the South American Regional Infrastructure.” The COSIPLAN Project Portfolio currently includes 581 integration projects throughout the region, for which the body aims to obtain political support and viable financing conditions.<sup>9</sup>

Where this prioritisation function is not anchored in a capable and empowered institution, MDBs and IOs can help to address capacity challenges through initiatives such as Project Preparation Facilities (PPFs) and observatories (refer to Box 10: The IDB’s Mesoamerican Observatory on Freight Transport and Logistics), among others. Through these initiatives, MDBs may offer anything from upstream technical assistance to create a conducive enabling environment, to downstream project preparation support. Refer to Section 4.3.2.2 on the role of MDBs and IOs with respect to financial support for infrastructure projects.

Other IOs, such as GICA, offer capacity building support to governments through cooperation frameworks and knowledge exchange. GICA was launched by the G20 to close the knowledge gap related to infrastructure connectivity and is supported by MDBs and IOs, including the World Bank Group and the OECD. GICA provides a collection of maps of key connectivity initiatives from around the world.<sup>10</sup>

In Asia, there are several regional initiatives that aim to improve connectivity, many of which are supported by MDBs. For example, the ADB has supported the Central Asia Regional Economic Cooperation (CAREC) program;<sup>11</sup> the European Bank for Reconstruction and Development (EBRD) has been very active in the region, with a particular focus on Kazakhstan; and the relatively new Asian Infrastructure Investment Bank (AIIB), which began operations in January 2016, highlights connectivity and regional cooperation as a key thematic priority in its Corporate Strategy.<sup>12</sup>

## PROGRAM

### Box 10: The IDB’s Mesoamerican Observatory on Freight Transport and Logistics

Observatories, more common in the freight industry than other industries, are entities established to support robust policy development, modern economic regulation and sophisticated infrastructure planning.

The Inter-American Development Bank (IDB) launched the Mesoamerican Observatory on Freight Transport and Logistics with the aim of generating information and statistics to enhance policymaking for increased competitiveness in the region. Other key goals of the observatory include:

- enhancing knowledge of transport and logistics across the region
- measuring and comparing logistics performance
- harmonising information and developing regional databases
- providing training to improve performance
- joining the network of other observatories supported by the IDB in the region to create a regional network.

Source: [https://www.iadb.org/en/news/news-releases/2012-10-11/mesoamerican-observatory-freight-transport-and-logistic,10156.html?wt.mc\\_id=NewsEmail\\_Long\\_10156&wtarticleid=10156&wtsrc=Email&wttype=Long](https://www.iadb.org/en/news/news-releases/2012-10-11/mesoamerican-observatory-freight-transport-and-logistic,10156.html?wt.mc_id=NewsEmail_Long_10156&wtarticleid=10156&wtsrc=Email&wttype=Long)

<sup>9</sup> <http://www.iirsa.org/Page/Detail?menuItemId=32>

<sup>10</sup> <https://www.gica.global/maps>

<sup>11</sup> The CAREC Program is a partnership of 11 countries and six multilateral development partners working to promote regional cooperation in four priority areas: transport, trade facilitation, energy and trade policy

<sup>12</sup> AIIB Corporate Strategy for 2021–2030 ([https://www.aiib.org/en/policies-strategies/strategies/.content/index/\\_download/AIIB-Corporate-Strategy.pdf](https://www.aiib.org/en/policies-strategies/strategies/.content/index/_download/AIIB-Corporate-Strategy.pdf))



## 4.2

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Creating legal, regulatory  
and stakeholder  
alignment to enable  
cross-border delivery

## 4.2 CREATING LEGAL, REGULATORY AND STAKEHOLDER ALIGNMENT TO ENABLE CROSS-BORDER DELIVERY

Even with optimal frameworks in place to identify and plan the right projects, achieving alignment to deliver them is difficult. Different policy and planning systems in the countries engaged in the cross-border project make coordination more complex than on national projects. Similarly, the involvement of more than one jurisdiction multiplies risks. Alignment on legal and regulatory issues is key, as is getting all the right stakeholders on board and aligned.

### Summary of key learnings for creating legal, regulatory and stakeholder alignment

The key learnings suggest that governments should consider the following:

- Where possible, intergovernmental agreements should be used to help align governments on project objectives and ensure the project is not adversely affected by changes in national policies or legal and regulatory frameworks.
- All relevant stakeholders, including relevant affected industries and communities, should be involved to define the win-win perspective and reap durable benefits from the project. Multi-level governance mechanisms can be effective in facilitating involvement of stakeholders.

This section highlights the value of:

- effectively using intergovernmental project agreements to align on objectives (Section 4.2.1)
  - involving the right stakeholders at the right time through multi-level and multi-stakeholder frameworks (Section 4.2.2)
  - assessing mutual costs and benefits to understand project viability (Section 4.2.3)
  - harmonising rules and regulations to ensure equity in implementation (Section 4.2.4).
- 
- It is essential to quantifiably assess costs and benefits for each party – including environmental, social and governance (ESG) considerations. Given the complex nature of cross-border projects and the fact that the parties do not have complete visibility of the project context from the perspective of any other party, scenario analysis is essential to understand risks and draft multi-lateral agreements. To be most useful, scenarios should include extreme scenarios.
  - Binational or multinational frameworks can be put in place to harmonise rules and regulations, including tariffs, customs and border crossing procedures, and technical operability and safety standards. This will help enable smooth planning, delivery and operation.

### 4.2.1 Effectively utilising intergovernmental project agreements

For a cross-border project to succeed, the policy and planning systems of the countries involved must be reconciled. This is usually done through appropriate intergovernmental agreements, signed by the parties to the project. The agreements translate the political vision and project idea (refer to Section 4.1 on policy, planning and prioritisation) into a sustainable and durable governance model for the project (refer to Section 4.4 on governance structures).

To provide certainty about the development and management of the project, the agreement should place the countries involved on an equal footing. This helps ensure that the cross-border project is

not significantly affected by changes in the policy environment or legal or regulatory frameworks of the countries involved. Agreements should also be flexible enough to deal with significant changes that arise (refer to Section 4.5 Managing efficiently throughout the project lifecycle).

The binding power of the agreement will vary based on what it includes and specifies. One example is a memorandum of understanding expressing the common will of the parties and setting a common line of action to accomplish the investment. Another is a legal commitment act under both national and international law,<sup>13</sup> such as the Treaty of Canterbury for the Channel Tunnel (refer to Box 11: The Treaty of Canterbury). Such an act binds the parties to

<sup>13</sup> Article 19: In order to resolve any disputes regarding the Concession, the relevant provisions of the Treaty and the Concession shall be applied. The rules of English law or the rules of French law may, as appropriate, be applied when recourse to these rules is necessary for the implementation of particular obligations under English law or French law. In general recourse may also be had to the relevant principles of international law, and if the parties in dispute agree, to principles of equity

cooperation, specifies roles and obligations of each, and sets up an organisational and contractual scheme for the project – including a dedicated binational entity to carry out the investment. Such an agreement can also serve as a foundation for financing the project, as seen with the Gordie Howe International Bridge (refer to Box 12: The Canada–Michigan Crossing Agreement).

#### PROJECT

##### Box 11: The Treaty of Canterbury

The Treaty of Canterbury, signed on 12 February 1986 by British Prime Minister Margaret Thatcher, British Foreign Secretary Sir Geoffrey Howe, French President François Mitterrand and French Minister of Foreign Affairs Roland Dumas, provided for an undersea tunnel between the two countries (the Channel Tunnel).

The Treaty settled the outlines of the Concession for the construction and operation of the Channel Tunnel by privately owned companies and outlined the methods to be used for arbitration in the event of a dispute. It also set up the Intergovernmental Commission (IGC), which is responsible for monitoring all matters associated with the construction and operation of the tunnel on behalf of the British and French Governments, together with a Safety Authority to advise the IGC.

*See the Channel Tunnel case study in Part B for further detail on this project.*

#### PROJECT

##### Box 12: The Canada–Michigan Crossing Agreement

On 15 June 2012, the Government of Canada and the State of Michigan signed a Crossing Agreement to provide fundamental guidance on the design, build, financing, operation and maintenance of the Gordie Howe International Bridge.

The Agreement set the financing framework, ownership, operation rights, requirements for the procurement of materials, jurisdictional processes and procedural requirements the crossing would need to satisfy. Further, it allowed for the establishment of a crossing authority (to become Windsor-Detroit Bridge Authority), whose role would be to direct and administer all aspects of the crossing's implementation, from financing to procurement and eventually maintenance and operation.

*See the Gordie Howe International Bridge case study in Part B for further detail on this project.*

Stakeholders are critical to creation of a project rationale that is based on a win-win perspective for the countries concerned. This rationale is what will ultimately see a cross-border project prioritised in national, long-term infrastructure development plans and funded in national budgets. Without project champions, who are often senior government representatives or bureaucrats that can influence the politics between countries and stakeholders, a project may easily fail on account of concerns about the preservation of sovereignty and potential backlash from taxpayers.

In project planning and preparation, there is a marriage between politics and projects. Internal, domestic and international engagement and dialogue are essential, and stakeholders are sources of productive dialogue.

The win-win perspective for a project should consider the balance of interests, the project ownership and power sharing arrangement, and the common objectives of the parties. Appropriate time and resources need to be invested during project planning to establish relationships with relevant stakeholder representatives and form a consensus-building dialogue that will result in a vision that addresses these issues.

#### 4.2.2 Getting the right stakeholders in the room

All projects need to appropriately and effectively identify project stakeholders and get their input and buy-in. Stakeholders contribute to project success in two key ways:

1. They can become champions of the project across all levels of government and industry, and their buy-in is essential to driving the project forward and establishing project agreements and frameworks.
2. They represent the institutional capacity and ability of the relevant organisations to design, deliver, operate and use the cross-border project effectively.

Potential stakeholders include internal stakeholders from within government agencies and jurisdictions, as well as external stakeholders from affected industries and communities domestically and internationally. The large number of stakeholders interested in and affected

by a cross-border project creates a need for more intense stakeholder identification and coordination, as demonstrated well by the multi-level governance approach described in Box 13: Collaboration benefits through multi-level governance.

## POLICY

### Box 13: Collaboration benefits through multi-level governance

Multi-level governance (MLG) originated as a theory during European integration in the 1990s, when the shift in authority from individual nations to the EU made decisionmaking more complex. What were previously national issues became international issues, necessitating consideration of a wider number of interests. The internationalisation of decisions was also perceived to reduce the voice of local and regional governments and other actors.

An MLG approach adds value to bilateral or multilateral agreements by extending the basis for decisionmaking. It helps engage politicians, officials, experts, media, citizen groups and the private sector. Reaching out to each of these groups deepens understanding of the diverse needs and expectations of users and prospective service operators.

The practical application of MLG incorporates all relevant stakeholders in a coordinated, collaborative way. In practice, the MLG approach creates a structured meeting forum and arena for learning

and exchange of knowledge among various interest groups. This happens, broadly, across three dimensions:

1. vertical exchange across local, regional, national and international levels of government
2. horizontal exchange among regions and municipalities involved
3. interdisciplinary exchange among the private sector and other stakeholders and experts.

Depending on the application, the meeting forum can be informal, agreement-based or a legal body.

Source: Szydarowski W., Tallberg P, 2013, Multi-level governance. European experience and key success factors for transport corridors and transborder integration areas. Task 3.2 report. BSR TransGovernance project, <https://scandria-corridor.eu/index.php/en/component/phocadownload/category/18-bsr-transgovernance>

Source: A Multilevel Governance Model in the Scandinavian-Adriatic Corridor: The Scandria®-Alliance Work Package 6 Final Report, Background paper (<https://scandria-corridor.eu/index.php/en/component/phocadownload/category/18-bsr-transgovernance?download=66:mlg-model-in-the-scandinavian-adriatic-corridor-the-scandria-alliance-2014>)

In essence, MLG is one mechanism for collecting the input of all governments, businesses and communities implicated in a project. As described previously, the collection and collation of these inputs is important to the design, delivery and operation of the project as it helps not only build but also maintain the win-win perspective created during project conceptualisation. For the design stage in particular, MLG helps ensure the designed project meets the expectations of stakeholders. A recent OECD study highlighted how Norway's use of extensive early-stage stakeholder engagement allowed schemes to be modified at a stage when making changes was less costly.<sup>14</sup>

Collecting inputs of all stakeholders also connects complementary policies at the national, regional and local levels, enabling any potential negative effects of the cross-border investment to be mitigated and strengthening opportunities for socioeconomic

development. Policies to be connected include those related to land use, industry and trade promotion, industrial clusters, labour and skills, urban development and municipal services, tourism, and other sectors with high demand for services enabled or influenced by the new cross-border infrastructure. Engagement with these stakeholders is also part of the foundation of the project's social licence (refer to Section 4.5.3 for more on social licence).

The Lyon–Turin line demonstrates the importance of collecting inputs from all relevant stakeholders (refer to Box 14: The Lyon–Turin line). In this case, the involvement of local groups helped optimise the alignment of the railway to increase benefits and reduce threats. In addition, the project featured transparency in decisionmaking, mitigating the risk of corruption.

14 OECD, 2018, Economic Surveys – Norway ([https://www.oecd-ilibrary.org/economics/oecd-economic-surveys-norway-2018\\_eco\\_surveys-nor-2018-en](https://www.oecd-ilibrary.org/economics/oecd-economic-surveys-norway-2018_eco_surveys-nor-2018-en))



## PROJECT

### Box 14: The Lyon–Turin line

The Lyon–Turin line is one of the most significant rail projects being implemented in Europe. It is a high-capacity railway line for freight and passengers, stretching over 270 km. A 65 km cross-border section (including the 57.5 km Mont Cenis base tunnel) is co-financed by the EU (40%), Italy (35%) and France (25%).

The project's implementation is enshrined in several international treaties signed by Italy and France. TELT (Tunnel Euralpin Lyon–Turin) is the equal-share binational body responsible for the implementation and management of the cross-border section of the Lyon–Turin line.

After the original plan for the route drew protests, the Italian Government set up in 2006 the Observatory on the Lyon–Turin line for the purpose

of consultation on the works. The involvement of local bodies helped agree on the current configuration of the cross-border section in Italy, with this section changing significantly from the original route planned.

In 2016 TELT adopted an ethical code that sets strict rules of conduct and monitoring procedures concerning ethics principles and anti-corruption rules.

In April 2018, the Italian Government redesigned the composition, tasks and functions of the Observatory so it now comprises groups of local bodies divided according to planned interventions and location.

Source : [https://www.telt-sas.com/wp-content/uploads/2018/11/TELT\\_LyonTurin\\_depliant\\_nov\\_2018\\_ENG.pdf](https://www.telt-sas.com/wp-content/uploads/2018/11/TELT_LyonTurin_depliant_nov_2018_ENG.pdf)

#### 4.2.3 Assessing mutual costs and benefits

The distribution of costs and benefits between the countries and stakeholders in a cross-border project is commonly theorised and forecast through a quantitative mechanism such as a CBA. As part of the CBA, it is important to consider the wider economic benefits that can flow from a project. For example, on cross-border transport projects, time savings from the infrastructure may significantly boost the cross-border labour market and by extension help build a more functional region. ESG considerations should also be factored into the CBA. Box 15: Rail Baltica CBA provides an example of a recent CBA conducted for the Rail Baltica project between Estonia, Latvia and Lithuania.

Assessment of costs and benefits is a prerequisite to understand the viability of any project, but even more so for cross-border projects, given the commonly low visibility countries have of their neighbor's internal plans, processes and markets. Low viability might be a barrier to project development, implementation and completion, particularly for projects seeking commercial financing (refer to Section 4.3 Optimising the financial structure to properly allocate risks and benefits).

Quantitative mechanisms like a CBA or sensitivity analysis also allow scenario testing of the impact of project assumptions on project risks, costs and benefits. Given the commonly low visibility between countries, extreme scenarios should be included as part of project due diligence.

While the CBA is the quantitative mechanism to identify and resolve uneven distribution of costs and benefits, internal benefits arising from alignment with national priorities and stakeholders may not be quantifiable through a CBA.

Strong policy, planning and prioritisation frameworks (refer to Section 4.1) can then help set and ensure fair and transparent sharing of the costs, risks and benefits. An example of sharing costs and benefits can be seen in the Itaipu Hydroelectric Dam (refer to Box 16: Sharing costs, benefits and mitigation measures in Itaipu).

To incentivise and ensure accurate assessment of mutual costs and benefits, governments can implement complementary systems that assess projects based on how they address risks and broader project development (see Box 17: Impact and Responsible Investing for Infrastructure Sustainability).

## PROJECT

### Box 15: Rail Baltica CBA

The Rail Baltica project seeks to integrate the three Baltic nations of Estonia, Latvia and Lithuania into the TEN-T. Released in 2017, the CBA was conducted by EY on behalf of the project coordinator RB Rail AS (a joint venture of the three nations) to interrogate and support the delivery method and assumptions used for the project. This followed amendments to the route alignment and changes to the project scope since an initial 2011 study conducted by AECOM. Key findings of the CBA included:

- The total cost of the project would be EUR5.8 billion.
- The measurable project socioeconomic benefits totalled EUR16.2 billion.
- The project has an economic rate of return of 6.32% and would create a gross domestic product (GDP) multiplier effect worth an additional EUR2 billion.
- The project is not financially viable without public co-financing. However, once operational, the project will be financially sustainable after 2031 (five years after the forecasted completion of construction).
- The project is not economically viable if the capital expenditure exceeds by 26% or more the estimate used in the analysis.

The project was deemed financially and economically viable.

Additional recommendations provided by EY in the CBA included:

- The project should be governed by a single body to eliminate potential for discriminatory practices of the infrastructure manager or railway undertakings.
- The project's proponents should proactively promote the project to potential users and involve them in the process of designing the technical and user-facing solutions of the project to improve the uptake rate.
- The business case should be periodically reviewed, especially at the completion of important stages (e.g. completion of technical design, construction contract signed).
- Due to the complexity of the project as a cross-border project, it will be paramount to ensure adequate project management and governance structures are implemented to facilitate successful delivery.

Importantly, Rail Baltica notes that the CBA "is just one of the decisionmaking instruments ... used during the project implementation process" and should be viewed in combination with the other instruments. Such instruments include the long-term business plan, operational plan and infrastructure management strategy as well as studies on project commercialisation and the supplier market, among others.

Source: <https://www.railbaltica.org/cost-benefit-analysis/>

*Note: Refer to Box 30 for Rail Baltica's financial structure and Figure 6 for its project structure.*

## PROJECT

### Box 16: Sharing costs, benefits and mitigation measures in Itaipu

As per the Treaty of Itaipu, all the costs and benefits of the Itaipu Dam, as well as the implementation of social and environmental mitigation measures, are split equally between Brazil and Paraguay. This means the construction debt and maintenance costs of the dam are also evenly distributed.

Furthermore, the total quantity of energy generated must be bought by the two countries and is divided equally. Any surplus electricity not used by one country must be sold to the other at a price corresponding to the cost of generation defined in the Treaty.

*Read more about the Itaipu Hydroelectric Dam in the case study in Part B.*



## POLICY

### Box 17: Impact and Responsible Investing for Infrastructure Sustainability (IRIIS)

Led by the Russian Ministry of Finance and developed by the Russian State Development Corporation VEB.RF, the National Center for PPP and AECOM, IRIIS is an infrastructure project assessment and certification system that offers independent assessment of the quality of an infrastructure project. The system is aimed at improving the quality of infrastructure projects initiated and implemented.

Adhering to the G20-endorsed Quality Infrastructure Investment (QII) principles and the UN Social Development Goals (SDGs), IRIIS assesses three project aspects: economy and governance, quality of life, and environment and climate. Points are awarded to the project across these aspects. The higher the final score, the better the certification result that the project receives. Certification of the project can help it access funding and financing. Points are awarded for factors like:

- alignment with strategic planning priorities, including consideration of positive cross-border effects
- viability and feasibility, including presence of a CBA
- quality of project structuring
- project stakeholder engagement
- energy efficiency.

While IRIIS is still in the pilot phase, it is an example of how governments can incentivise use of processes and analyses like a CBA to help develop more quality infrastructure.

Source: [https://en.rosinfra.ru/IRIIS\\_Methodology\\_ENG.pdf](https://en.rosinfra.ru/IRIIS_Methodology_ENG.pdf)

### 4.2.4 Harmonising rules and regulations

Harmonised rules and regulations are a unique part of the enabling environment for cross-border projects and need to be addressed as early as possible. The rules and regulations should work in conjunction with any intergovernmental agreements signed, providing the necessary scaffolding for the project to be built up. Harmonisation helps ensure that:

- The project is implemented in a way that is fair and equitable to the parties involved.
- The project is efficient and effective for users and operators.
- The project delivers on the desired vision.

Rules and regulations that can affect cross-border projects vary depending on the project and the countries involved. They may relate to the legal system, technical design or operational standards, and as such can affect just one project (refer to Box 22: Common safety standards for the Channel Tunnel) or an entire function or application of the infrastructure in question (e.g. electricity tariffs).

It is the responsibility of the parties to the project to identify conflicting rules and regulations that will be to the detriment of the project. The relevant governments are responsible for enacting solutions to those conflicts. It is important to note that harmonising rules and regulations does not necessarily mean making them the same.

Depending on the conflicting rules and regulations, there are several ways to harmonise rules and regulations.

Where harmonisation of rules and standards raises concerns about national sovereignty or political gaming, these concerns can often be resolved through establishment of a neutral body to oversee and implement the harmonisation intended. An example of this is the Agency for the Cooperation of Energy Regulators (ACER) created as part of the EU's 'Third Energy Package' market legislation, which entered into force in 2009 (refer to Box 18: Role of the European Agency for the Cooperation of Energy Regulators).

## POLICY

### Box 18: Role of the European Agency for the Cooperation of Energy Regulators (ACER)

The Agency for the Cooperation of Energy Regulators (ACER) was established in March 2011 as an independent body to foster the integration and completion of the European Internal Energy Market (IEM) for electricity and natural gas.

By fostering cooperation among National Energy Regulatory Authorities (NRAs) across the IEM, ACER ensures that market integration and the implementation of national legislation is achieved according to the EU's energy policy objectives and regulatory frameworks. Specifically, ACER's work involves:

- drafting guidelines for the operation of cross-border gas and electricity networks
- reviewing the implementation of EU-wide network development plans
- deciding on cross-border issues if national regulators cannot agree or if they ask ACER to intervene
- monitoring the functioning of the internal market, including retail prices, network access for electricity produced from renewables and consumer rights.

Source: <https://www.acer.europa.eu>

For cross-border transport projects, which rely on efficient border crossing and customs clearance procedures, some joint regulatory instruments can be put in place as mechanisms to reduce the overall clearance time of goods and decrease the compliance cost of import and export (refer to Box 19: The East African Community Customs Union).

One instrument for reducing overall clearance time is a single window for cross-border trade. Box 20: The Association of Southeast Asian Nations (ASEAN) single window provides an example. Single windows are “facilities that allow parties involved in trade and transport to lodge standardised information and documents with a single-entry point to fulfil all import, export and transit-related regulatory requirements. If information is electronic, then individual data elements should only be submitted once.”<sup>15</sup>

## POLICY

### Box 19: The East African Community Customs Union

The Customs Union is a critical foundation and the first Regional Integration milestone for the East African Community (EAC), a regional intergovernmental organisation of six partner states: the United Republic of Tanzania and the Republics of Burundi, Kenya, Rwanda, South Sudan and Uganda.

The Customs Union has been in force since 2005, defined in Article 75 of the Treaty for the Establishment of the East African Community. The EAC partner states agreed to establish free trade (or zero duty imposed) on goods and services among themselves and agreed on a common external tariff (CET) whereby imports from countries outside the EAC zone are subject to the same tariff when sold to any EAC partner state.

Goods moving freely within the EAC must comply with the EAC Rules of Origin and with certain provisions of the Protocol for the Establishment of the East African Community Customs Union.

Source: <https://www.eac.int/integration-pillars/customs-union>

## POLICY

### Box 20: The Association of Southeast Asian Nations (ASEAN) single window

The Association of Southeast Asian Nations (ASEAN) single window connects and integrates the national single windows of ASEAN member states (AMS) to exchange electronic trade-related documents.

The system enables a single submission of data, a single synchronous processing of information, and a single decisionmaking point for customs release and clearance among AMS and participating countries. The system aims to expedite the cargo clearance process, reduce cost and time of doing business, and enhance trade efficiency and competitiveness.

Source: <https://asw.asean.org/about-asw>

15 UN/CEFACT Recommendation No 33 – Recommendations and Guidelines on Establishing a Single Window

Another approach for reducing clearance time is a one-stop border post. This establishes a single clearance procedure for exit and entry documentation for goods and passengers, thereby improving border crossing speed and efficiency, reducing barriers to trade and improving business competitiveness (refer to Box 21: Hong Kong–Guangzhou high-speed rail customs point).

#### PROJECT

##### **Box 21: Hong Kong–Guangzhou high-speed rail customs point**

In China, the one-country, two-systems governance system provides a unique cross-border infrastructure case study. The high-speed rail connection between the Hong Kong Special Administration Region and Guangzhou, Guangdong Province connects the two locations in 48 minutes, compared to a connection time of 120 minutes on the intercity train.

Not only is the trip by high-speed rail faster, but clearing immigration is too. With the existing train and bus routes, passengers need to clear immigration at the border. On the high-speed line, passengers heading to Guangzhou clear Hong Kong and Guangzhou immigration before they board the train, allowing for a seamless journey into Guangdong Province and border-free connections to the wider Chinese public transport network. The reverse is the case for travellers from Guangzhou entering Hong Kong; they clear both Guangzhou and Hong Kong immigration after arriving at Hong Kong West Kowloon Station.

Source: <https://multimedia.scmp.com/native/infographics/article/2172120/high-speed-rail/>

Technical compatibility is also important to harmonise through agreements. For example, for cross-border transport infrastructure projects, bilateral or multilateral cross-border agreements between states or commercial contracts between infrastructure managers and operators are key to ensure an efficient movement of passengers and freight. Apart from immigration requirements and customs procedures, such contracts or agreements should

deal with technical compatibility (interoperability) of infrastructure, rolling-stock/vehicles, signalling systems and other technical specifications, as well as the harmonisation of licensing requirements, safety standards, and other laws and regulations relevant for cross-border traffic. Examples from the case studies include the Channel Tunnel and Øresund Fixed Link (refer to Boxes 22 and 23).

#### PROJECT

##### **Box 22: Common safety standards for the Channel Tunnel**

Safety aspects of the Channel Tunnel operations are managed under the remit of the Channel Tunnel Safety Authority (CTSA), a bilateral regulatory body that advises the Intergovernmental Commission (IGC) on safety matters and ensures that safety rules in the Channel Tunnel are in line with prevailing safety laws.

*See the Channel Tunnel case study in Part B for further detail on this project.*

#### PROJECT

##### **Box 23: Technical standards for rail operations on the Øresund Fixed Link**

Technical standards for the railway on the Fixed Link are defined in the Network Statement drawn between its operator (Øresundsbro Konsortiet) and the two national railway administrations of Denmark and Sweden.

The Network Statement follows a common document structure developed by Rail Net Europe (RNE), a collaboration among 40 European infrastructure managers that aims to facilitate cross-border rail traffic. It defines, among other things, access requirements, traffic operational rules, approval processes for vehicles, traffic management and safety systems, capacity allocations and service charges.

*See the Øresund Fixed Link case study in Part B for further detail on this project.*

Another measure to improve the reliability of cargo deliveries, and thereby the efficiency of cross-border projects, is a harmonised ICT support system for ensuring cargo safety on a corridor between the countries involved (refer to Box 24: Corridor safety measures for cargo transport on the N4 Toll Route).

#### PROJECT

##### **Box 24: Corridor safety measures for cargo transport on the N4 Toll Route**

Innovative technologies for the N4 Toll Route, such as the implementation of load control measures, a satellite tracking system, an electronic (automatic) tolling system and the Cross-Border Road Safety Management (TIDS) led to significantly increased road safety.

*See the N4 Toll Route case study in Part B for further detail on this project.*

Harmonisation of rules and regulations can also extend to environmental and social aspects of a project. When assessing the impacts of relevant rules and regulations, it is important to also consider the broader impacts of the project. This is where engaging the right stakeholders is essential to a project's success. A common scenario of this is environmental assessments for a project.

Environmental regulations often focus on ecology but do not offer guidance related specifically to the displacement of affected residents, occupational hazards, public health concerns and other factors directly impacting the residents of the participating countries and the workers constructing the project. These should be, to the maximum extent possible, harmonised between the countries concerned to avoid controversies, such as that seen on the Øresund Fixed Link (refer to Box 25: Approaches to environmental investigation in the Øresund Fixed Link). This ties into the social licence of a project (refer to Section 4.5 Managing efficiently throughout the project lifecycle).

#### PROJECT

##### **Box 25: Approaches to environmental investigation on the Øresund Fixed Link**

In the project design and construction stages, one of the main differences between the two countries' planning regimes concerned the formal procedures for environmental enquiries.

In Denmark, the environmental assessment report was made public only a few weeks before the signature of the governmental agreement. In Sweden, the formal procedure implied that the projects had to be tested against different legal frameworks in several juridical instances before approval, which was a long and complicated process.

This led to a controversial situation, in which construction on the Danish side began before the Swedish environmental inquiry was fully completed. As the environmental inquiry could have influenced the shape and design of the fixed link, the inquiry had the potential to significantly alter the project. However, this did not eventuate.

*See the Øresund Fixed Link case study in Part B for further detail on this project.*

One of the largest harmonisation challenges is when the countries involved do not have the same legal system. The legal system used determines how the project is planned, procured and governed through the contracts devised for its delivery. Section 4.4 on governance structures provides detail on how the legal system affects the governance structure and operation.

All parties must ultimately respect the contracts entered into and be able to enforce their provisions in a court of law if necessary. The arbitration seen on the Channel Tunnel between the UK and France is a good example of this (refer to Section 4.5 Managing efficiently throughout the project lifecycle).



## 4.3

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**Optimising the  
financial structure to  
properly allocate risks  
and benefits**



### 4.3 OPTIMISING THE FINANCIAL STRUCTURE TO PROPERLY ALLOCATE RISKS AND BENEFITS

Intertwined with planning, regulatory and stakeholder considerations is how a cross-border project is paid for. The financial structure of a project is key to its viability and ultimate success. The unique risks and challenges seen in cross-border projects can make them more expensive to finance and harder to fund. In addition, the requirement for financial structures that are agreeable for all countries and financial stakeholders involved makes cross-border projects more vulnerable to market or government failure.

This section illustrates global practice in developing financial structures for cross-border projects, including:

- identifying barriers to, and risks in, financing cross-border projects (Section 4.3.1)
- choosing a viable financial structure that properly allocates risks and benefits (Section 4.3.2).

#### Summary of key learnings for optimising the financial structure to properly allocate risks and benefits

The key learnings suggest that governments should consider the following:

- Given the unique risks that cross-border projects face in their financing, governments should be prepared to assume more risk than they would on comparable national projects.
- Financial structures for national projects can also be used on cross-border projects, with due consideration of the cross-border project's specific additional risks.

#### 4.3.1 Identifying barriers and risks in financing cross-border projects

Infrastructure is a significant financial investment. To understand the barriers and risks to financing cross-border projects, it is important to fully appreciate how a project can be funded.

Infrastructure is funded by taxpayers or users. In other words, a project is funded by a government's tax base (the taxpayer) either through taxes, through user charges levied at the point of use or through a combination of both.

Financing is the money (capital) provided to a government or organisation to build and operate the infrastructure, in the form of:

- short- or long-term loans or liabilities, which must be repaid along with a certain percentage of interest
- any additional amount contributed by the project partners in equity, which carries an obligation to provide these partners with return on their equity.

Therefore, the cost of a project comprises the cost of the physical goods and resources required to deliver it, plus the interest on the loan financing and the required equity returns. The interest rate and equity returns are determined by the risk in the project. Hence, financing fundamentally involves pricing of risk. If risks are high, the cost of financing is high too. Mitigating risks, and funding the associated financing, are two of the key challenges governments face in the delivery of public assets and services.

Compared to national projects, cross-border projects face several unique barriers and risks to their financing as a result of their augmented risk profile. Despite all the efforts made to harmonise rules and regulations, align stakeholders, and align legal frameworks and planning processes, the financial structure of a cross-border project is still inherently susceptible to additional risks. These are outlined in Table 3.

The application of a viable financial structure to the project is essential to appropriately manage these risks (refer to Section 4.3.2 Choosing a viable financial structure).

**Table 3: Overview of major risks to financing of cross-border projects**

Risk type	Causes (factors giving rise to risk)	Effects (how risks may unfold in the project)
<b>Geopolitical risks</b>	Political changes or instability in one or both countries, such as war or natural, political or economic disasters	Uncertainty of project completion or operation, and/or uncertainty of financial sustainability of project  Instigation of major changes to contract
<b>Counterparty risk / domestic policy changes</b>	The need for financial stability to be maintained in multiple governments, rather than only one  The need for multiple governments, rather than only one, to meet obligations under the contract (e.g. obligations to provide connecting infrastructure) in order for the project to remain viable  Changes in government or legislation/regulation after contract signing, which invalidate assumptions made in developing the financial and operational structure of the project	Counterparty risks affecting government payments required to recompense investors over the life of the project or to be made in specific circumstances, such as default  Financial or operational risk
<b>Fiscal uncertainty or disparity / demand risk</b>	Over-optimistic or unbalanced demand forecasting  External events or influences affecting the utility of, or demand for, the asset	Project financial constraint, insolvency or loan default
<b>Foreign exchange movements / currency risk</b>	Multiple currencies involved in project financing or funding  Lack of sufficient hedging solutions  Changes in economic conditions of countries involved	Capital losses arising from currency fluctuation or inability to convert local currency into another country's currency due to specific exchange restrictions

If left unaddressed, these risks can place a premium on the financing of the cross-border project and create other barriers, too. For example, countries with volatile economies and political environments can struggle to attract commercial financing for projects, as prospective financiers may deem the risk of lending money or investing equity to be too great. Similarly, countries with a lower GDP per capita may have difficulty accessing finance due to their debt sustainability levels, their credit ratings or other issues.

Fiscal uncertainty can emerge from several areas of a project, but one of the most prominent is demand risk. While demand risk can affect the viability of any project, having multiple countries involved often means multiple currencies and therefore multiple funding sources with different economies attached. An example of this risk arising is the scenario that played out on the N4 Toll Route (refer to Box 26: Traffic and demand risk mitigation in the N4 Toll Route project).

## PROJECT

### Box 26: Traffic and demand risk mitigation in the N4 Toll Route project

Trans African Concessions Pty Ltd (TRAC), the private concessionaire of the N4 Toll Route, responsible for traffic volume risks, came across an unexpected and considerable risk related to asymmetry of toll revenues on the two sides of the border. Lower-income communities in Mozambique were unable and unwilling to pay the relatively high toll fees.

To mitigate, TRAC agreed to cross-subsidise the Mozambican portion of the road with higher tolls from the South African side, providing substantial discounts to regular Mozambican users.

*See the N4 Toll Route case study in Part B for further detail on this project.*



Demand risk can also affect the delivery of cross-border projects when the project is delivered sequentially. As seen on the East Africa Standard Gauge Railway, when a project's overall commercial viability is misjudged, it can significantly affect the ability of other countries involved to gain financing and can prevent the completion of the project (refer to Box 27: Low feasibility of standard gauge railway project in East Africa).

## PROJECT

### Box 27: Low feasibility of Standard Gauge Railway project in East Africa

The 1,500 km East African Standard Gauge Railway (SGR) – linking Kenya, Rwanda and Uganda – was conceived at the first Northern Corridor Infrastructure Summit in Uganda in 2013. The railway was envisioned to transform the East and Central African economies, increasing the region's competitiveness and lowering the cost of doing business. The three countries agreed to complete the SGR by 2018.

Kenya completed the initial 487 km phase of the line from Mombasa to Nairobi at a cost of USD3.8 billion in May 2014, with 90% of the financing coming via a loan from the Exim Bank of China (Eximbank). Eximbank provided Kenya a further USD1.5 billion loan for the second 120 km phase from Nairobi to Naivasha. However, the project was unable to obtain a further loan of USD3.6 billion from Eximbank for the remaining

two phases extending from Naivasha to Malaba at the Ugandan border. This was because projected demand for the initial phase from Mombasa to Nairobi did not materialise, resulting in a USD100 million loss during the first year of operation and raising concerns that the SGR was not commercially viable. To try to inflate demand (and help the project pay its debts), the Kenyan Government directed that all imports through the Mombasa port use the SGR railway, while at the same time the SGR operator China Road and Bridge Corporation increased freight charges.

The lack of demand and finance for the project has resulted in the indefinite delay of the Ugandan section of the SGR. In fact, without the finance required to deliver its remaining SGR sections, the Kenyan Government has instead opted to revamp the 120-year-old metre gauge railway from Naivasha to Malaba at a cheaper cost of USD400 million.

Source: <https://www.theeastafrican.co.ke/business/SGR-future-in-doubt/2560-5163080-nhvaiaz/index.html>

Fiscal uncertainty can also arise due to changes in credit ratings. If, for example, a cross-border project is being financed through government debt and the government's credit rating is downgraded, this will potentially increase the debt burdens of not only the government in question, but other parties to the project as well (depending on the financial structure in place). If a party defaults on its debt, this could have dramatic ramifications for other parties. It is therefore important to consider fiscal risks and the debt sustainability of the parties involved when structuring how a project is financed. Countries that are fiscally constrained are particularly at risk of affordability challenges.

These concerns can be recognised and managed through processes such as a detailed business plan and scenario analysis and the appropriate use of a CBA (refer to Section 4.2.3 Assessing mutual costs and benefits).

#### 4.3.1.1 Mitigating foreign exchange risk

Currency risk is one of the most challenging financial risks in cross-border projects where the countries involved do not share the same currency. The project's financial structure must be set up to manage multiple

currency fluctuations and the risks associated with currency convertibility and transferability.

Currency fluctuation risks depend on the asset type, project costs and project revenues. As an example, if project revenues are available in foreign currencies and debt finance is available in that same foreign currency, this provides a natural hedge against the currency exchange rate and convertibility risks – depending on the volatility of the foreign currency revenue. However, where project revenues are only available in a local currency and debt finance is only available in a foreign currency, the mismatch creates an exchange rate risk.

Hedging instruments may be a solution to currency risk in such circumstances, but in many markets, they tend not to be a cost-effective solution, due to the costs involved and the lack of long-term hedging options for many local currencies. The alternative is for lenders to settle for the maximum tenor the local market will offer and then renew the maturity of the hedge in due course. An example of a natural currency risk hedge is found on the Nam Theun 2 hydropower project in Laos (refer to Box 28: Mitigating currency risk on Nam Theun 2).

## PROJECT

### Box 28: Mitigating currency risk on Nam Theun 2

With a project cost of USD1.58 billion, the Nam Theun 2 hydropower project is the largest-ever privately financed hydropower scheme in the world and the largest economic asset of the Laos Government. Although it was constructed in Laos, the project involved the sale of 995 MW of generating capacity and electrical energy to the Electricity Generating Authority of Thailand (EGAT).

Currency risk was mitigated by structuring the currency profile of the financing to match that of the project costs (pre-completion of the project) and the revenues (post-completion of the project). This also provided a natural hedge against the tariff structure, which required half of the underlying long-term debt structure to be denominated in Thai baht and the other half in US dollars.

Sources: <http://documents.worldbank.org/curated/en/200041468044952974/pdf/584400PUB0ID161Better09780821369852.pdf> and <http://www.pfie.com/nam-theun-2-powers-ahead/21073485.fullarticle>

Government monetary policy can present challenges when accessing finance from abroad. Some governments impose restrictions and/or limits on investors that receive their revenue in a local currency when they seek to convert that revenue to a foreign currency or transfer it abroad. An effective way to avoid this risk is to avoid foreign exchange at all, as seen in the construction phase of the Gordie Howe International Bridge (refer to Box 29: Currency risk management in the Gordie Howe International Bridge project).

Identifying monetary policy or financial regulation misalignment during the planning phase of the project will ensure foreign exchange risks can be properly addressed through the financial structure chosen (refer to Section 4.2 Creating legal, regulatory and stakeholder alignment to enable cross-border delivery).

## PROJECT

### Box 29: Currency risk management in the Gordie Howe International Bridge project

Against the background of a fair risk allocation between the contractor and the public party, and in order to reduce financial risks for the contractor, a mechanism was put in place to share currency risks during the 30-year operation period of the Gordie Howe International Bridge. Payments between Windsor–Detroit Bridge Authority (WDBA) and Bridging North America (BNA) will be made in both currencies.

The tolls for both Canadian and US traffic will be collected on the Canadian side of the crossing and will be used to reimburse the Canadian Government for funds advanced by it in connection with the project.

*See the Gordie Howe International Bridge case study in Part B for further detail on this project.*

#### 4.3.2 Choosing a viable financial structure

As discussed in the previous section, cross-border infrastructure has inherent risks that can make it expensive to finance. Therefore, along with appropriate allocation, reduction and mitigation of risks, cross-border projects have particular challenges developing viable and sustainable financing structures.

The optimal financial structure will strive to:

- reflect the respective national policy parameters, which may in some cases mean that different procurement and delivery models are used in the participating countries
- provide value for money
- reduce risk
- competitively determine financing requirements
- set limitations on the level of financing required to be obtained by each party
- avoid unknown contingent liabilities.

The financial structure chosen correlates directly with the procurement and delivery approach for a project, and thus has a direct impact on project governance (refer to Section 4.4 Establishing effective governance structures).

For example, some cross-border projects may be best delivered by splitting the project into sections based on country borders, making the cross-border project essentially two national projects that can be financed individually (refer to Box 30: Divided financing on the Singapore–Malaysia Second Link). However, as seen in Box 27: Low feasibility of the Standard Gauge Railway project in East Africa, the interrelation of project sections means financing of each section is not completely independent.

Structures used on national projects apply to cross-border projects too, as do sources of finance. Infrastructure finance options fall under two broad categories: public and private finance. The seven case studies chosen for this Reference Guide, which are all economic infrastructure, exemplify varied financial and contractual structures, with varying splits of public and private finance (refer to Table 4: Case study financial structures and sources).

The commercial viability, or bankability, of a project will determine the split of public and private finance engaged for the project. Public finance is more common than private finance across cross-border infrastructure. This is due to inherent risks typically

being too large to make many cross-border projects bankable (i.e. the cash flows generated by the project through revenues are not sufficient to cover the debt service).

#### PROJECT

##### Box 30: Divided financing on the Singapore–Malaysia Second Link

On the Singapore–Malaysia Second Link bridge project, the agreement between the two countries divided the responsibility for financing based on the infrastructure requirements on either side of the border line. Therefore, a different financing model was used in each country, with Singapore opting for public funding and Malaysia choosing a public-private partnership (PPP) model.

To manage demand risk on the Malaysia side, land development rights were included in the PPP to offset reliance on toll revenue.

Source: Ramboll

**Table 4: Case study financial structures and sources**

Project	Financial structure	Primary finance source	Government financial guarantee/support	Type of support
Addis Ababa–Djibouti Railway	Government-owned company	Public	Yes	Government-financed
Channel Tunnel	PPP	Private	No	-
Coral Sea Cable System	Government-owned special purpose vehicle (SPV)	Public	Yes	Government-funded
Gordie Howe International Bridge	PPP	Private	Yes	Some financial risks held by government
Itaipu Hydroelectric Dam	Government-owned company	Public	Yes	Government-financed
N4 Toll Route	PPP	Private	Yes	Government-guaranteed debt finance
Øresund Fixed Link	Government-owned SPV	Public*	Yes	Government-guaranteed state-owned enterprise (SOE) debt finance

\*Bonds issued in the private market with a credit-rating guaranteed by the States

This does not mean, however, that cross-border projects cannot be bankable. Rather, it means these projects often require some form of public support. Public support can be provided in the form of grants or subsidies (lump-sum subsidies or volume-based subsidies), as well as debt guarantees, minimum revenues guarantees or concessional loans. Multilateral financial support can also support a project's bankability and is typically provided in the form of concessional loans, contingent support or guarantees, or other credit enhancement instruments.

An example of public support is the Øresund Fixed Link, where Sweden and Denmark provided state guarantees for the project consortium's loans, where the project consortium comprised binational public SOEs.<sup>16</sup>

Generally, however, cross-border projects are financed by multiple stakeholders, in various capacities, including:

- governments party to the project
- MDBs and international financial institutions
- government aid programs
- private investment.

The following subsections will focus on these different sources of finance in the cross-border project context. For further information on the different infrastructure finance options, please refer to:

- GI Hub Risk Allocation Tool
- PPP Knowledge Lab PPP Reference Guide
- APMG International Public-Private Partnerships Certification Program PPP Guide.

#### 4.3.2.1 Governments party to the project

To finance cross-border infrastructure, governments commonly use the public budget through borrowing. This is often done by issuing bonds to the market, such as treasury bonds or – when the local capital market is sufficiently mature – infrastructure bonds (refer to the Channel Tunnel case study in Part B).

Governments can also look to finance projects through SOEs that invest public funds on behalf of the government, such as on the Øresund Fixed Link (see case study in Part B), or through national infrastructure banks.<sup>17</sup>

Where regional government authorities like the EU are established, financing for cross-border projects can also be sourced from them (refer to Box 31: Rail Baltica EU financial structure). Such financing can include non-repayable, interest-free funds such as direct grants or soft loans (a loan with a rate of interest below the market rate).

#### PROJECT

##### Box 31: Rail Baltica EU financial structure

Rail Baltica is a greenfield rail transport infrastructure project with a goal of integrating the Baltic States in the TEN-T. At 870 km long, the new railway is the largest railroad infrastructure project to be constructed in the Baltic States in the last 100 years. It is also currently one of the largest regional investments in improving mobility and travel opportunities and developing business, trade, tourism and the exchange of goods in the region.

The total estimated construction cost of the project is approximately EUR5.8 billion (USD6.8 billion). The project is funded by the national states – Estonia, Latvia and Lithuania – and co-funded by the EU up to 85% of the total eligible costs. The EU funding is via the CEF instrument.

Source: <https://www.railbaltica.org/about-rail-baltica/finances/>

<sup>16</sup> [https://www.itf-oecd.org/sites/default/files/docs/danish\\_state\\_guarantee\\_model\\_4.pdf](https://www.itf-oecd.org/sites/default/files/docs/danish_state_guarantee_model_4.pdf)

<sup>17</sup> For more information on national infrastructure banks, see GI Hub Guidance Note on National Infrastructure Banks and Similar Financing Facilities

#### 4.3.2.2 MDBs and development finance institutions (DFIs)

For cross-border infrastructure, development finance institutions (DFIs) can offer dedicated products such as export credit insurances or loan guarantees to cover political, credit and currency risks in a project's early phases and to facilitate private sector involvement, as described in Box 32: Loan Guarantee Instrument for Trans-European Transport Network Projects (LGTT). For example, the CEF is the funding instrument to realise European transport infrastructure cross-border projects.

##### POLICY

#### Box 32: Loan Guarantee Instrument for Trans-European Transport Network Projects (LGTT)

The Loan Guarantee Instrument for Trans-European Transport Network Projects (LGTT) is an innovative financial instrument set up and developed jointly by the European Commission and the European Investment Bank (EIB).

LGTT aims to facilitate private sector involvement in core European transport infrastructure, which often faces difficulties in attracting private sector funding due to the relatively high levels of revenue risk in a project's early operating stages.

The LGTT, which is part of the EU's TEN-T program and the EIB's Action for Growth initiative, will partially cover these risks and consequently improve significantly the financial viability of a project. It aims to cover especially the ramp-up period.

LGTT will be financed with a capital contribution of EUR1 billion (EUR500 million each from the Commission and the EIB), which is intended to support up to EUR20 billion of senior loans.

Source: <https://www.eib.org/en/about/documents/lgtt-fact-sheet.htm>

DFIs also provide technical assistance to facilitate the preparation of cross-border infrastructure. This is often through multi-donor special funds, which provide grants to developing countries for regional

or cross-border projects in energy, trans-boundary water, transport and ICT to make them bankable, and therefore investment-ready. The grants are used to carry out pre-feasibility, feasibility, technical and engineering designs, as well as to obtain transaction advisory services such as that seen on Ruzizi III (refer to Box 33: Multi-donor special fund support for the Ruzizi III Hydroelectric Power Plant project).<sup>18</sup>

##### PROJECT

#### Box 33: Multi-donor special fund support for the Ruzizi III Hydroelectric Power Plant project

The Ruzizi III Hydropower Plant Project is a proposed greenfield hydropower station on the border between Rwanda and the Democratic Republic of Congo. It is the first regional power project in East Africa to be established as a PPP. The project's implementation has been entrusted to the Great Lakes Energy Organisation (EGL), a sub-regional body that coordinates energy development in East Africa.

The project is expected to be commissioned in 2025 at the total cost of USD625.19 million (2015 prices), of which USD138.88 million will be borne by the African Development Bank Group and the European Development Fund, and USD50.22 million by the private sector. Other funders include the KfW (Kreditanstalt für Wiederaufbau, a German Development Bank), Development Bank of South Africa, EIB and the World Bank, among others. The private sponsors can request political risk insurance from the World Bank's Multilateral Investment Guarantee Agency.

The Ruzizi III Hydropower Plant Project implementation was made possible following a grant awarded to EGL in 2011 by NEPAD Infrastructure Project Preparation Facility (NEPAD-IPPF) to finance transaction advisory services. The USD1.4 million NEPAD-IPPF grant helped provide key expertise for the project's development, as well as sound knowledge of the context and actors in the region, which led to the project's eventual financial close.

Source: <https://www.afdb.org>

<sup>18</sup> Further information on Project Preparation Facilities can be found in GI Hub's Reference Tool on Governmental Processes Facilitating Infrastructure Project Preparation

#### 4.3.2.3 Government aid

Another source of potential investment in cross-border projects is government aid programs. Depending on the country of origin, aid programs can provide grant funding or loans to projects deemed to meet established criteria. An example of this is the Coral Sea Cable System project. Australia funded two-thirds of the project's AUD200 million project cost, and Solomon Islands and Papua New Guinea covered the remaining third (for more information see the case study in Part B).

Through aid programs, project risks can be reduced, enabling better terms of finance for the countries delivering the project.

#### 4.3.2.4 Private finance

The widely documented fiscal constraints that governments face in delivering and maintaining infrastructure have resulted in private finance becoming an important source of infrastructure finance. The application of private finance to infrastructure relies on the infrastructure being structured to generate a commercial return on investment for the private parties. Private finance can be provided through two general mechanisms: corporate finance or project finance.<sup>19</sup>

Corporate finance is essentially traditional finance on a full recourse basis. This mechanism is used where the entities investing control hold nearly all the risks, such as seen in regulated utilities.

Project finance is based on the project's asset being paid for through a future stream of revenue. It comprises the financing of a standalone project vehicle (SPV) established specifically for the project. The SPV is the contracting party with the asset owners to carry out the construction and/or operation of the project. SPVs are usually created for PPPs, as this allows financing to be on a limited recourse basis, meaning the liability of the investment only involves what is held by the SPV, excluding any other assets of the investing entities. Therefore, the exposure of the entities to the project's risks is limited. On the N4 Toll Route, the South African and Mozambican Governments decided to procure the toll route as a PPP, enabling a consortia of private investors to establish an SPV to deliver and operate the route (for more information see the case study in Part B).

Several global practices for private sector involvement in key infrastructure sectors have direct applicability to cross-border infrastructure. These practices are the subject of multiple dedicated guides, including one by the GI Hub<sup>20</sup> and one by the Asian Development Bank.<sup>21</sup>

A private partner may contribute to:

- reduced cost or improved value for money for the public sector (e.g. through innovative construction or design techniques, cost controls or risk allocation)
- improved revenue collection through better management of the asset
- removal of revenue or cost sharing complications between governments in cases where either the revenue generated or the costs incurred are asymmetric between the countries involved.

It is important to stress that not all risk can be transferred to the private sector. For an infrastructure project to be structured to generate a commercial return for private investors, governments need to assume key risks. Transferring too much risk (or the wrong risks) to the private sector can result in poor outcomes for government and taxpayers. Extreme cases can see the private sector entities enter insolvency, ultimately meaning the risks transferred to the private sector must be borne by the government.

Further guidance on risk allocation between public and private sector on projects can be found in the GI Hub's Risk Allocation Tool referenced above.

<sup>19</sup> Note that governments can also structure their financing of projects through corporate or project finance

<sup>20</sup> <https://ppp-risk.gihub.org/>

<sup>21</sup> <https://www.adb.org/publications/series/developing-best-practices-promoting-private-sector-investment-infrastructure>







## 4.4

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### Establishing effective governance structures

## 4.4 ESTABLISHING EFFECTIVE GOVERNANCE STRUCTURES

A cross-border infrastructure project requires an effective governance structure to carry it through the design, construction and operational stages. Following the choice made on the most appropriate collaboration framework, a cross-border project governance body should be established. This body should reflect the project specificities in terms of geographical location, legal jurisdictions, development context and broader aims to be accomplished with the built infrastructure.

This subsection describes global practice in governance structures for cross-border investments, including:

- selecting an appropriate collaboration format, considering the unique context of each project (Section 4.4.1)
- establishing a project governance body to set the project development agenda and beyond (Section 4.4.2)
- ensuring adequate management capacities and competencies within governance structures (Section 4.4.3).

### Summary of key learnings for establishing effective governance structures

The key learnings suggest that governments should consider the following:

- The project collaboration format needs to correspond to the stakeholder community, and governance decisions should be made in agreement among all stakeholders, irrespective of size, power and interests.
- The governance structure and contractual model chosen should be appropriate to the context of the project and its evolving requirements throughout the project lifecycle. At government level, the multilateral governance body should have equal representation from governments involved to ensure that the decisions made are mutually agreeable.
- Competent staff and resources must be assigned by all countries involved to plan, deliver and operate a cross-border project, assisted by external help where required and augmented by capacity building and training programs.

### 4.4.1 Assessing the project landscape to choose an appropriate collaboration format

Practice shows that a formalised governance mechanism may be appropriate in some projects, particularly complex projects where multiple stakeholders or the private sector are involved. In other cases that are simpler and more time-bound, a temporary configuration with minimal governance and administrative requirements may be preferable as a more expeditious and affordable approach.

Complexity of governance structure	Decisionmaking powers	Collaboration scheme	Financing
<p>How complex is the project by the number of stakeholder organisations, business markets and policies addressed?</p> <p>Are the individual interests mapped and assessed?</p> <p>What is the common interest and do the common interest areas prevail over the specific ones?</p> <p>How does it affect the competencies to be given to the project governance structure?</p>	<p>How much should the management structure be empowered to take decisions on its own, and what is the power of its decisions on governments?</p>	<p>What is the planned time and organisational perspective of the management structure?</p> <p>Should it be a temporary or a permanent one?</p> <p>Should collaboration occur in a single location where stakeholders gather in one spot, or should it be a networked scheme wherein each country provides its own premises where project management activities occur?</p>	<p>How will the management structure be financed?</p> <p>What options are feasible (e.g. support through fixed national contributions, international grants through higher-level cooperation frameworks or secondment of administration staff and technical experts)?</p>

Figure 4: Guiding questions to determine the optimum stakeholder governance format (Source: Ramboll)

In either case, the mechanism should correspond to the unique stakeholder community in terms of the policymaking levels involved, the users and operators engaged, and the socioeconomic contexts of each country involved. For the purpose of the investment’s operational efficiency, the collaboration format is recommended to contain a single coordinating body, which often is associated with a secretariat.

The collaboration formats and governance structures may need to be revised as project stages progress. Figure 4 illustrates principal guiding questions to determine the optimum stakeholder governance format for a cross-border infrastructure project in the design, construction and operational stages.

#### 4.4.2 Establishing a project governance body

Regardless of its format, the project governance body has an essential role in setting a joint development agenda for and beyond the direct project investment period. The governance body should not only enable delivery of the project on time and within budget, but also establish the asset as a safe, reliable and cost-effective connection of national grids or networks, and

ensure the asset contributes to sustainable economic growth and regional stability and integration.

Cross-border projects use a large variety of governance structures, as can be seen in Table 5. The involved governments may choose for the governance structure to contain just public-side arrangements or to involve the private sector.

The contractual model is a key component of the bilateral governance agreement that must be established prior to commencing a cross-border project. Examples of the contractual models for the Channel Tunnel and the project structure for the Rail Baltica Global Project are shown in Figures 5 and 6 respectively, demonstrating the relationships among internal stakeholders and the relevant political agreements, implementing bodies and external stakeholders. The Channel Tunnel example shows the establishment of an integrated project-wide delivery and operations authority and governance structure, whereas the Rail Baltica project structure provides an example of how to establish an overarching coordinating body, but with delivery performed by each respective country within its jurisdiction.

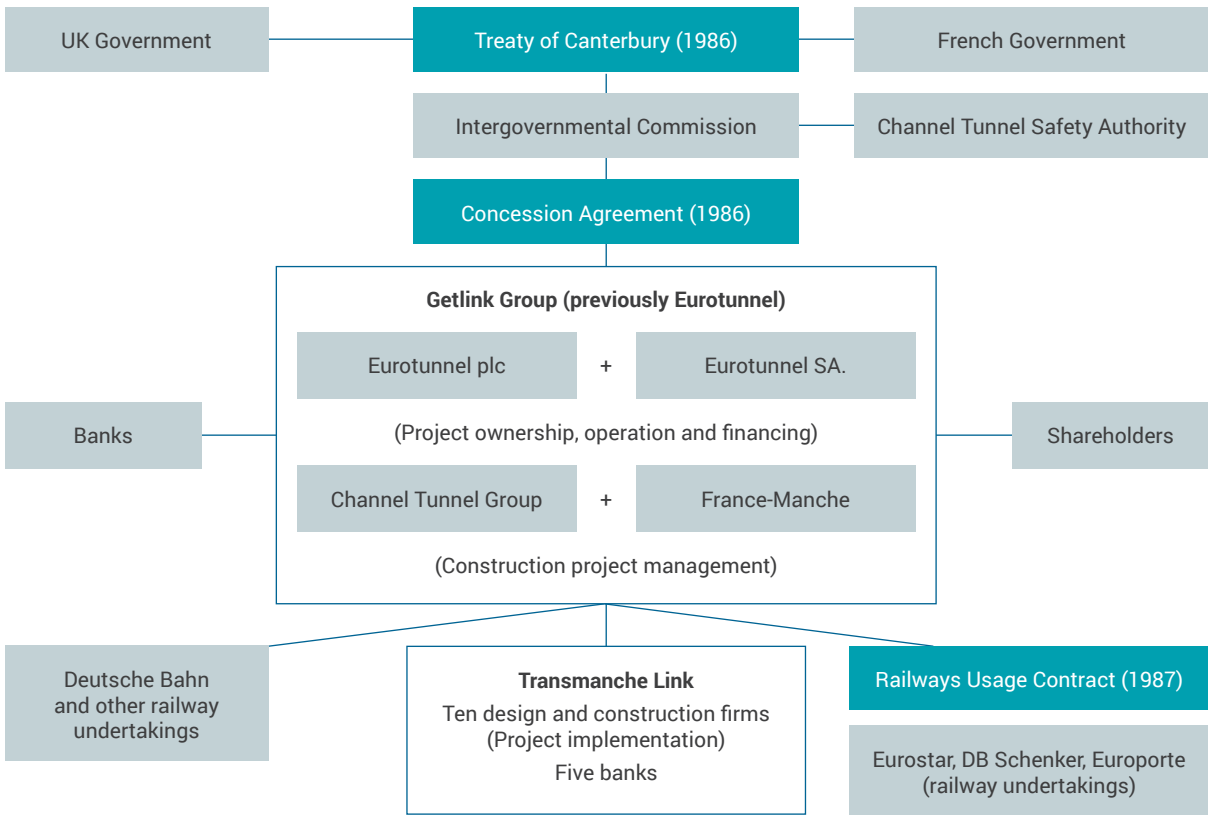


Figure 5: An ownership model and contractual scheme for the Channel Tunnel (Source: Ramboll)<sup>22</sup>

<sup>22</sup> <http://www.oecd.org/gov/infrastructure-governance/recommendation/>

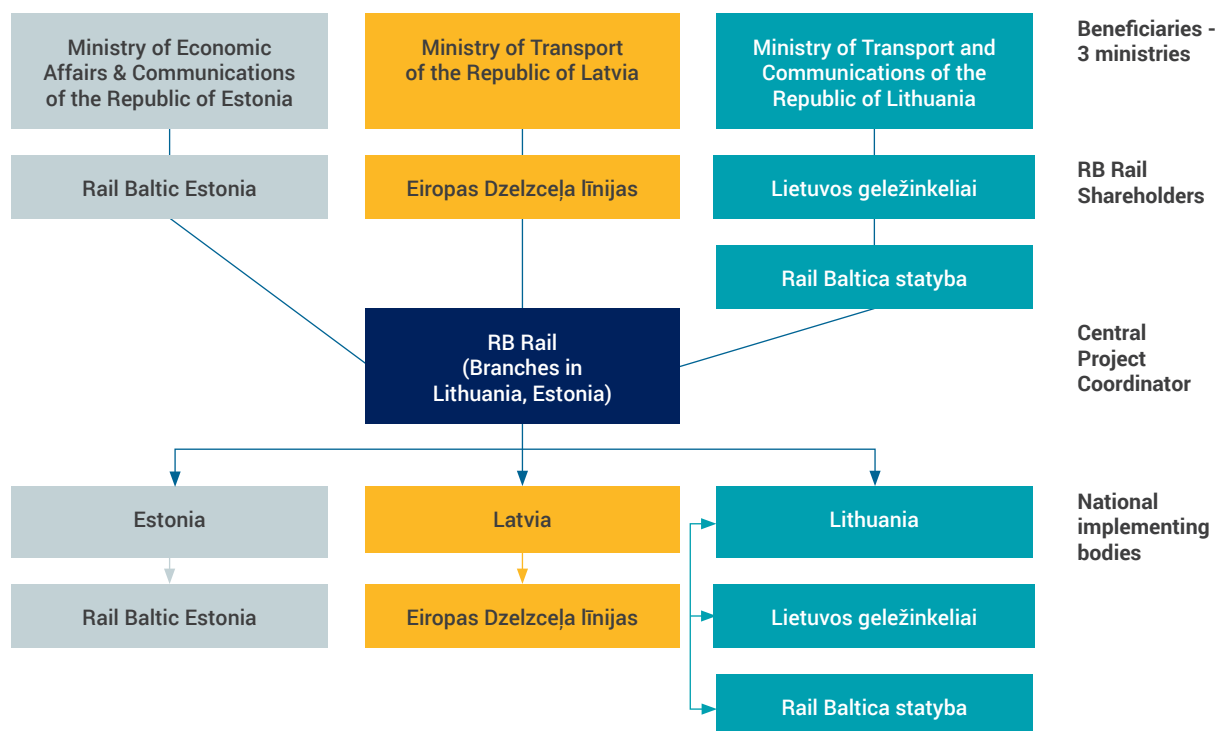


Figure 6: The Rail Baltica project structure (Adapted from: <https://www.railbaltica.org>)

Table 5 details the intergovernmental governance bodies of the projects selected as case studies for this guide (refer to Part B). The table includes an overview of the functions and responsibilities of each body during the project stages. It should be noted that some governance bodies may only exist for the design and construction phase, as a different body may take over for the operational phase, for example. Alternatively, a single body may cover the whole lifetime of the project.

Table 5: Functions and responsibilities of intergovernmental governance bodies in the implementation of cross-border projects

Cross-border project and countries involved	Function	PHASE		
		Design	Construction	Operation
Channel Tunnel United Kingdom and France	Supervision and control	IGC, the dedicated binational authority acting on behalf of the two governments. Responsible for adopting and implementing rules for the Channel Tunnel, safety (under the remit of the CTSA) and economic regulation (including tariffs of the line access).		
	Coordination			
	Delivery	<b>PRIVATE COMPANY</b> Getlink (formerly Groupe Eurotunnel) acting on concession by the IGC to carry out the development, financing, construction and operation during the concession period. Responsible for the maintenance of the line and the management of the rolling stock.		

continued...

Cross-border project and countries involved	Function	PHASE		
		Design	Construction	Operation
Coral Sea Cable System Australia, Papua New Guinea and Solomon Islands	Supervision and control	Australian Government		Governments of Australia, Papua New Guinea and Solomon Islands
	Coordination	PRIVATE COMPANY Vocus, contracted by the Australian Government to scope out the design, construction and procurement of the project.		PUBLIC COMPANY Coral Sea Cable Company Pty Ltd (an SPV jointly owned by Papua New Guinea, Solomon Islands and Australia)
	Delivery	PRIVATE COMPANY Alcatel Submarine Networks (France) contracted by Vocus to design, construct and install the cable system.		
Øresund Fixed Link Denmark and Sweden	Supervision and control	Governments of Denmark and Sweden through two state-owned companies, which are also responsible for the ownership and operation of the land works on their respective sides of the Fixed Link.		
	Coordination	PUBLIC COMPANY The Øresundsbro Konsortiet, a Danish-Swedish consortium to own and operate the Fixed Link Consortium responsible for traffic control, power management, maintenance and railway safety coordination, but works performed by external parties.		
	Delivery			
Gordie Howe International Bridge US and Canada	Supervision and control	Governments of Canada and Michigan through an International Authority.		
	Coordination	PUBLIC COMPANY Windsor–Detroit Bridge Authority (WDBA), a not-for-profit Crown corporation owned by the Government of Canada. WDBA responsible for directing and administering all aspects of the crossing's implementation, from financing to procurement and eventually maintenance and operation.  WDBA to set and collect all tolls.		
	Delivery	PRIVATE COMPANY A consortium branded Bridging North America to design, build, finance, operate, and maintain the Gordie Howe International Bridge and the ports of entry and to design, build and finance the Michigan Interchange.  The State of Michigan to be responsible for the operation and maintenance of the Michigan Interchange.		
Itaipu Hydroelectric Dam Brazil and Paraguay	Supervision and control	Governments of Brazil and Paraguay through their two national administrations in charge of electricity, Eletrobras and Ande.		
	Coordination	PUBLIC COMPANY Itaipu Binacional, a binational entity co-owned by Eletrobras and Ande.		
	Delivery			

continued...

Cross-border project and countries involved	Function	PHASE		
		Design	Construction	Operation
N4 Toll Route South Africa and Mozambique	Supervision and control	Governments of Mozambique and South Africa (as part of the Maputo Corridor Development initiative).		
	Coordination	Two governmental agencies for national roads in South Africa (SANRAL) and Mozambique (ANE).		
	Delivery	<b>PRIVATE COMPANY</b> A consortium, TRAC, on a 30-year BOT concession contract to develop and maintain the asset through user tolls.		
Addis Ababa–Djibouti Railway Ethiopia and Djibouti	Supervision and control	Governments of Ethiopia and Djibouti through a Joint Railway Commission of two state-owned companies: Ethiopian Railway Corporation (ERC) and Société Djiboutienne de Chemin de Fer (SDCF).		
	Coordination	<b>PUBLIC COMPANY</b> Ethio-Djibouti Standard Gauge Railway Share Company (EDR), (an SPV), Ethiopia (75%) and Djibouti (25%).		
	Delivery	<b>FOREIGN PUBLIC COMPANIES</b> Two Chinese state-owned companies: China Railway Group (CREC) and China Civil Engineering Construction Corporation (CRCC).	<b>FOREIGN PUBLIC COMPANIES</b> CREC and CRCC until 2023  <b>DOMESTIC PUBLIC COMPANY</b> EDR from 2024	

#### 4.4.3 Ensuring adequate leadership and capability within governance structures

Competent staff are essential to the delivery of a cross-border project. First and foremost, efficient project management relies on a motivated and enthusiastic leader, often referred to as a champion (refer to Sections 4.1 and 4.2 on policy, planning and prioritisation and enabling frameworks respectively). Through an open, collaborative approach, the champion organises stakeholder dialogue, moderates individual and sometimes conflicting interests and viewpoints, and mobilises the participating bodies to pursue the work direction set in the project's strategic framework.

The champion is key to sustaining project continuity in the complex cross-border environment. Keeping so many stakeholders aligned requires continuous and transparent information exchange to enable knowledge sharing across borders, levels and thematic sectors. Even though the dialogue principles may be codified in a cooperation agreement, informal contacts are essential to build trust and detect early any changing priorities and expectations among the members.

The foundations of the project owner's and proponents' broader capability to deliver a cross-border project are laid during the project initiation phase through establishment of a specific cross-border team or utilisation of external resources such as MDBs and IOs (refer to Section 4.1.3 Ensuring appropriate institutional capacity). With the project governance structure identified, key gaps in capability can be identified and filled with external or independent specialists from the MDBs or IOs, or specialist consultants.

The opportunity to develop internal capabilities to deliver cross-border infrastructure should not be wasted by the governments and entities involved. While external and independent support can be beneficial, it is particularly important for governments to build their internal capability to govern cross-border projects to ensure the projects deliver on the mutual development goals defined at the initiation of the project. More guidance on the governance of infrastructure can be found in the OECD Recommendation on the Governance of Infrastructure.<sup>23</sup>

<sup>23</sup> <http://www.oecd.org/gov/infrastructure-governance/recommendation/>





4.5

**Managing efficiently  
throughout the project  
lifecycle**

## 4.5 MANAGING EFFICIENTLY THROUGHOUT THE PROJECT LIFECYCLE

Strong governance and monitoring mechanisms adopted by a project owner should facilitate the efficient management of a cross-border project across its lifecycle and allow the project to respond to the changing project environment. This section details good practice in the functional management of cross-border projects, including:

- ensuring flexibility in the governance structure to adapt to changing circumstances (Section 4.5.1)
- resolving operational risks and contractual disputes (Section 4.5.2)
- achieving and maintaining social licence of the project and entities involved (Section 4.5.3).

### Summary of key learnings related to efficient management throughout the project lifecycle

The key learnings suggest that governments should consider the following:

- The governance structure of a cross-border project should, where possible, be flexible enough to adapt to changes in government mandates or institutional reforms.
- It is important that an effective mechanism, compatible with the legal and regulatory frameworks of the entities and countries involved, be implemented for performance review, compliance and dispute resolution across the life of the project.
- Social licence needs to be achieved and maintained throughout the project lifecycle through effective public consultation and the provision of opportunities for local communities through technical and institutional capacity-building measures.

### 4.5.1 Ensuring a flexible governance structure

Across the lifetime of a project, changing priorities or new internal and external circumstances can result in changes to how the project is governed and by whom.

Changes in governance structure across phases of the project's lifecycle are expected and often built into the governance structure (refer to Section 4.4 on governance structures). However, events outside the project's control, such as changes in policy, macro-economic events and disasters, can force a project to adjust and adapt its governance operational structures to a new normal. For cross-border projects, having two or more countries involved makes this a unique challenge.

Decisions by each sovereign state may not align. The cross-border project has to bridge any such gap. The most pertinent examples of changing circumstances during the development of this Reference Guide are the COVID-19 pandemic (refer to Box 34: Political coordination during the COVID-19 pandemic) and the United Kingdom's withdrawal from the EU, a.k.a Brexit (refer to Box 35: Channel Tunnel dealing with Brexit). These examples show that building flexibility into a project's governance structure where it is possible to do so will help ensure the project can adapt to a changing environment.

## PROJECT

### Box 34: Political coordination during the COVID-19 pandemic

The COVID-19 outbreak resulted in many countries closing their borders and implementing movement controls to reduce the spread of the virus. This severely impacted several operational cross-border infrastructure assets, as countries took different approaches to combat the spread of the virus. Two interesting examples are the Øresund Fixed Link between Denmark and Sweden and the Malaysia–Singapore Second Link.

#### Øresund Fixed Link

The Fixed Link connects two countries that have taken very different approaches to combatting COVID-19. In response to the rapid emergence of the virus, the Danish Government chose to 'lock down' and restrict travel with neighbouring countries such as Sweden. Sweden, took the opposite approach, allowing citizens to continue moving freely in the country.

This presented an interesting challenge for the Øresund Fixed Link, as it remained open for freight traffic and trips from Denmark to Sweden but was restricted in the opposite direction. Travellers could only enter Denmark from Sweden if they had a valid reason, such as living or working in Denmark. The restriction greatly reduced traffic flow. Between 14 March 2020 – when the regulations entered into force – and 12 April 2020, car traffic was about 71% lower than during the same period in 2019. Train traffic was also severely reduced, with only one to two trains crossing the link per hour instead of six in regular times.

*See the Øresund Fixed Link case study in Part B for further detail on this project.*

#### Malaysia–Singapore Link

The Causeway and the Malaysia–Singapore Second Link are the only two border crossings between Malaysia and Singapore. They are critical assets for hundreds of thousands of people commuting daily between Malaysia and Singapore for work and for Singapore's freight and logistics supply chain. Due to COVID-19, on 18 March 2020, Malaysia implemented a Movement Control Order, effectively closing its borders.

The two governments agreed to continue entry screening and to align health screening protocols at the two cross-border links. They also agreed to work out the operational details to ensure the continued flow of goods, cargo and food supplies between the countries. At the same time, the border closure necessitated the Singapore Government's assistance for many thousands of Malaysian workers looking for temporary accommodation in Singapore.

At the time of writing, the border has partially reopened with the Reciprocal Green Lane (RGL) and Periodic Commuting Arrangement (PCA) schemes introduced to facilitate short-term travel for essential business and official purposes, and to allow work pass holders to attend their workplaces across the border.

Source: <https://safetravel.ica.gov.sg/malaysia/overview>

## PROJECT

### Box 35: Channel Tunnel dealing with Brexit

The Channel Tunnel has been able to adapt to the realities of Brexit due to the flexibility enabled by the Treaty of Canterbury, which initiated the development of the Tunnel, and the establishment of the Channel Tunnel Intergovernmental Commission (IGC).

In principle, smooth transit through the tunnel, regardless of Brexit, is ensured by the Treaty of Canterbury, which stipulates that France and the UK will facilitate smooth travel through the Tunnel up until 2086. In practice, the IGC and Getlink Group, the Tunnel's operator, are in charge of ensuring transit is maintained in accordance with evolving rules and regulations devised by the UK and French Governments and the European Union.

The IGC, comprised of equal numbers of French and UK government representatives, oversaw the Tunnel's construction and now oversees the Tunnel's operation. Primarily this involves regulatory function that implements common EU legislation. The IGC is directly involved in the process of coordinating the transition following Brexit.

While the Tunnel is still exposed to administrative changes that sit outside the purview of the Treaty of Canterbury or the IGC, such as border control, employment law, and licencing agreements, the physical operation of the Tunnel is ensured by the Treaty and the work of the IGC.

Source: <https://www.eurotunnel.com/uk/brexit/will-the-channel-tunnel-be-open-after-brexit/>

## PROGRAM

### Box 36: European Grouping of Territorial Cooperation (EGTC) on the Rhine–Alpine Corridor

Several cities, regions and ports teamed up in an EU Interreg project called CODE24 to coordinate the development of the TEN-T Rhine–Alpine Corridor between Rotterdam and Genoa from a regional and local perspective. After five years, the CODE24 project partners presented a common strategy for the future development of the Rhine–Alpine Corridor, with a combination of economic development, spatial, transport and ecological planning measures to address urgent issues of capacity, sustainability and quality of life.

In 2015, the project partners decided to establish a permanent cooperation body with the purpose of securing a long-term partnership and cooperation beyond the limited Interreg project period. They chose the format of the European Grouping of Territorial Cooperation (EGTC) to:

- implement the joint development strategy for the multimodal Rhine–Alpine Corridor
- promote the joint interests of EGTC members to national, European and infrastructure institutions
- provide a central platform for mutual information, exchange of experience and encounter
- direct funds to corridor-related activities and projects.

#### Assembly

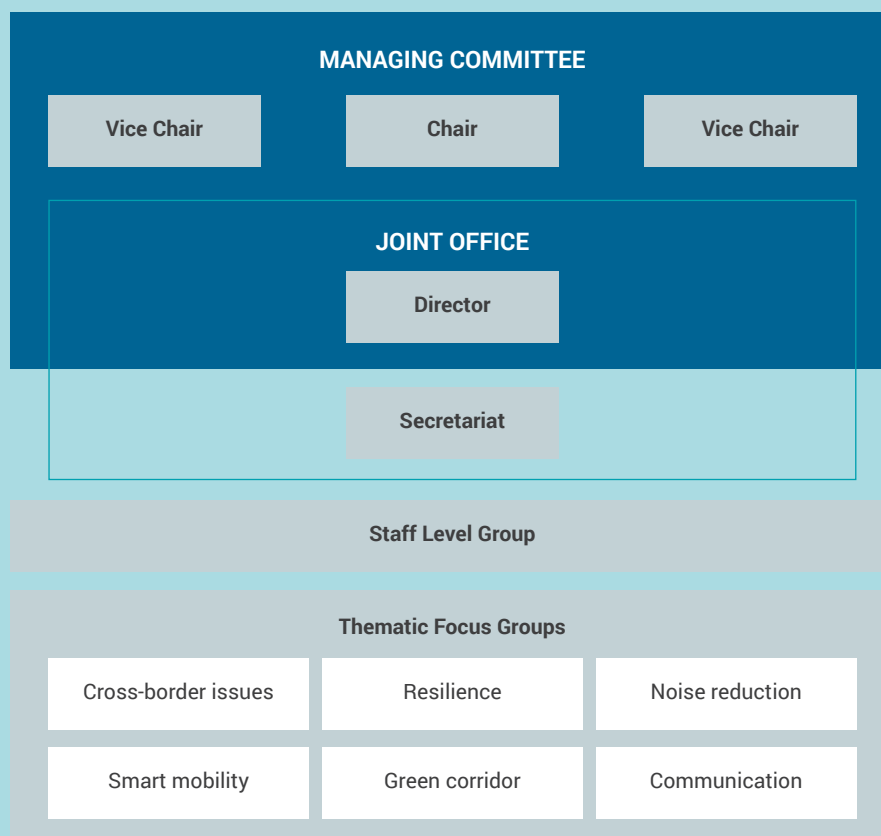


Figure 7: Organisational structure of the Rhine–Alpine Corridor EGTC

Source: <https://egtc-rhine-alpine.eu/>

It is evident from the literature that governance of cross-border projects is effective when stakeholder consultation and input are maintained throughout the project's life. The knowledge accumulated in the cross-border project through learning and information sharing with both internal and external stakeholders can help determine the future of a project, such as the extension of an operation or delivery mandate. Often, this involves setting up expert groups to exchange best practice and advise on ensuring wider economic benefits of a cross-border project.

In some cases, this even includes adopting a new legal form to manage external funding and take decisions on follow-up investments, such as seen on the Rhine–Alpine Corridor (refer to Box 36: European Grouping of Territorial Cooperation (EGTC) on the Rhine–Alpine Corridor).

#### 4.5.2 Resolving operational risks and contractual disputes

In managing a cross-border project, it is important that the governments involved establish and maintain an effective mechanism to identify and deal with risks and disputes related to the project. Such risks include (among others) geopolitical disputes, insolvency of the project company (e.g. SPV), contractual disputes between equity holders and risk allocation ambiguity in extraordinary events.

Identifying these risks early is the best approach on any project, but even more so on cross-border projects, as finding a resolution can be a lengthier and more difficult process than in the case of national investments. Examples of insolvency and geopolitical disputes are the bankruptcy of the high-speed rail Perpignan–Figueres project (refer to Box 37: SPV bankruptcy in the high-speed rail Perpignan–Figueres project) and the Itaipu Hydroelectric Dam dispute with Argentina (refer to Box 38: Conflict in the Itaipu Hydroelectric Dam project).

A specific challenge arises in projects between countries that have different types of legal systems, as in the case of France and the UK. Any arbitration in contractual disputes in the Channel Tunnel project has to be settled in coordination between the English common law system and the French civil law system (refer to Box 39: Arbitration on cross-border issues in the Channel Tunnel).

#### PROJECT

##### Box 37: SPV bankruptcy in the high-speed rail Perpignan–Figueres project

The 44 km Perpignan–Figueres high-speed rail concession between France and Spain benefited from large state subsidies from the two governments and the EU (EUR590 million, 57% of the capital expenditure). The revenue flow depended on tolls levied on train operators like SNCF, RENFE and others.

The line was fully operational in 2010, but traffic levels were much lower than anticipated. This led to financial difficulties for the private concessionaire TP Ferro, with EUR500 million in debts. TP Ferro asked for EUR300 million in compensation payments from the two governments, whom it made responsible for the losses due to delays in providing cross-border network infrastructure (e.g. train stations) and the alleged priority of domestic rail traffic over the high-speed rail link.

TP Ferro obtained compensation before going into liquidation in 2016 after failing to renegotiate its debts of almost EUR400 million with its creditors. As a result, the two governments agreed to form a joint venture to take over the operation of the line.

Source: <https://www.railway-technology.com/projects/perpignan/> and subsequent progress updates

#### PROJECT

##### Box 38: Conflict in the Itaipu Hydroelectric Dam project

The signature of the Treaty of Itaipu in 1973 led to conflicts with Argentina, as the construction of a dam directly affected water flows received downstream on the Paraná river. This threatened Argentina's various plans for hydropower production, such as the Corpus hydroelectric power plant, planned downstream from the Itaipu Dam.

The conflict was resolved in the 1979 Tripartite Itaipu-Corpus Agreement, signed by Paraguay, Argentina and Brazil, which sets out downstream flow requirements with which Itaipu Binacional must comply.

See the *Itaipu Hydroelectric Dam case study* in Part B for further detail on this project.

## PROJECT

### Box 39: Arbitration on cross-border issues in the Channel Tunnel

Between 1999 and 2002, Eurotunnel's business was severely harmed by massive intrusions into its terminal in France by large numbers of migrants seeking to gain access to the UK through the Channel Tunnel.

Eurotunnel complained that the presence of a hostel for the migrants, opened by the French Government close to the mouth of the tunnel, acted as a magnet, and that neither France nor the UK took the necessary steps to resolve this situation for several years. To try and recover its losses, Eurotunnel launched arbitration proceedings in December 2003 against the French and UK Governments. The arbitration was based on a provision in the Treaty and the Concession Agreement under which Eurotunnel operated the tunnel.

In January 2007, Eurotunnel secured a landmark victory – a ruling that marked a major step forward both for international foreign investment law and for Eurotunnel itself. Eurotunnel was represented by an English arbitration team coordinated from London, incorporating both London and Paris civil and common law arbitration specialists. The dispute was resolved through arbitration by a prestigious tribunal of five eminent arbitrators sitting in the Peace Palace in The Hague. The arbitration was ad hoc, governed by the United Nations Commission on International Trade Law (UNCITRAL) rules and was conducted in both English and French.

Source: <https://www.eversheds-sutherland.com/documents/lawsocietyenglandandwalesjurisdictionofchoice.pdf>

#### 4.5.3 Achieving and maintaining social licence

Social licence is, in broad terms, the implicit licence given by a community to an entity (public or private) or project operating in the community. It is an increasingly essential part of business operations. Its criticality is even more pronounced for infrastructure projects that cause major disruption to communities during construction and have lasting effects – whether positive and negative – once operational. Social licence can be won and lost throughout the project's life, and therefore should be a constant key consideration.

Social licence commonly revolves around consideration and mitigation of social, environmental and cultural impacts to the project's immediate and connected environment. Consideration of these impacts is essential to achieving acceptance for the project among affected residents and beneficiaries. As these impacts are relevant throughout the project lifecycle, it is important to establish a due diligence framework during the planning process, and ensure oversight during project delivery. Due diligence should cover the range of environmental and human aspects as presented in Figure 8.

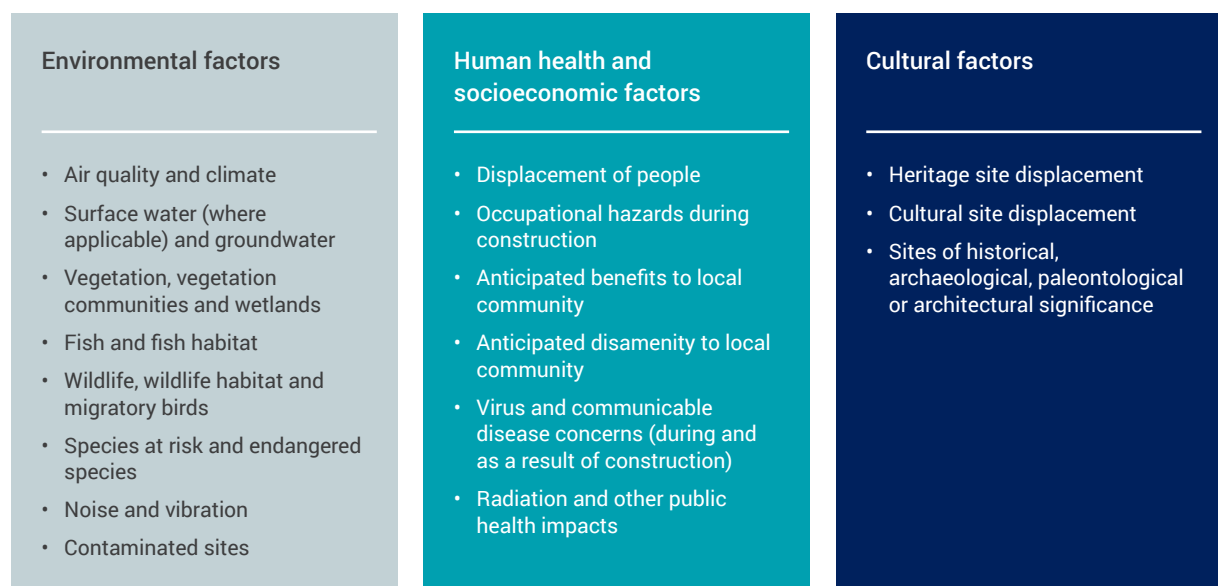


Figure 8: Environmental and social impact factors in the due diligence framework for cross-border projects



Oversight is required beyond the planning process to ensure that any relevant mitigation measures are enforced, and to monitor for any change in the anticipated impacts. Oversight should be the purview of the governing body that is responsible for ensuring project implementation in accordance with the relevant rules and regulations. To enable the governing body to manage the social licence of the project, certain actions to achieve and maintain social licence can be written into the performance specifications of project contracts.

Cross-border projects add the additional layer of complexity in crossing two or more jurisdictions, and therefore involving two or more regulatory regimes and communities. Like government and private sector stakeholders, affected communities can hold different views on a project and its environmental and social impacts. It is essential for the project to mitigate and adapt to the concerns and needs of the communities it affects.

Regulatory compliance should be considered the minimum standard. There can be a need to include requirements above and beyond these minimum requirements in the output specifications of a contract, to meet the needs of communities and stakeholders.<sup>24</sup> Further information on harmonisation of rules and regulations can be found in Section 4.2.4.

Stakeholder outreach is a lifecycle issue, as successful projects that maintain stakeholder acceptance are typically those in which the governing body maintains transparency of project activities in tune with public sentiments, pre-empts foreseeable issues, and addresses new issues as they arise. Examples of this are the General Ombudsman's Office created for the Itaipu Hydroelectric Dam (refer to Box 40: Approach to inclusivity and public outreach in Itaipu) and the roles assumed by the Windsor-Detroit Bridge Authority (WDBA) on the Gordie Howe International Bridge (refer to Box 41: Environmental analysis, inclusivity and public outreach for the Gordie Howe Bridge). Both of these projects also demonstrate the importance of inclusivity and transparency to maintaining community awareness and public support.

## PROJECT

### Box 40: Approach to inclusivity and public outreach in Itaipu

The Itaipu Dam submerged a natural landmark waterfall and displaced 65,000 people (60% Brazilians, 40% Paraguayans) as a result of the artificial lake it created. At the time of construction in 1983, no environmental protections were afforded by the laws of either participating country. Since 2003, the governing body Itaipu Binacional has been implementing environmental protection measures that are critical to the sustainability of the region – such as for fish and wildlife protection to support local food sources.

In 2009, the General Ombudsman's Office was created as an autonomous body to ensure communication between the dam operators and the public. The office receives suggestions, complaints, compliments and denunciations, and, after screening them, refers them to the relevant organisations. In parallel, the company formed an Ethics Committee that receives and evaluates any complaints of non-ethical conduct that constitutes an infringement of the values, principles and norms of the Itaipu Binacional Code of Ethics. The office is staffed by appointees from both countries, with equal representation.

*See the Itaipu Hydroelectric Dam case study in Part B for further detail on this project.*

Social licence is not just about managing social, environmental and cultural concerns; it is also about what the project gives back to the community in which it is operating. Implementing technical and institutional capacity-building measures in the affected communities can also help build social licence. Often these are special provisions in the project's contract, but they can also be developed at a later stage or be developed by the project company separately.

<sup>24</sup> <https://www.gihub.org/infrastructure-output-specifications/>

#### PROJECT

##### **Box 41: Environmental analysis, inclusivity and public outreach for the Gordie Howe International Bridge**

Environmental analysis studies were conducted during the investment planning process and were used to inform the analysis of border crossing alternatives. Ultimately, a bridge was selected.

The independent governing body, WDBA – which is responsible for oversight of the construction, financing and operations – is also responsible for public outreach and engagement.

WDBA considers transparency a top priority and runs a robust public outreach program. Public consultations occur on a regular basis, at the time of any key schedule updates and at the onset of major construction activities. The public provides feedback and concerns, which are addressed by WDBA. The proactive engagement of the public has been a key factor in maintaining positive public perception and support for the project.

*See the Gordie Howe International Bridge case study in Part B for further detail on this project*

One such approach, seen on the N4 Toll Route (refer to Box 42: Community participation in the N4 Toll Route project) and the Addis Ababa–Djibouti Railway (refer to Box 43: Knowledge transfer measures in the Addis Ababa–Djibouti Railway project), is to provide training, education and jobs to local communities. This contributes to strengthening local communities' capacities and promotes long-term growth opportunities and socioeconomic development.

Given most cross-border projects are economic infrastructure that are looking to promote economic trade and prosperity between countries, local capacity-building can help stimulate this broader goal.

#### PROJECT

##### **Box 42: Community participation in the N4 Toll Route project**

TRAC, the concessionaire of the N4 Toll Route project, was obliged to award a set share of subcontracts to local companies and to set up an integrated community participation program.

As part of this, TRAC developed three training centres along the project route, where more than 20,000 members of the local communities were trained on various issues, including literacy and HIV awareness.

*See the N4 Toll Route case study in Part B for further detail on this project.*

#### PROJECT

##### **Box 43: Knowledge transfer measures in the Addis Ababa–Djibouti Railway project**

As part of the investment propositions on this project, the two engaged Chinese companies, CREC and CCECC, committed themselves to hiring local workers in the project construction phase – more than 20,000 local workers in Ethiopia and 5,000 in Djibouti. Upon completion of the project, approximately 2,000 local workers were hired for infrastructure and rolling stock maintenance.

In addition, more than 300 employees of the ERC were sent to technical universities in Beijing, Tianjin and Chengdu to further their professional knowledge of railway engineering, train driving and track maintenance before taking over the infrastructure operations and maintenance responsibility from 2024.

*See the Addis Ababa–Djibouti Railway case study in Part B for further detail on this project.*



## Appendix A

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### Glossary

Acronym	Description
<b>Bankability</b>	The ability of a project to be accepted by lenders as an investment under a project financed structure, or the ability of the project to raise a significant amount of debt financing by means of long-term loans under a project financed structure, due to the creditworthiness of the project in terms of sufficiency and reliability of future cash flows.
<b>Build-Operate-Transfer (BOT)</b>	The project delivery method whereby the concession is given by a public entity such as a local government to a private partner to finance, design, construct, own and operate the project in question. At the end of the contract, the project assets are returned to the public entity.
<b>Case study</b>	A study of the projects that were reviewed as part of the development of this Reference Guide.
<b>Concession Agreement</b>	The agreement outlining the terms on which the project will be undertaken by a private partner.
<b>Cost-benefit analysis (CBA)</b>	A systematic approach to estimating the scale and distribution of investment return to the society vs. the costs incurred. CBA helps assess whether the benefits to users and other stakeholders (e.g. in terms of accessibility, quality and reliability of supplies, travel and delivery times) are likely to exceed the costs, which are generally funded by the taxpayers of the countries involved.
<b>Design-Build-Finance-Maintain (DBFM)</b>	The project delivery method whereby the private partner is responsible for designing, building, financing and managing the project. At the end of the contract, the project assets are returned to the public entity that will manage it.
<b>Design-Build-Finance-Operate-Maintain (DBFOM)</b>	The project delivery method whereby the private partner designs and builds the project asset in question, then finances and retains the responsibility for long-term operation and maintenance services.
<b>Development finance institutions (DFIs)</b>	Financial institutions (e.g. multilateral, bilateral or national development banks), usually established and majority-owned by governments as part of their development aid or economic development initiatives to finance projects in developing countries that would otherwise not be able to get funds from commercial lenders.
<b>Externality</b>	A cost or benefit (either positive or negative) that stems from the project and affects parties and sectors in the countries concerned.
<b>Funding</b>	Refers to how infrastructure is paid for. It consists of either government expenditure or direct user charges, such as tolls in the case of highways. In a sense, it is money that is not intended to be returned.
<b>Financing</b>	An amount of money (capital) provided to an organisation (e.g. through debt or equity instruments) with the requirement that it be repaid including a rate of return (interest).
<b>Lenders</b>	Institutions that provide lending or debt capital to the project, mainly banks through loans and institutional investors through project bonds.
<b>Project lifecycle</b>	A sequence of stages of a project, including initiation, planning, procurement, construction, operation and decommissioning.
<b>Public-private partnership</b>	A long-term contract between a private party and a government entity for providing a public asset or service, under which the private party bears significant risk and management responsibility, and remuneration is linked to performance.
<b>Social licence</b>	The implicit licence given by a community to an entity (public or private) or project to operate in the community.
<b>Spillover effect</b>	The impact of some events in one sector or one country involved in a project on another sector or another country.
<b>User charges</b>	Payment collected by the private partner directly from users of the service.



## Appendix B

### Literature Reviewed



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**Part B**



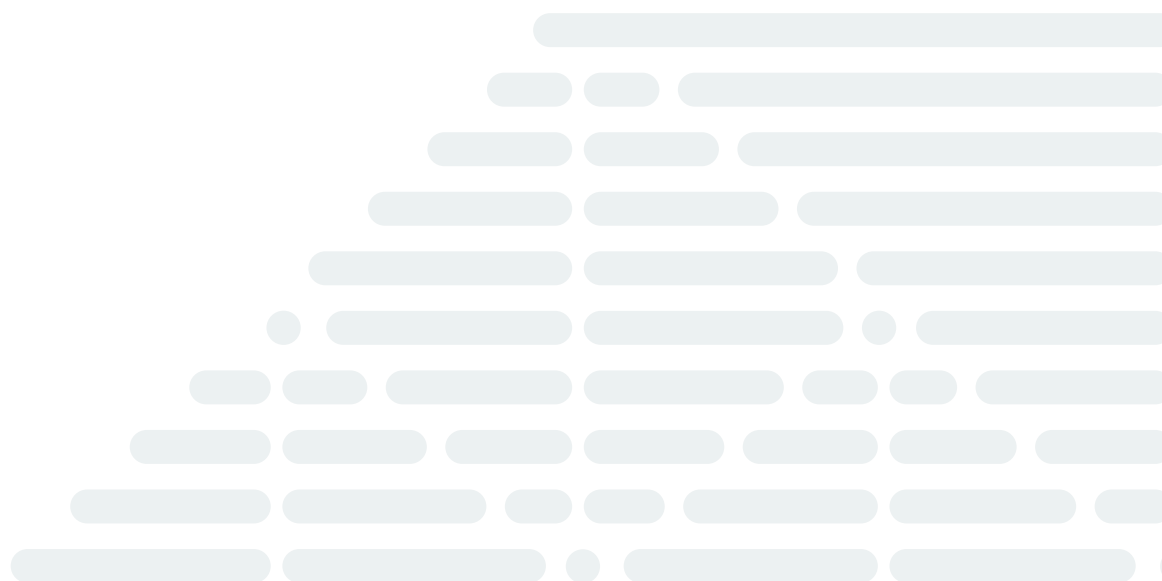
**Case Studies**

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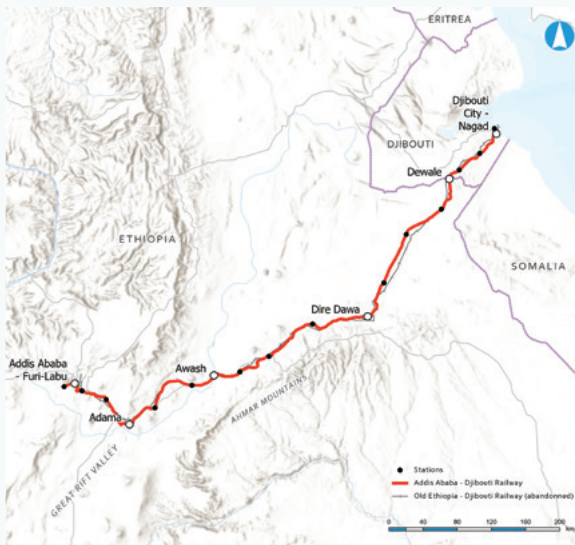






Source: Cay Lienau

## Addis Ababa–Djibouti Railway



### Location

Ethiopia, Djibouti

### Sector

Rail

### Procuring authorities

Governments of Ethiopia and the Republic of Djibouti through their state-owned companies, the Ethiopian Railway Corporation (ERC) and the Société Djiboutienne de Chemin de Fer (SDCF)

### Project company

(to operate line from 2024)

Ethio-Djibouti Standard Gauge Railway Company (EDR)

### Design, build, maintain, operate (DBMO) companies (to operate line until 2023)

China Railway Group Ltd (CREC) and China Civil Engineering Construction Corporation (CCECC)

### Contract obligations

Design, build, maintain, operate (DBMO)

### Start of operations

January 2018

### Capital value

USD5.1 billion – 2011 value

### Start of operations

January 2018

### Contract period (years)

6

### Key facts

First electrified standard gauge railway in Africa, part of the Belt and Road Initiative

## Project highlights

The Addis Ababa–Djibouti Railway modernisation project is the first cross-border electrified railway in Africa. The railway line is a 753 km electrified single-track standard gauge line between Ethiopia's capital Addis Ababa and the Port of Djibouti, with 45 stations in total. The new standard gauge line runs parallel to and replaces an abandoned 1 m gauge railway, which was built more than 100 years ago.

As a landlocked country, the line serves as the main transport corridor for Ethiopia to its gateway of the Port of Djibouti, which handles over 90% of Ethiopia's international trade. The line runs from Addis Ababa/Sebeta through the two large Ethiopian cities of Adama and Dire Dawa and links industrial parks and dry ports.

The railway line is owned by the EDR, a joint venture company of the two state-owned companies the

ERC and SDCF. The project was constructed by Chinese state-owned companies CREC and CCECC, which are operating the railway for a period of six years following construction completion. The line was opened for freight in October 2015 and was formally inaugurated for passenger services in October 2016. It became officially commercially operational as of 1 January 2018.

The project is part of China's Belt and Road Initiative and the first overseas railway constructed by Chinese enterprises with complete adoption of international standards (1,435 mm gauge line and electrification at 25 kV<sup>1</sup>), and Chinese equipment (CSR Zhuzhou for the rolling stock).

This case study was drafted based primarily on a literature review and interviews with representatives from the Addis Ababa Institute of Technology (AAiT) and the ERC.

<sup>1</sup> The 1,435 mm gauge is known as the "International Standard Gauge", used by USA, UK, France, Germany and others. Electrification using 25 kV has become the international standard for railway electrification and is now part of the European Trans-European railway interoperability standards

## Project timeline<sup>2</sup>

- **April 1993**  
Declaration of independence in Eritrea
- **May 1995**  
First democratic elections in Ethiopia
- **2007**  
Formation of Technical Advisory Group (TAG) (under Ethiopia's Ministry of Transport) to indicate framework for the railway network in Ethiopia
- **November 2007**  
Creation of the national railway operator ERC
- **2010**  
Agreement for the modernisation of the Addis Ababa–Djibouti Railway between Ethiopia and China as part of the Belt and Road initiative
- **June 2010**  
MoU on the Development and Operation of Standard Gauge Railway Line between Ethiopia and Djibouti
- **September 2010**  
Issue of the national five-year Growth and Transformation Plan (GTP) by the Ethiopian Government
- **2011**  
Contract awards from ERC for CREC and CCECC
- **2011**  
Start of construction of Addis Ababa–Djibouti Railways
- **2013**  
Regional Integration Agreement on railway infrastructure integration between Ethiopia and Djibouti
- **October 2016**  
**Officially opened railway service (Ethiopia)**
- **January 2017**  
**Officially opened railway service (Djibouti)**
- **January 2018**  
**Officially inaugurated commercial railway service**

## Development

### POLICY AND PLANNING SETTING

Ethiopia became a landlocked country following Eritrea's independence in 1993, which constrained Ethiopia's trade. Consequently, in the early 2000s, the Port of Djibouti became Ethiopia's main port and a gateway for over 90% of its international trade.

Investments in road and rail along the Djibouti corridor had the potential to significantly reduce transport costs and time. They were a key element encouraging greater interest from investors in developing manufacturing export capabilities in Ethiopia.

In the 1990s, Chinese corporations started to invest in African countries. In recent years, through the Belt and Road Initiative, China has sought to strengthen its trade routes and foreign investments in other continents and has provided strong political support for investment in Africa. The Addis Ababa–Djibouti Railway is part of this investment strategy.<sup>3</sup>

In 2007, a TAG was established under the Ethiopian Ministry of Transport to define a framework for the development of a railway corridor. This included a pre-feasibility study on socioeconomic and macro-economic benefits, and a detailed corridor analysis. The TAG recommended the introduction of a railway system throughout Ethiopia as the primary national mass transportation system. The study emphasised the importance of modernisation and expansion of the existing 1 m gauge (1,000 mm) railway to a standard gauge (1,435 mm) line to provide faster access to the Port of Djibouti from inland Ethiopia. In the same year, the Council of Ministers established the ERC by regulation No. 141/2007 to develop the railway infrastructure and provide freight and passenger transport services in Ethiopia.

In June 2010, the Transport Ministers of both countries signed an MoU in Djibouti on the Development and Operation of a Standard Gauge Railway Line between Ethiopia and Djibouti. The Ethiopian Government subsequently adopted its five-year GTP to achieve economic structural transformation and sustainable accelerated growth towards Ethiopia's longer-term vision of being a middle-income country by 2020–2023. The GTP included the development of dry ports, rail and road networks and air transport.<sup>4</sup> It aimed to develop the standard gauge railway line for Ethiopia and Djibouti

<sup>3</sup> De Laubier et al. (2018). Available at: <https://www.bcg.com/en-ch/publications/2018/trillion-dollar-plan-new-silk-road.aspx>, accessed on 20-03-2020

<sup>4</sup> Growth and Transformation Plan Ethiopia. Available at: <https://www.greengrowthknowledge.org/national-documents/ethiopia-growth-and-transformation-plan-i>

<sup>2</sup> Based on Ethiopian Railway Corporation (2020)

and a 34 km light rail system for Addis Ababa as priority projects.<sup>5</sup>

Since 2010, Ethiopia has been striving to build an extensive rail network in line with the GTP. Railway transport services are regulated through a series of bilateral agreements to:

- guarantee Ethiopia access to the sea (transit transport service)
- outline management of the railway (as well as a minimum volume guarantee by Ethiopia)
- specify rates as freely negotiated between shipper and carrier
- deal with customs arrangements for the Port of Djibouti.

### CHALLENGES AND OPPORTUNITIES ADDRESSED BY THE PROJECT

Before the modernisation of the Addis Ababa–Djibouti Railway, Ethiopia and Djibouti were connected through a 780 km railway corridor via Dire Dawa, which was built in 1917. This 1,000 mm gauge railway was the only railway line between the two countries, but it deteriorated due to lack of maintenance and management.

As the majority of goods to and from the Port of Djibouti were carried by road, the transport and trade costs for landlocked Ethiopia were prohibitively high compared with other African countries. A low-quality and costly logistics system hindered Ethiopia's efforts to achieve growth through export-orientated industrialisation. Ethiopia's economy is based on agriculture and, due to the lack of fundamental industrial and manufacturing bases, its social and economic development mostly relies on international trade. In total, 80% of the goods imported via the Port of Djibouti are destined for Ethiopian central regions. The new railway line is, thus, an enabler of Ethiopia's sustainable social and economic development.

Djibouti is one of the smallest countries in Africa and its economy heavily depends on international trade. Benefitting from its strategic location at the Red Sea gateway bridge between Africa and the Middle East, Djibouti's economy is driven by port services in the import of food grain and all industrial products. The railway improves the inland transport connection of the port to provide a fast, high-capacity collection and distribution corridor for the Port of Djibouti.

Trade through the port is expected to grow in parallel with the expanding economy of its major trading partner Ethiopia.<sup>6</sup> Also, the project will have a positive impact on the main areas along the route and facilitate the development of Djibouti's port services industry and economy.

Still, construction of the new railway line is technically very demanding and requires equipment that can withstand the region's adverse natural conditions. The line runs through different climate zones, with huge day-night and seasonal temperature differences, including the 2,300 m altitude in Addis Ababa, and up to 50° Celsius temperatures in the Danakil Desert.

### PERCEIVED LONG-TERM BENEFITS

The new railway is expected to bring considerable advantages for long-haul transport of freight, including massively reduced travel times, from up to 50 hours down to 10 hours. On the cost side, the temporary passengers and freight tariffs adopted by the two governments are very competitive compared to road transport (USD0.017 per passenger-km, an import rate of USD0.046 per ton-km and an export rate of USD0.023 per ton-km,) giving the railway a competitive cost advantage.

The reduced transport costs and delivery times are forecast to increase trade volumes between the two countries. The estimated market share of rail transport is set at 75%. However, meeting the traffic forecasts does depend to an extent on the overall expansion of the Port of Djibouti. The new line currently has a capacity of 11.2 million tons of freight, rising to 24.9 million tons by 2025.<sup>7</sup> The ERC anticipates the line will carry approximately 4 million tons of cargo by 2035, growing from an expected 2.3 million tons in 2025 and 3.1 million tons in 2030. To achieve these figures, the line requires an expansion of the handling capacity at the Port of Doraleh (an extension of the Port of Djibouti for handling oil, bulk cargo and containers with an annual turnover capacity of 8.2 million tons), with the aim of reaching 10 million tons by 2022.<sup>8</sup>

The new railway line boosts the performance of the international trade corridor and significantly contributes to strengthened economic ties between the two countries. For Ethiopia, it helps accomplish its strategic goal of sustainable and stable economic development towards a middle-income country, with an annual GDP growth of 8.3% in 2019 and the

<sup>5</sup> The light rail system was inaugurated in 2015

<sup>6</sup> World Bank Group (2019): Djibouti Overview, <https://www.worldbank.org/en/country/djibouti/overview>, accessed on 20-06-2020

<sup>7</sup> Global Construction Review (2015): <https://www.globalconstructionreview.com/markets/ethiopia-steam-ahead-vision-modern-n8a8t8i8o8n8a8/>, accessed on 01-06-2020

<sup>8</sup> Port de Djibouti S.A.: Available at: <https://www.portdedjibouti.com/doraleh-multi-purpose-port/>, accessed on 01-06-2020

target of an average GDP growth of 11% annually.<sup>9</sup> For Djibouti, the better and more competitive railway service supports port and transit cargo operations, which are essential sources of income and employment for the country. The annual GDP growth for Djibouti is 5.9%, driven by public investment in rail and port infrastructure. In 2019, the service sector, of which transport forms the largest component, accounted for 76% of GDP.<sup>10</sup>

The line, designed as Ethiopia's main transport corridor, strengthens development opportunities for rural communities. New railway stations built on the outskirts of the urban settlements require, however, further investments to connect them to city centres and other interchange nodes by means of public transport. A strategic Transport Master Plan for Addis Ababa, currently under preparation, addresses the issues of integrated transport and urban development.

The transfer of knowledge from the project development and first years of operation will benefit job creation in the local communities.

As part of the investment propositions, the two engaged Chinese enterprises committed themselves to training local personnel to operate and maintain the railway. More than 300 employees of the ERC were sent to technical universities and schools in Beijing, Tianjin and Chengdu to further their professional knowledge of railway engineering, train driving and track maintenance.<sup>11</sup> In addition, they provided regular training to promote compatibility of the working culture between both parties. Upon completion of the project, approximately 2,000 local workers were hired for infrastructure and rolling stock maintenance.

## Financing

### PROCUREMENT MODEL

In 2011, the ERC awarded an EPC (engineering, procurement and construction) contract for the railway line from Addis Ababa to the Port of Djibouti to two Chinese state-owned companies, CREC and CCECC.

In 2012, the governments of Ethiopia and Djibouti signed a bilateral agreement for the development and operation of the standard gauge network. In 2016, the two governments agreed on the development, operation and management of the railway network

ERC and Djibouti's Minister of Equipment and Transport signed commercial contracts with CREC and CCECC respectively. In the same year, CREC and CCECC formed a consortium to operate the entire railway line for six years.

In October 2016 in Ethiopia and in January 2017 in Djibouti, the passenger railway services were opened. The official commercial operation commenced in January 2018.

### INFRASTRUCTURE FINANCING AND FINANCIAL RISKS

The total cost of the project was USD5.09 billion (2011 value).

The Governments of Ethiopia and Djibouti altogether financed 30% of the project and currently own the railway assets. The other 70% of the project cost was financed through concessional loans from China's Exim Bank (Eximbank), the China Development Bank, and the Industrial and Commercial Bank of China. These loans were supported by market capitalisation of nearly USD3.3 billion.<sup>12</sup> The Governments of Ethiopia and Djibouti have both purchased credit guarantee insurance for their loans.

The project has faced some financial risks, associated with lower traffic volumes than predicted in the transport forecast and currency exchange rate fluctuations – as the project's debt was structured in US dollars, while construction and operation cost as well as revenues were granted in Ethiopian Birr.

In response to some repayment risks, the Chinese banks restructured the Ethiopian debt and extended the repayment period from 15 to 30 years.

## Management

### SUPERVISION AND CONTROL

Project supervision and control functions on behalf of the Governments of Ethiopia and Djibouti are performed by a Joint Railway Commission of the two state-owned companies ERC and SDCF.

CREC and CCECC are to operate and maintain the railway for six years from the launch of operation and will provide two additional years of technical support during the gradual handover of management duties to EDR from 2024.

<sup>9</sup> World Bank Group (2020): Economic data Ethiopia, <https://www.worldbank.org/en/country/ethiopia/overview>, accessed 02-07-2020

<sup>10</sup> World Bank Group (2020): Economic data Djibouti, <https://data.worldbank.org/indicator/NY.GDP.PCAP.KD.ZG?locations=DJ>, accessed 02-07-2020

<sup>11</sup> Tesfaye, A. (2020): China in Ethiopia: The Long-Term Perspective, Chapter 5

<sup>12</sup> Dreher et al. (2017). Available at: <https://www.aiddata.org/publications/aid-china-and-growth-evidence-from-a-new-global-development-finance-dataset>, accessed on 20-03-2020



The Bilateral Agreement signed on 16 December 2016 between the two governments established EDR, with shareholdings divided between Ethiopia (75%) and Djibouti (25%). Its main purpose is to manage the Addis Ababa–Djibouti Railway (including the maintenance and renewal of all infrastructure and equipment) and to operate freight and passenger transport services on the line from 2024.

### HARMONISATION OF RULES AND STANDARDS

The new line is the first electric railway run completely according to China's railway standards, based on the Chinese railway class standards for National Railway Class II. These are:

- Electrified overhead line 25 kV AC, 50 Hz
- Signalling system: Automatic block and ETCS-2 and train protection system
- Design speed maximum running speed of passenger train: 120 km/h
- Maximum running speed of freight train: 80km/h
- Traction type: Electric traction
- Traction mass: 3,500t
- Locomotive type: HX series locomotive
- Minimum curve radius: 1,200m for normal section and 800m for difficult section
- Train running: Running on the left in double-track sections; single-track sections equipped with passing loops.

### ARBITRATION ISSUES

Ethiopia's dedication to large-scale infrastructure projects, such as dams, industrial parks, mass housing and railways, has delivered impressive economic growth in recent years. But it has also kindled political tensions. In 2014, thousands of farmers and ethnic tribes complained that they had not been treated fairly by the ERC due to unfair compensation for land acquisition. The lack of serious public participation of local communities and nomadic tribes led to rent-seeking practices, such as compensation for owners of cattle and camels killed by trains.<sup>13</sup> The level of compensation is at the discretion of the operator; the level of compensation payment has no statutory basis.

## Conclusions

- **Public benefits** – Project benefits must be clearly identified and quantified for all parties. The Addis Ababa–Djibouti line has provided visible socio- and macro-economic benefits. Export and import in Ethiopia and Djibouti were clearly improved, increasing economic performance in both countries. The transformative aspect of railways in Ethiopia and Djibouti played an important role in land development. The project has fostered trade between the two countries by boosting the performance of the international trade corridor, although there are still improvements to the Ports of Djibouti and Doraleh that need to be completed to fully realise the project's benefits. For Ethiopia, the railway helps accomplish the country's strategic goal of sustainable and stable economic development towards a middle-income country. For Djibouti, the better and more competitive railway service supports port and transit cargo operations, which are essential sources of income and employment for the country.
- **Policy and regulatory framework** – The political relations between the two countries were strengthened through the signed bilateral agreements and competitive tariffs for passengers and freight adopted by the two governments.
- **Socioeconomic development** – The new line connects rural regions and helps reduce regional disparities. Local communities have been provided with development opportunities. The transfer of knowledge from the project development and first years of operation will benefit job creation in the local communities.
- **Planning** – Integration of the rail line with the existing freight and port networks appears to be low and is likely influencing the low usage of the line. This could have been improved through better planning at the inception of the project to address inter-country coordination.
- **Knowledge transfer/capacity building** – The project fostered technology transfers, local personnel have been trained and the companies agreed to hand back the operations and maintenance by 2023. Local employees from the ERC have been sent to technical universities and schools in Beijing, Tianjin and Chengdu in order to enhance their professional knowledge of railway maintenance and operation.

<sup>13</sup> The Guardian (2018), Available at: <https://www.theguardian.com/global-development/2018/may/12/ethiopia-railway-boom-promises-turn-to-dust>, the Economist (2018). Available at: <https://www.economist.com/middle-east-and-africa/2018/02/10/camel-trains-are-holding-up-ethiopia's-new-railway-line>



# The Channel Tunnel



## Location

The English Channel between Folkestone (England) and Coquelles (France)

## Sector

Water crossing, fixed link, rail and road

## Procuring authorities

Government of the United Kingdom, Government of the Republic of France

## Project company

Getlink Group (previously Eurotunnel)

## Contract obligations

Design, build, finance, maintain, operate, transfer (DBFMOT)

## Start of operations

1994

## Financial closure year

1987 (syndication of the Project Finance Facility)

## Capital value

GBP9.5 billion (USD11.8 billion – 1994 value)

## Contract period (years)

99

## Key facts

No governmental subsidies, 100% Project Finance

## Project highlights

The Channel Tunnel is a roughly 50 km rail tunnel linking Folkestone, Kent, in England, with Coquelles, Pas-de-Calais, near Calais in northern France. The tunnel extends beneath the English Channel at the Strait of Dover. It is the only fixed link between the island of Great Britain and the European mainland. It allows the city of London to be directly connected by train to Paris, Lille, Brussels, Amsterdam and Cologne – thanks to the Eurostar and Thalys train lines.

The Channel Tunnel was officially opened in 1994. Train operation consists of shuttle trains conveying cars and coaches and other trains conveying heavy goods vehicles between the two terminals. Other trains using Getlink infrastructure are operated by the respective owners.

Getlink, previously Groupe Eurotunnel (until 2017),<sup>1</sup> is a public company that manages and operates the Channel Tunnel, including the Eurotunnel Shuttle vehicle services, and earns revenue on other trains through the tunnel (DB Schenker freight and Eurostar passenger trains). The company was

formed in 1986, with the objective of financing, building and operating a tunnel between the two countries initially for a period of 55 years, then extended to 99 years until 2086. Getlink's head office is located in Paris.

Originally estimated at GBP 4.8 billion in 1985 (about USD6.2 billion, 1985 prices), the Channel Tunnel's total cost was much higher than expected, reaching GBP9.5 billion by the end of its construction (about USD14.5 billion in 1994).<sup>2</sup> Project costs were vastly underestimated and an overrun of 80% was incurred.<sup>3</sup> This was due to delays related to "construction cost, equipment delivery and testing problems",<sup>4</sup> and to changes to the design of the project during construction to increase safety. The project was financed entirely by private sector capital, including five banks who were part of the TransManche Link consortium. Financing originated partly from investment by shareholders and partly from GBP8 billion of debt (about USD12.2 billion, 1994 prices).

<sup>1</sup> Note that Getlink and Eurotunnel will be used interchangeably throughout the case study depending on the point in time being discussed

<sup>2</sup> Anguera, R. (2006). The Channel Tunnel – An ex post economic evaluation. Retrieved from: <https://ideas.repec.org/a/eee/transa/v40y2006i4p291-315.html>

<sup>3</sup> Flyvbjerg, B. (2014). What You Should Know About Megaprojects, and Why: An Overview.

<sup>4</sup> Finnerty, J.D. (2012). Chapter 18 Case Study: The Eurotunnel Project (in: Project Financing – Asset-Based Financial Engineering). John Wiley & Sons, Inc., Hoboken, New Jersey.

## Project timeline<sup>5</sup>

- **1802** First design for a cross-Channel tunnel
- **1867** Approval of a design by Napoleon III and Queen Victoria and exhibition at the Universal Exposition
- **1880** First attempt at tunnel excavation
- **1882** French and UK Governments drop the idea and excavation stops due to public safety concerns
- **1960s** The Channel Tunnel Study Group presents to the governments a proposal of railway tunnel, bored or submerged, comprising a twin rail tunnel with a service tunnel
- **1973** Signature of the Franco-British Channel Tunnel Treaty giving mandate to the Channel Tunnel Group to lead the study and preparatory construction work
- **1975** Cancellation of the works by UK Government for financial reasons and times of the oil crisis
- **1981** Resumption of the work, and the governments setting up a joint working group to study technical and economic aspects of a fixed link
- **1985** Start of a call for proposals, and selection of Eurotunnel as the winning proposal for the project
- **1986** Signature of the Treaty of Canterbury between the UK and French Governments, and of the Concession Agreement conceding the project to Eurotunnel
- **1987** Signature of the Railways Usage Contract which determines Eurotunnel's source of income based on charges and tolls levied on traffic volumes
- **1993** End of construction
- **1994** Opening of the tunnel, the first Eurostar train link created between Paris, Lille and London
- **1997** Eurostar lines extended to Brussels
- **2015** Eurostar lines extended to Avignon, Lyon and Marseille
- **2018** Eurostar lines extended to Amsterdam

## Development

### HISTORY OF THE PROJECT

The idea of a tunnel under the English Channel has a long history with the first proposal dating back to 1802, and several others following over subsequent years.<sup>6</sup> The idea was discussed several times during the 20th century but only in the 1960s did dialogue between France and the UK result in a call for proposals, leading to the drafting of a convention in 1972, which gave the Channel Tunnel Group the mandate to start the technical and financial feasibility studies and the preparation of the construction works. Government-funded tunnel boring works started in 1974 but were cancelled in 1975 by the newly elected UK Government for financial reasons, including the oil crisis.<sup>7</sup> The project resumed in 1981 with the formation of a joint working group to study technical and economic aspects of a fixed link. After four years of studies and discussions, the procurement procedure was initiated in 1985 under British Prime Minister Margaret Thatcher and French President François Mitterrand for the construction of the link as we know it today.

### POLICY AND PLANNING SETTING

The Channel Tunnel was approved with the signature of the **Treaty of Canterbury** (signed by the French and UK Governments on 12 February 1986), which authorised the construction of the Fixed Link as a concession without any public financing or guarantees. The Treaty of Canterbury also established the creation of the Channel Tunnel Intergovernmental Commission (IGC) as the body in charge of supervising the construction and operation of the Fixed Link on behalf of the French and UK Governments, as well as the general application of the Treaty. The IGC is the body in charge of adopting and implementing rules for the Channel Tunnel. Safety aspects of the project are managed under the remit of the Channel Tunnel Safety Authority (CTSA).

Another key document to the Channel Tunnel's inception is the **Concession Agreement** (signed 14 March 1986),<sup>8</sup> which establishes the rights and roles of the concessionaires, the two governments and the IGC. It stipulates that concessionaires of the Channel Tunnel "have the right and the obligation to carry out the development, financing, construction and operation during the Concession Period" (i.e. for 55 years from 1986 – extended by 10 years in 1994,

<sup>5</sup> Sources: Dupont (1990), Finnerty (2012), Getlink (2019), Wilson (1994), Winch (1996).

<sup>6</sup> GetLink Ltd. (2019). Our history. Available at: <https://www.getlinkgroup.com/en/our-group/history/>

<sup>7</sup> Ibid.

<sup>8</sup> <https://www.getlinkgroup.com/content/uploads/2019/09/Extracts-Concession-Agreement-UK.pdf>



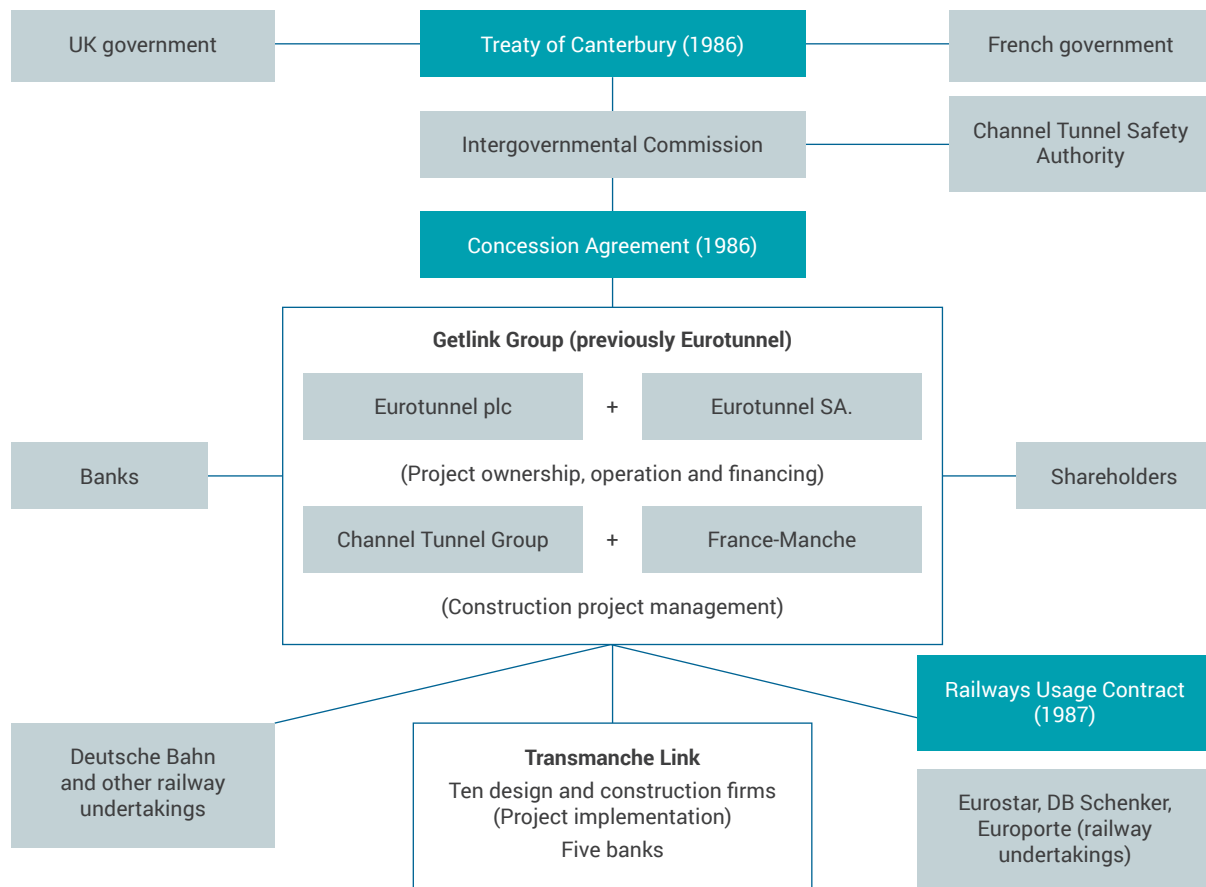
and extended again in 1997 to 99 years until 2086). This is done “at their own risk, without recourse to government funds or to government guarantees of a financial or commercial nature and regardless of whatever hazards may be encountered”. Furthermore, “the Concessionaires [are] free to determine their tariffs and commercial policy and the type of service to be offered. In particular, laws relating to control of prices and tariffs shall not apply to the prices and tariffs of the Fixed Link”.<sup>9</sup>

The third key document is the **Railways Usage Contract**, which determines Eurotunnel's source of income. According to Michael Grant, at the time Eurotunnel's Corporate Finance Manager, “Under this Contract, Eurotunnel is required to make half of the

tunnel capacity available to the British, French and Belgian railways for their Eurostar and freight trains.

In return, the railways pay a fixed charge and tolls based on the volume of traffic passing through the tunnel together with a contribution to Eurotunnel's operating costs. There is a minimum charge level, a mechanism to ensure a guaranteed level of cash flow to Eurotunnel over the first 12 years of operation”.<sup>10</sup> The Railways Usage Contract is of fundamental importance to the Channel Tunnel, together with the Treaty of Canterbury and the Concession Agreement, in giving confidence to investors that the Channel Tunnel will remain operational.

The project contractual structure and associated governance structure are illustrated in Figure 1.



**Figure 1: Overview of the Channel Tunnel contractual scheme**  
(Source: authors own figure, based on data from Michael Grant<sup>11</sup>)

<sup>9</sup> This is also stated in Article 1 of the Treaty of Canterbury.

<sup>10</sup> Grant, M. (1997). Features: Big Project Financing – Financing Eurotunnel. Japan Railway & Transport Review No. 11, pp. 46–52. East Japan Railway Culture Foundation (EJRCF). Tokyo. Retrieved from [https://www.ejrcf.or.jp/jrtr/jrtr11/pdf/f46\\_gra.pdf](https://www.ejrcf.or.jp/jrtr/jrtr11/pdf/f46_gra.pdf)

<sup>11</sup> Grant, M. (1997). Features: Big Project Financing – Financing Eurotunnel. Japan Railway & Transport Review No. 11, pp. 46–52. East Japan Railway Culture Foundation (EJRCF). Tokyo. Retrieved from [https://www.ejrcf.or.jp/jrtr/jrtr11/pdf/f46\\_gra.pdf](https://www.ejrcf.or.jp/jrtr/jrtr11/pdf/f46_gra.pdf)

## CHALLENGES AND OPPORTUNITIES ADDRESSED BY THE PROJECT

The project aimed to provide a fixed (rail) link for the transport of freight and passengers (including by high speed train, 'Train à Grande Vitesse' or TGV), complementing ferry and air travel between the UK and France, and by extension the rest of the EU. One of the objectives of the project was to provide a transport option that was faster than the ferry and more affordable than air travel.<sup>12</sup> The project had strong economic and political implications with regard to trade and tourism, in particular the strengthening of ties between the UK and France, and by extension between the UK and the rest of the EU.

## ALTERNATIVE OPTIONS CONSIDERED

In 1985, a call for proposals received several submissions of varying designs. Four were shortlisted:

- Euroroute, a hybrid solution of a bridge-tunnel-bridge (GBP4.8 billion – about USD6.2 billion, 1985 prices)
- Europont, a suspended bridge (GBP5 billion – about USD6.5 billion)
- Transmanche Express, four bored tunnels allowing both railway and road traffic (GBP2.5 billion – about USD3.3 billion)
- Eurotunnel, a rail shuttle service for road vehicles with provision for through trains, using three tunnels (GBP2.6 billion – about USD3.4 billion).<sup>13</sup>

The Eurotunnel consortium, consisting of the Channel Tunnel Group (CTG) and France-Manche (FM), was awarded the project in January 1986. Of all project

options, Eurotunnel was selected in part because it offered the highest level of safety thanks to the three-tunnel design that includes two tunnels for train transit, and a tunnel in the middle for maintenance and safety evacuation (see Figure 2).

In 1994, the first Eurostar train link service was created between Paris, Lille and London, then Brussels was added in 1997 and Amsterdam in 2018, via the high-speed Eurostar train. In 2015, the Eurostar line was extended from London to Avignon, Lyon and Marseille. The Eurostar also connects London and the Savoie region of France during winter.

## LONG-TERM BENEFITS

The Channel Tunnel project has driven transport infrastructure improvements of the road and rail networks in France and the UK that connect to, and are associated with, the tunnel. Of all designs proposed, Eurotunnel also offered the least environmental disruption, due to the tunnel being dug 40 m under the seabed, as well as less health risks from pollution (compared to an automobile 'drive-through' tunnel, initially preferred by the UK Government); lower vulnerability to environmental disasters; and better protection against the risk of terrorism.<sup>14</sup>

In terms of trade, the trade value of the Channel Tunnel has been estimated as equivalent to 26% of total UK–EU trade as of 2016.<sup>15</sup> The speed and efficiency of transport offered by the Channel Tunnel has significantly increased trade interconnectivity between the UK and the EU, with the benefit of consumers able to access products cheaply.<sup>16</sup>

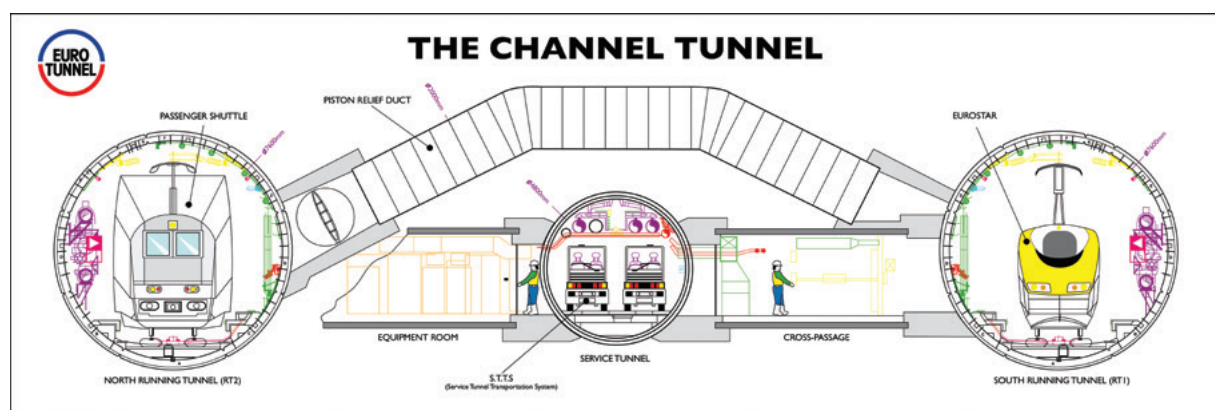


Figure 2: Cross section of the Channel Tunnel, showing the three-tunnel design. Source: Getlink Group.

12 Hereford, P. (2003). The Eurostar and The Channel Tunnel. Retrieved from: <http://www.mit.edu/~1.011/finalppr/hereford-TheEurostarChannelTunnel.pdf>

13 Reported costs are cited from Finnerty (2012, p.369).

14 Dupont, C. (1990). The Channel Tunnel Negotiations, 1984–1986: Some aspects of the process and its outcome. Retrieved from: <https://link.springer.com/article/10.1007/BF01000458>

15 EY., (2018). Economic Footprint of the Channel Tunnel in the EU. Retrieved from: <https://www.getlinkgroup.com/content/uploads/2019/09/180604-EY-Channel-Tunnel-Footprint-Report.pdf>

16 Ibid.



## Procuring and financing

### PROCUREMENT PROCESS

The project was procured using an open form of tendering. The tendering procedure formally took place after discussions between governments and with private sector actors following the release of the joint statement of the two governments in October 1984, up until the final decision a year later.<sup>17</sup> The concession was awarded to the Eurotunnel consortium, who which owns, financed and manages the Channel Tunnel, and which makes revenue with access charges levied on railway undertakings. The Eurotunnel consortium consists of CTG and FM.

The Channel Tunnel proposal from Eurotunnel was conceived as a combination of financing and construction functions. The design-and-build contract was awarded by Eurotunnel to the bi-national organisation TransManche Link (TML),<sup>18</sup> a consortium made up of five banks – arranging Eurotunnel Credit – and 10 construction companies: five French companies (TRANSMANCHE)<sup>19</sup> and five UK companies (TRANSLINK).<sup>20</sup>

The passenger trains are run by Eurostar, which is owned by public companies:

- SNCF – 55%
- London and Continental Railways (LCR) – 40%
- SNCB – 5%.

LCR's holding was transferred to the Treasury in June 2014, and the UK Government's shares – equalling 40% – were sold in 2015 to a consortium comprising the Caisse des Depot et Placement du Quebec (CDPQ) and Hermes Infrastructure.<sup>21</sup>

### FINANCIAL STRUCTURE

The Treaty of Canterbury and the Concession Agreement established that the project would be entirely financed, delivered and operated by the private sector. This approach was particularly advocated for by the UK Government at the time to spare public expenditure on the project.

To enable total private financing of the project, the Channel Tunnel was procured as a concessional public-private partnership (PPP). The concessionaire would design, build, own, operate and transfer the project over an initial duration of 55 years, extended to 99 years throughout the many renegotiations over the debt restructuring. The initial structure was a project finance structure (equity/debt) with equity provided by five banks and 10 construction companies.

Eurotunnel had forecast that the Channel Tunnel would lead to construction costs of GBP2.8 billion (about USD3.6 billion in 1985) and total costs of GBP4.8 billion (about USD6.2 billion) between 1986 and the last year of construction, 1993.<sup>22</sup> Eurotunnel planned to raise GBP6 billion (about USD7.8 billion) in order to cover the costs and possible overruns. This amount included GBP1 billion (about USD1.3 billion) in equity and GBP5 billion (about USD6.5 billion) in debt.<sup>23</sup> However, construction costs were more than double their initial predictions. This was partly due to unforeseen technical complications related to the complexity of the three-tunnel design, but also modifications to the design as a result of safety concerns expressed by the IGC during construction.

Moreover, the expected revenue from passenger and freight transport through the Channel Tunnel was vastly overestimated from the outset. Fierce competition from existing ferry operations resulted in a lower market share for the tunnel and Eurotunnel needing to reduce tariffs.<sup>24</sup>

In its first year of operation (1994-95), the company reported a loss of GBP925 million (about USD1.4 billion) because of disappointing revenue from passengers and freight, together with heavy interest charges on its GBP8 billion (about USD12.2 billion in 1994) of debt. In light of its financial difficulties, Eurotunnel was at serious risk and sought to refinance the project with a scheme based on debt-for-equity restructuring legally enforced using French legal protection with a 'procédure de sauvegarde'<sup>25</sup> (safeguard procedure), effectively pausing all debt

17 Dupont, C. (1990). The Channel Tunnel Negotiations, 1984–1986: Some aspects of the process and its outcome. Retrieved from: <https://link.springer.com/article/10.1007/BF01000458>

18 Wilson, K. M. (1994). Channel tunnel visions, 1850-1945 : dreams and nightmares. Retrieved from: <https://academic.oup.com/ahr/article-abstract/101/4/1211/175820?redirectedFrom=fulltext>

19 TRANSMANCHE : Bouygues, Dumez, Spie-Batignolles, La Société Auxiliaire d'Entreprises (SAE), La Société Générale d'Entreprises (SGE),

20 TRANSLINK: Balfour Beatty Construction, Costain UK, Tarmac Construction, Taylor Woodrow Construction, George Wimpey International.

21 Eurostar.com, Behind the scenes. Available at: <https://www.eurostar.com/uk-en/about-eurostar/our-company/behind-the-scenes>

22 Finnerty, J.D. (2012). Chapter 18 Case Study: The Eurotunnel Project (in: Project Financing – Asset-Based Financial Engineering). John Wiley & Sons, Inc., Hoboken, New Jersey.

23 Ibid.

24 Anguera, R. (2006). The Channel Tunnel – An ex post economic evaluation. Retrieved from: <https://ideas.repec.org/a/eee/transport/v40y2006i4p291-315.html>

25 The French 'procédure de sauvegarde' was introduced in 2005 and is comparable to the UK legal procedure for company voluntary arrangement.

repayment processes for six months and enabling Eurotunnel to bank in some of its operating revenue to finance the restructuring effort. The refinancing plan was completed in 2007 with Eurotunnel turning a net profit of EUR1 million (about USD1.4 million) for the first time in that year.

When asked the question of what made the Channel Tunnel model withstand economic difficulties, a representative from the Getlink Group interviewed for the purpose of this case study replied that the Treaty of Canterbury and Concession Agreement, but especially the Railways Usage Contract, were fundamentally important in giving confidence to investors that a minimum volume of traffic would continue to run despite financial difficulties.

### Currency risk and credit ratings

Due to the cross-border nature of the project between two countries with different currencies (the French franc and since 2002 the Euro in France, and the pound sterling in the UK), Eurotunnel has structured its debt and established its operations in both currencies to mitigate currency fluctuations. For instance, passenger traffic tends to be more UK-led whereas freight traffic is more EU-led, such that the corresponding currencies are used for either activity. This has been an advantage to Getlink: if a change in currency value occurs (such as the drop in the Pound during Brexit), Getlink can, for instance, change its focus when tendering for contracting by preferring one currency or the other.

In order to guard against customer credit risk, Getlink Group applies UK and Eurozone credit policy "requiring that every new customer undergo a credit check before being able to benefit from the Group's standard credit terms".<sup>26</sup> Furthermore, "The Group's credit risk exposure to account customers is managed by the continuous monitoring of their financial position and of their outstanding debt in relation to the credit limits and payment terms granted to them".<sup>27</sup>

## Management

### POLITICAL AND OPERATIONAL COORDINATION

The IGC is made up of an even split of French and UK Government representatives who regularly meet and oversee the Channel Tunnel's operation. Regulatory discrepancy is minimised in the case of the Channel Tunnel due to the application by both countries of relevant EU legislation (even after Brexit). For instance, the IGC is responsible for the implementation of safety provisions from EU legislation (Directive 2004/49/EC on rail safety).

Rules and procedures are harmonised as part of implementing common EU legislation and under the regulatory role of the IGC. Border procedures are, for instance, set by EU standards for border controls for EU Member States and third countries to the EU.<sup>28</sup> After Brexit, the UK will introduce import controls on EU goods at the border after the transition period ends on 31 December 2020.<sup>29</sup> Immigration control will continue to be performed on the way from France to the UK due to the UK not being in the Schengen area.<sup>30</sup>

Being composed of key government officials, the IGC is directly involved in the process of coordinating the transition following Brexit. In the case of a no-deal Brexit at the end of the transition period, Getlink Group remarks that Eurotunnel and Eurostar "will be dependent on the decisions of the governments and regulatory authorities regarding the licences, and operating agreements and procedures needed to ensure the smooth running of the rail service" including "border control measures, cross-border employment contracts for Eurostar personnel, operating and safety licences that are valid in the EU, as well as the regulatory and operational framework of the European Union".<sup>31</sup> France has now formally asked the European Commission if it may negotiate with the UK a new agreement supplementing the Treaty of Canterbury fixing rules governing the tunnel. At the time of writing this case study report, an agreement between the UK and the EU has not yet been found to resolve the situation.

28 A country that is not a member of the EU as well as a country or territory whose citizens do not enjoy the EU right to free movement, as defined in Art. 2(5) of the Regulation (EU) 2016/399 (Schengen Borders Code).

29 Cabinet Office, UK (2020). Press release: Government confirms plans to introduce import controls, 20 Feb 2020. Available at: <https://www.gov.uk/government/news/government-confirms-plans-to-introduce-import-controls>

30 The Schengen Area, which comprises 26 European states, is an area in which citizens can cross internal borders without being subjected to border checks. The border-free Schengen Area guarantees free movement to more than 400 million EU citizens, as well as to many non-EU nationals, businesspeople, tourists or other persons legally present in the EU territory.

31 Interview with a Getlink representative.

26 GetLink Ltd. (2019). Registration document. Retrieved from: <https://www.getlinkgroup.com/content/uploads/2019/08/2018-Registration-Document-Getlink-SE.pdf>

27 Ibid.

## HARMONISATION OF RULES, PROCEDURES, AND TECHNICAL STANDARDS

Technical standards for the Channel Tunnel relate mostly to safety and interoperability. In the EU, interoperability is ensured by the Safety in Railway Tunnels Technical Specifications for Interoperability (TSI), however the safety standards applied to the Channel Tunnel by the IGC do not comply with the EU TSIs. According to the Getlink Group, the reason for this is that the Channel Tunnel should obey the specific standards approved by the CTSA in accord with the tunnel's particular design, such as its length (being one of the longest tunnels in the world). For example, shorter tunnels may more easily prescribe that trains which have an incident must run out of the tunnel and be repaired outside the tunnel. Due to the length of the Channel Tunnel, an internal firefighting system was built in four places in the tunnel, going beyond standard TSIs.

## ARBITRATION ISSUES

Arbitration has occurred twice in the history of the Channel Tunnel. The first arbitration case occurred during project development and related to the rising costs of construction, which led TML to launch a claim to the International Chamber of Commerce (ICC) in Brussels, as foreseen by the construction contract, for additional construction costs of GBP1.5 billion (about USD2.0 billion, 1985 prices).<sup>32</sup> As TML was threatening to suspend work unless its claim was met, Eurotunnel applied to the English court for an interim injunction to restrain TML from carrying its threat. However, this injunction was rejected, as all the parties had agreed to go to arbitration abroad in their contract.

The second time was in 2003, when Eurotunnel launched an arbitration request related to “the Governments’ failure to protect the Fixed Link from multiple incursions” of migrants leading to delays, damage and expenses.<sup>33</sup> A second issue of the same arbitration relates to the “Governments’ granting (or failing to prevent the grant) of large subsidies to SeaFrance, thereby allowing it to remain in business, to renew its fleet and to compete with the Fixed Link on an unfair basis”.<sup>34</sup> Arbitration between Eurotunnel, the UK and French Governments was handled by the Permanent Court of Arbitration (PCA). The PCA eventually ruled in favour of Eurotunnel, judging that the UK and French Governments should be held liable.

## ACCOUNTABILITY

The management of the Channel Tunnel is held accountable by means of transparent reporting of related activities.<sup>35</sup> According to Eurotunnel's Network Statement, the fixed link is also subjected to a performance monitoring and improvement regime which involves measurement of delays and reporting of causes, as well as reporting of incidents to Eurotunnel and to the European Railway Agency, all in accordance with relevant EU legislation. This monitoring is conducted by railway undertakings and in collaboration with Eurotunnel.<sup>36</sup>

32 Grant, M. (1997). Features: Big Project Financing – Financing Eurotunnel. Japan Railway & Transport Review No. 11, pp. 46–52. East Japan Railway Culture Foundation (EJRCF). Tokyo. Retrieved from: [https://www.ejrcf.or.jp/jrtr/jrtr11/pdf/f46\\_gra.pdf](https://www.ejrcf.or.jp/jrtr/jrtr11/pdf/f46_gra.pdf)

33 Permanent Court of Arbitration (2007). Partial award, 30 Jan 2007. The Eurotunnel Arbitration. Retrieved from: <https://pca-cpa.org/en/cases/70/>

34 Ibid.

35 See for example IGC minutes of meetings <http://www.channeltunneligc.co.uk/-Ongoing-affairs-.html?lang=en>; see also Getlink Group publications <https://www.getlinkgroup.com/en/shareholders-investors/>

36 GetLink Ltd. (2019a). Eurotunnel railway network. Retrieved from: <https://www.getlinkgroup.com/en/our-group/eurotunnel-railway-network/>

## Conclusions

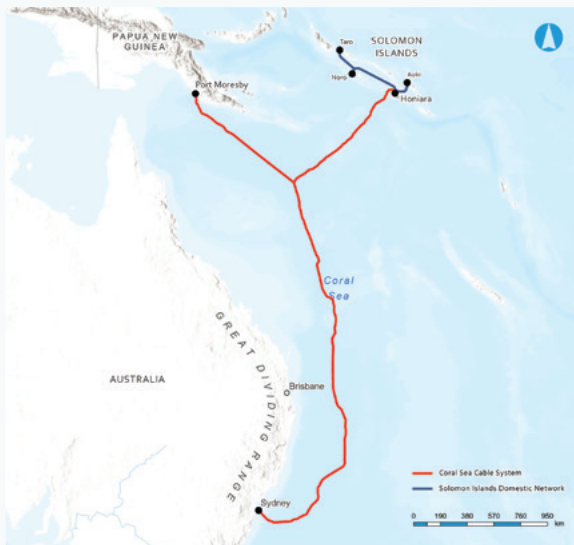
- **Political will** – The Channel Tunnel could be realised thanks to strong political will from both the French and UK Governments wishing to build a fixed link between the UK and the rest of Europe.
- **Financial issues** – The project has faced several financial difficulties during construction and operation that resulted in several restructures and significant losses for the private sector. However, the financial situation was able to be resolved thanks to several restructuring and refinancing plans, the participation of many individual shareholders, and the Channel Tunnel's operating model based on the terms of the Railways Usage Contract. In hindsight it is possible that, had design been completed and agreed upon with the IGC before construction started, the project may have avoided some of its financial difficulties. This demonstrates the importance of proper planning and design to the successful delivery of infrastructure.
- **Policy, planning setting and governance**
  - The project benefits from a solid legal basis enshrined in the Treaty of Canterbury and the Concession Agreement, as well as the binational steer of the IGC overseeing the good implementation of the Treaty and maintenance of the project's operations in spite of Brexit. This policy and planning setting, involving both countries on an equal footing, has provided certainty to the development and management of the project and is exemplary in terms of project governance.
- **Long-term benefits** – The Channel Tunnel is one of the longest tunnels in the world for freight and passenger transport. Channel Tunnel passenger trains allow for fast travel between the city centres of several EU capitals and cities at a low environmental footprint compared to private cars, airplanes and ferries in terms of air pollutant emissions, including greenhouse gases. The choice of a rail tunnel is also safer for people to use than the car in terms of the lower risk of accident, but also faster than the ferry, and more frequent than flights. Accounting for an estimated 26% of France–UK trade, the Channel Tunnel is a significant contributor to both French and UK consumer markets.





Source: Erich Westendarp from Pixabay

## Coral Sea Cable System



### Location

Sydney (Australia), Port Moresby (Papua New Guinea), Honiara (Solomon Islands)

### Sector

Information and communications technology (ICT)

### Procuring authorities

Australian Government

### Project company

Coral Sea Cable Company

### Project company obligations

Own and operate

### Financial closure year

2019

### Capital value

AUD200 million (USD131 million – 2019 value)

### Start of operations

2020

### Key facts

100% governmental subsidies



## Project highlights

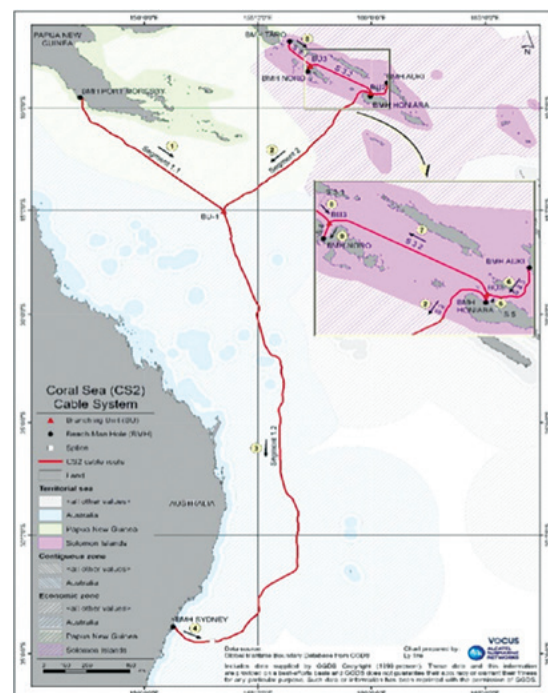
The Coral Sea Cable System (CS<sup>2</sup>) is a 4,700 km fibre-optic submarine telecommunications cable that links both Papua New Guinea and Solomon Islands to the major East Coast Internet Hub in Sydney, Australia. The project also includes a Solomon Islands Domestic Network (SIDN), a 730 km submarine cable connecting Honiara to three provincial centres (Auki in Malaita Province, Noro in Western Province and Taro in Choiseul Province).

The aim of the CS<sup>2</sup> project is to provide faster, affordable and more reliable internet connection to Papua New Guinea and Solomon Islands. Prior to the project, the two countries were dependent on either low-capacity submarine cable connections (Papua New Guinea) or expensive satellite links (Solomon Islands).

The CS<sup>2</sup> has a four fibre-optic pair core, sheathed in one physical cable extending from Australia over 2,500 km to a Branching Unit (BU) in the Coral Sea, where the four fibre-pair core is split into two cables, each containing a two fibre-pair core, that make their ways to landing stations in Port Moresby and Honiara.

The four fibre-pair system has a total capacity of 40 terabits/sec. Each country will be able to access up to 20 terabits/sec of bandwidth if the cable is expanded to full capacity. The initial installed capacity of the system is 200 gigabits/sec to each country.

The CS<sup>2</sup> project was carried out in partnership among the Australian Department of Foreign Affairs and Trade (DFAT) and the two infrastructure providers: PNG DataCo Limited and the Solomon Islands Submarine Cable Company Limited (SISCC). The design, construction and installation were managed by Vocus Communications (an Australian fibre-optic cable network provider and operator), while the technology was supplied by Alcatel Submarine Networks.



**Figure 1: Project site overview (Sources: Vocus and Alcatel Submarine Networks)**

The project was initiated in late 2017 and operationally ready in December 2019. Its total project budget was about AUD200 million (USD131 million in 2019). The Australian Government provided two-thirds of the funding, and the Papua New Guinea and Solomon Islands Governments have made commitments to jointly contribute one third of the project costs.

This report contains information retrieved from the literature on the project, validated through stakeholder interviews.

## Project timeline<sup>1</sup>

- **November 2017**  
Public announcements made on the project
- **December 2017**  
Vocus contracted to scope out the design, construction and procurement of the Coral Sea Cable System
- **June 2018**  
Project commenced through a trilateral memorandum of understanding (MoU) on funding arrangements between Australia, Papua New Guinea and Solomon Islands
- **September 2018**  
Design finalised with lock-down of options
- **November 2018**  
Physical survey of planned cable route completed
- **March 2019**  
Manufacture and assembly of power feed equipment, cable, repeaters and branching unit completed
- **September 2019**  
Cable landing stations completed in Sydney, Port Moresby and Honiara
- **October 2019**  
Lay of the cable completed
- **December 2019**  
**Systems commissioned**
- **February 2020**  
Commercial operations commenced in Papua New Guinea and Solomon Islands

## Development

### POLICY AND PLANNING SETTING

Papua New Guinea, Solomon Islands and Australia are committed to supporting inclusive economic growth in the Pacific region. The partnership with the Pacific is one of the highest foreign policy priorities of the Australian Government, as outlined in the 2017 Foreign Policy White Paper.<sup>2</sup> This approach recognises that closer cooperation among Pacific countries is essential to the region's long-term economic and security prospects.

The Australian Government further enhanced its commitment to work with governments in the Pacific through the Pacific Step-up announced in September 2016. The Step-up is a 'step-change' in the way Australia responds to sovereignty, stability, security and prosperity needs in the Pacific region.

One of the dedicated instruments for closer regional cooperation is the Australian aid program, operated by the Australian Government, with the majority of expenditure managed through DFAT.<sup>3</sup> The purpose of the program is to promote Australia's national interests by contributing to sustainable economic growth and poverty reduction with a strengthened focus on the Indo-Pacific region. Prior to the COVID-19 pandemic, the program's focus was on investing in infrastructure, trade facilitation and international competitiveness, agriculture, fisheries and water, effective governance, better quality education and health systems, building resilience to natural disasters and economic shocks, as well as gender equality and the empowerment of women and girls.

The program's infrastructure portfolio aimed, among other things, to unlock transformational ICT to expand access to banking services, market information, and commercial opportunities. This improved conditions for the private sector and helped to expand trade.

Following the outbreak of COVID-19, the Australian Government has pivoted the program to focus on health security, stability and economic recovery. Infrastructure remains an important element of the program, supporting development of sustainable economic growth and local employment<sup>4</sup>

<sup>1</sup> <https://www.corseacablesystem.com.au/progress>

<sup>2</sup> <https://www.fpwitepaper.gov.au>

<sup>3</sup> <https://www.dfat.gov.au/aid/Pages/australias-aid-program.aspx>

<sup>4</sup> <https://www.dfat.gov.au/publications/aid/partnerships-recovery-australias-covid-19-development-response>

## CHALLENGES AND OPPORTUNITIES ADDRESSED BY THE PROJECT

With the advancing digitalisation of the global economy, access to and demand for high-quality ICT play are key to achieving sustainable social and economic growth. High-capacity networks ensure better business productivity, help modernise public services and may reduce access inequalities, providing cost-effective solutions to more people.<sup>5</sup> The demand for high-bandwidth services is growing rapidly yet supply is hampered by very high capital expenditure investment to deliver hardware and software, and obtain the related licences and permissions.

In the Pacific region, this connectivity constraint is being addressed by progressive deployment of submarine optical fibre cables, through a combination of private and public funding, as well as investments by telecom services in low-latency medium earth orbit satellite services (O3B Networks<sup>6</sup>) and conventional satellite services.<sup>7</sup>

Submarine fibre cables offer a higher capacity and lower latency (delay) than satellite systems, which implies more reliable service and – prospectively – more reasonable customer pricing. On the other hand, if the cable is damaged and needs to be repaired, there may be service disruption. Moreover, the end capacity (at customer) depends on the quality of domestic network infrastructure to which the submarine cables connect at landing points.

The satellite technology, although it can help cover larger geographical areas, has a lower signal speed and capacity, and requires specific equipment (such as a transmitter, dish and modem). In addition, the transmission may be susceptible to noise and interference because of weather conditions, leading to quality deterioration.

In late 2017, the three governments committed to work together to lay a new submarine high-speed telecommunications cable for the purpose of supporting the future digital economy in Papua New Guinea and Solomon Islands, enabling these two countries to reap the economic and development benefits of fast and reliable telecommunications.

In 2017, only 11–12% of the population of Papua New Guinea and Solomon Islands had access to the

internet.<sup>8</sup> Prior to the CS<sup>2</sup> project, Papua New Guinea had two international submarine fibre-optic cable connections to Australia. The APNG-2 submarine cable, in service from 2006, has a total capacity of 1.12 gigabits/sec,<sup>9</sup> while the PNG Spur of the PPC-1 cable, completed in 2009, provides a total of 10 gigabits/sec.<sup>10</sup> The CS<sup>2</sup> provides capacity 20 times higher than the latter.

Solomon Islands had been reliant on satellite links for international voice and data broadband communications. The submarine cable is expected to raise broadband capacity by 6,000 times,<sup>11</sup> relative to estimated 2019 satellite usage.

## PERCEIVED LONG-TERM BENEFITS

The CS<sup>2</sup> investment is expected to facilitate access to the global digital economy for Papua New Guinea and Solomon Islands. By offering more cost-effective bandwidth to licenced operators, it should make the telecommunications services more affordable for their retail customers.

Even though prices of entry-level internet packages in Papua New Guinea had fallen by as much as 70% in the 2013–2016 period, the cost per gigabyte was still many multiples of that in developed countries. At around 10–20% of average monthly incomes, entry-level internet prices prior to the project were still out of reach for the majority of Papua New Guinea citizens. The pricing was also above the International Telecommunications Union's benchmark for driving rapid uptake of internet, which is less than 3–5% of average monthly income.<sup>12</sup>

A wholesale access rate was as high as USD1,700 per Mbps each month in 2013. It reduced to about USD445 per Mbps each month in mid-2016 and fell further to USD170 per Mbps per month in 2017. The rate is estimated to be further reduced to USD98 per Mbps per month for a 1 Gbps connection when the CS<sup>2</sup> is commercialised.<sup>13</sup> The maximum wholesale price for international submarine cable transmission capacity in Papua New Guinea is determined by the National Information and Communication

5 Verougstraete M., <https://www.gica.global/resources/mpfd-working-paper-public-private-partnership-cross-border-infrastructure-development>

6 Satellite services primarily intended to provide voice and data communications to mobile operators and Internet service providers in emerging markets

7 World Bank research (Assessment of the Potential Impact of the ICT Revolution in the Pacific on Economic Growth, Employment, and Government Revenue; Pacific Possible Technical Note by Robert Utz, June 28, 2017)

8 Data by the World Bank, <https://data.worldbank.org/indicator/IT.NET.USER.ZS>

9 Telecom PNG, <https://www.telikompng.com.pg/index.php/wholesale/apng2-submarine-cable>

10 <https://www.submarinenetworks.com/en/systems/australia-usa/ppc-1>

11 <https://www.coralseacablesystem.com.au/articles/sidn-lay-completed/>

12 The National Research Institute Papua New Guinea. Discussion paper 'Why are internet prices high in Papua New Guinea?', <https://pngnri.org/images/Publications/DP148--201610--Deloitte-Internet-Prices.pdf>

13 <https://www.pngdataco.com/services-over-the-coral-sea-cable-system-now-on-offer/>

Technology Authority (NICTA)<sup>14</sup> and, per public notices in late 2019, the maximum wholesale price for the CS<sup>2</sup> was set to drop to an equivalent of USD52 per Mbps per month for 2020, USD38 per Mbps per month for 2021, USD25 per Mbps per month for 2022 and USD21 per Mbps per month for 2023.<sup>15</sup>

Also, the SISCC self-assessment model indicates an initial reduction in the wholesale price offered to licenced operators of well over 50%, followed by continuing significant reductions with increased demand.<sup>16</sup>

The significant improvements in internet reliability, speed, quality and affordability in Papua New Guinea and Solomon Islands will be transformative to business development and bring substantial social benefits. The cable offers capacity well beyond forecast demand in Papua New Guinea and Solomon Islands. The CS<sup>2</sup> could unlock new opportunities for growth and connectivity for the two countries as they connect their tourism and agribusiness industries to the global marketplace, offering easier access to business and education services and boosting people-to-people contacts.

Through the complementary SIDN, key provincial centres should benefit from the new international cable system to extend the economic and social benefits of high-speed internet to the Solomon Islands' highly dispersed population. In Papua New Guinea, the CS<sup>2</sup> is part of Papua New Guinea's vision to improve domestic connectivity and achieve stability in connecting the country to the international network by means of various backup options.

The CS<sup>2</sup> project is expected to allow the application of digital technologies in education and healthcare and will contribute to better governance (e.g. by digitisation of government services).

As the increased connectivity also results in higher cybercrime risks for the countries' national infrastructure, the Australian Government has, in parallel, deepened cooperation with the Pacific region countries to improve cyber resilience. For example, as part of the Cyber Cooperation Program, Australia helped Solomon Islands ICT Support Unit (ICTSU) establish a Cyber Security Operations Centre and continues to support the ICTSU to build the technical

capacity and the cyber incident response skills of its staff.

Similarly, an MoU between Papua New Guinea and Australia aims to strengthen cyber cooperation between the two countries and enhance PNG's cyber security posture. As part of this, Australia helped PNG establish its National Cyber Security Centre to monitor threats in priority PNG networks. There is ongoing work to deliver accredited technical cyber security training to PNG's computer emergency response team, and other PNG government and industry staff, as well as efforts to progress PNG's cyber security governance arrangements.

## Financing

### INFRASTRUCTURE FINANCING

The project was co-funded by the Governments of Australia, Papua New Guinea and Solomon Islands under the terms of an MoU on the funding of construction and installation of the CS<sup>2</sup>, signed on 11 July 2018.

Australia grant-funded 66.7% of the total cost, with the remainder to be covered by Papua New Guinea and Solomon Islands. The exact co-contribution was based on the formula that Papua New Guinea and Solomon Islands each pay 16.7% of the total cost of the cable system to the BU and, similarly, equally split the co-contribution to overall project management. From the BU to each country, the country in question pays 33.3% of the costs of that part of the system. Australia and Solomon Islands funded SIDN with the same two-thirds, one-third approach.

The Solomon Islands Government contribution will be made through the SISCC. It is a joint venture company established in August 2016 to build and operate submarine fibre-optic communication systems for Solomon Islands.

The shareholders of SISCC are the Investment Corporation of the Solomon Islands (ICSI) with 51% of the share capital and the Solomon Islands National Provident Fund (SINPF) with 49% of the share capital.

Although it is not a state-owned enterprise (SOE), SISCC operates under direct government investment and control through the ICSI and the participation of all Solomon Islanders through the SINPF.

SISCC signed the Solomon Islands Landing Party Agreement with the Australian Government on 13 June 2018. Under this agreement, SISCC constructed all the landing party infrastructure in Solomon Islands ready for the installation of the cable. An equivalent Landing Party Agreement for

14 The National Information and Communications Technology Authority (NICTA) is a government agency responsible for the regulation and licensing of Information Communication Technology (ICT) in Papua New Guinea.

15 <https://www.nicta.gov.pg/downloads/download-info/no-g1014-specific-pricing-principles-submarine-cable-service-2019/>

16 <https://static1.squarespace.com/static/5b3afcc1aef1d74ee49c86a/t/5be8f003c2241bb5cb83e384/1541992453808/ISSUE+42+SSC+copy.pdf>

Papua New Guinea was signed between the Australian Government and PNG DataCo Limited (DataCo).

DataCo operates and manages over 2,100 km of fibre-optic network comprising both terrestrial and submarine cables. It was established by the Government of Papua New Guinea as an SOE in February 2014 to own, manage, operate and maintain telecommunications wholesale infrastructure and assets. DataCo's objective is to ultimately provide high capacity, resilient and robust wholesale international and domestic network telecommunications at competitive and non-discriminatory prices to retail service providers in Papua New Guinea.

Since the CS<sup>2</sup> project completion in December 2019, Papua New Guinea and Solomon Islands majority-own the international cable and receive all revenue generated. Solomon Islands also owns its domestic cable and all revenue generated. SISCC and DataCo were each granted Indefeasible Rights of Use (IRU) over two fibre pairs for the full lifetime of the CS<sup>2</sup> (25 years).

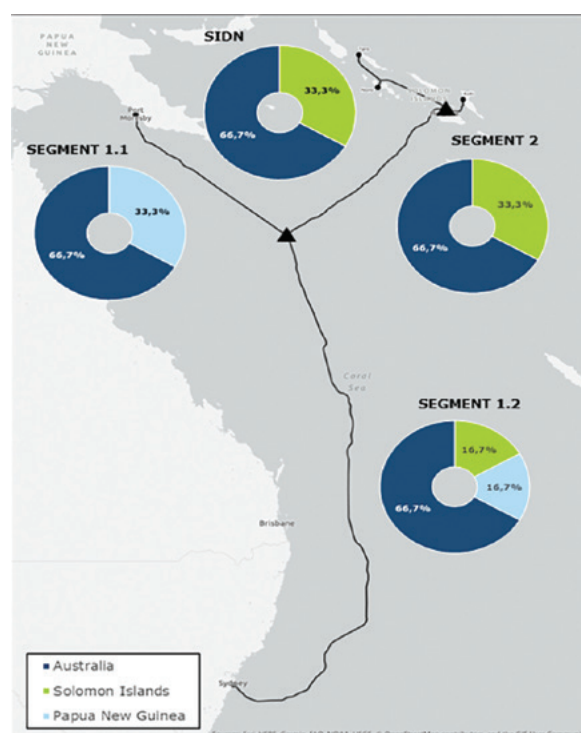
SISCC and DataCo are each wholesale providers of internet and communications bandwidth to licenced operators in Solomon Islands and Papua New Guinea, respectively, on a non-discriminatory basis. Their main business aim is to provide the lowest cost possible for internet bandwidth while recovering investment for their shareholders (from licence fees and any other sources), to strive for a greater uptake of services through the retail operators and thus to deliver economic growth and greater social benefits.

### PRIVATE SECTOR INVOLVEMENT

Vocus, a leading Australian fibre-optic cable network provider and operator, entered into an agreement with Australia's DFAT in December 2017 to scope out the design, construction, and procurement of the CS<sup>2</sup>. The three-month scoping study involved gathering detailed requirements; engaging the governments of Papua New Guinea and Solomon Islands in consulting on cost, performance and feasibility options for the investment; and commencing permits.

Through the tender process following the scoping study, Vocus was chosen to manage the rollout of the cable system on behalf of the Australian Government under an Engineering, Procurement and Construction (EPC) contract that was signed on 18 June 2018. The assignment stemmed from the vast experience of Vocus in building and managing fibre-optic infrastructure. The CS<sup>2</sup> was the third submarine cable project undertaken by Vocus since 2014. The company had already completed the 2,100 km North West Cable System (NWCS) in the Pilbara region in Western Australia in 2016 and the 4,600 km Australia Singapore Cable in 2018.

According to the contract terms, Vocus had to subcontract a suitably qualified submarine cable system vendor to design, construct and install the cable system. Following a rigorous tender and shortlisting process, Alcatel Submarine Networks (France) was commissioned to provide the technology for the cable system.



**Figure 2: Cost distribution for each segment of the investment (Source: Ramboll)**



## Management

### POLITICAL AND OPERATIONAL COORDINATION

The three governments worked closely in the project planning and construction stages to ensure compliance with the legal frameworks of the countries involved. While each country was responsible for compliance with its own jurisdiction in relation to the project, legal advisers to the governments arranged meetings to go through all documentation and agree on measures to overcome any disaccords in laws, licences and permits as determined by each country's legislation and national security needs. Arrangements, such as the technical standards for the cable landing stations in Papua New Guinea and Solomon Islands, were included in the Landing Party Agreements.

The daily operations of the CS<sup>2</sup> following construction completion are run by the newly formed Coral Sea Cable Company Pty Ltd (CSCC). It is an Australian proprietary company limited by shares, a special purpose vehicle (SPV) created to manage and maintain the cable. CSCC must maintain solvency under the Australian Federal Corporations Act (2001). Papua New Guinea and Solomon Islands each have IRU, allowing them to obtain revenue from selling the cable capacity. Meeting operating costs is a condition of the IRU agreements.

CSCC has three equal shareholders, with Australia, Papua New Guinea and Solomon Islands each represented by directors in the company. The board of directors is composed of representatives of the SISCC (Solomon Islands), DataCo (Papua New Guinea) and the Australian Government. The Australian Director, whilst being a representative for the Australian Government, is not a government official. The Australian Director was appointed based on strong financial expertise and board experience.

The board of directors acts on behalf of the three shareholders and is responsible for the financial, legal, technical and governance requirements for the CS<sup>2</sup>. The CSCC is responsible for the operation and maintenance services for the investment, including submarine network management and the network operations centre for preventive and corrective maintenance. The Australian Government maintains a decision-making role in the ownership and operation of the cable to protect its connection to critical infrastructure in Australia.

While CSCC owns and operates the cable, under the terms of IRU, DataCo and SISCC each own capacity on the cable, receive revenues and are responsible

for financing the operational costs of the company. Operating costs include landing party services from Telstra in Australia, outsourced operations and maintenance services and a marine maintenance contract with a regional repair ship provider.

DFAT engaged in a series of complementary policy dialogues and bilateral activities to assist in realising the economic and development benefits of the cable. These efforts also support the ability for the cable to generate revenues to meet operating expenses, while still ensuring affordable access.

DFAT advocated for, and funded, technical support to reduce wholesale prices and increase transparency and competition. Conditions to enable fair and non-discriminatory access to the cable were included in IRU agreements with both countries. Under the Cyber Cooperation Program, work is underway to strengthen the cyber security framework in Papua New Guinea and Solomon Islands, helping to mitigate cyber risks posed by the cable, as described above. Both of DFAT's bilateral programs with Papua New Guinea and Solomon Islands are investing in activities to strengthen domestic telecommunications infrastructure and the regulatory framework. DFAT continues to look for opportunities to promote and facilitate the uptake of the CS<sup>2</sup> and maximise its economic and social benefits.

### COMMUNICATION AND DISSEMINATION

The CS<sup>2</sup> has a dedicated website<sup>17</sup> which contains project highlights, cable system details, work milestones and press publications. The eventual intent is for the website to be archived and updates on the CS<sup>2</sup>'s performance will be provided by the respective governments.

During construction, there were extensive communications about the project via joint government media releases, social media announcements and video, the website and public exhibitions. Project milestones were acknowledged with different events, such as ribbon cuttings of cable landing stations in the Solomon Islands' provinces, soil turning events and Ministerial tours of the cable laying ship. This ensured visibility of project progress and increased community awareness of the project.

One interesting approach, which follows industry practice in undersea cables, was naming the 42 repeaters after prominent or inspirational ICT professionals, predominantly women.<sup>18</sup>

<sup>17</sup> <https://www.coralseacablesystem.com.au/>

<sup>18</sup> <https://www.coralseacablesystem.com.au/files/20191213-AHC-media-release.pdf>



## Conclusions

- **Public benefits** – The CS<sup>2</sup> is a unique cross-border project, motivated by the potential benefits that can arise from improved accessibility to high quality, low cost and secure internet. It saw the partnership of three national governments working together for the first time on a cross-border infrastructure project that will improve the connectivity of their economies and societies.
- **Adherence to national development priorities and staff mobilisation** – The CS<sup>2</sup> project responded to the national development priorities of Papua New Guinea and Solomon Islands and maintained high-level stakeholder engagement in Australia, Papua New Guinea and Solomon Islands through all project stages. In Australia, the project mobilised skills across government and the private sector to deliver, within the given time and budget frameworks, a high-quality infrastructure project that met the expectations of the partner countries' governments. For that purpose, DFAT allocated dedicated staff resources, including senior executives in Canberra and in country, to oversee and support the project from scoping to construction.
- **Fair business model** – The CS<sup>2</sup> project developed a business model that would safeguard the interests of Papua New Guinea and Solomon Islands in relation to ownership and access to revenues from operation of the cable. While the infrastructure was funded mainly through Australian aid, the ownership and associated revenues generated have been transferred to Papua New Guinea and Solomon Islands.
- **Long-term growth opportunities** – For Papua New Guinea and Solomon Islands, the project has the potential to be transformative for economic growth and development. Through access to cheaper, faster and more reliable internet services, it could boost development opportunities for local businesses and communities. Realising the full potential of the cable will depend on the regulatory environment and investments in the domestic ICT network infrastructure in Papua New Guinea and Solomon Islands.
- **Strong governance and monitoring mechanisms** – The project installed, at the outset, strong governance and monitoring mechanisms to follow the project's progress, address concerns and manage risks promptly. These included:
  - developing, and actively engaging with, a risk register to identify the project's risks and their mitigation strategies
  - contracting external, independent specialists to assist with knowledge gaps.
- **Strong communication activities** – Stakeholders involved in the project communicated, at a minimum, on a weekly basis to provide updates on project progress. The project team worked closely with partner governments to engage with the community and promote the project's progress, bearing in mind significant investment, long lead time and high community anticipation.
- **Global practices** – Several practices were particularly valued by project stakeholders. These were:
  - the use of a commercial company to scope out the design, construction and procurement of the infrastructure investment
  - a land acquisition approach that placed the terrestrial cables in Papua New Guinea and Solomon Islands on state land to minimise social and economic impacts of the groundwork
  - extensive communication and engagement with stakeholders to increase project visibility and community awareness.



Source: Gordie Howe International Bridge

# Gordie Howe International Bridge



## Location

Windsor, Ontario (Canada), Detroit, Michigan (United States)

## Sector

Transportation

## Procuring authorities

Windsor–Detroit Bridge Authority (WDBA)

## Project company

Bridging North America (BNA)

## Contract obligations

Design, build, finance, operate, maintain (DBFOM)

## Financial closure year

2018

## Capital value

CAD5.7 billion (USD4.4 billion) – 2018 nominal value

## Contract period (years)

36 (six years construction and 30 years operation and maintenance)

## Key facts

Canadian Government is providing funding for the project with tolls to recuperate. The contractual structure is an Availability Payment public-private partnership (PPP).

## Project highlights

The Gordie Howe International Bridge is a land border crossing between Ontario, Canada and Michigan, US. The bridge will connect the fourteenth largest metropolitan area in the US with its second largest trading partner. The Windsor–Detroit trade corridor is the busiest commercial land border crossing on the Canada–US border, handling almost 30% of all Canada–US trade transported by truck. As such, the Gordie Howe International Bridge is a critically important piece of public infrastructure.



**Figure 1: Four components of the Gordie Howe International Bridge project (Source: WDBA)**

The bridge will be 2.5 km long with a central span of 853 m, making it the longest main-span cable-stayed bridge in the US. Given the cross-border use of the bridge, the project includes extensive ports of entry with related immigration and customs facilities. On the Michigan side, the port of entry will be one of the largest US ports along the Canada–US border. On the Canadian side, the port of entry will be the largest along the Canada–US border.

The project includes roadway improvements on both sides of the crossing, including reconfiguration of the Michigan Interchange over a distance of 3 km. The project will provide a safe, efficient and secure end-to-end border crossing system directly connecting with the key high-speed and high-capacity links of Highway 401 in Windsor on the Canadian side and Interstate 75 (I-75) in Detroit on the US side.

The Gordie Howe International Bridge's inception was jointly developed by the governments of Canada, Ontario, the US and Michigan. The project has been procured using a PPP model. Overseen by the WDBA, the contractor consortium BNA will design, build, finance, operate and maintain the bridge and ports of entry and will design, build and finance the Michigan interchange on the US side.

## Project timeline

- **2001**  
Establishment of Canada–United States–Ontario–Michigan Border Transportation Partnership (the Partnership)
- **2009**  
Approval of the environmental studies in Canada and the US
- **June 2012**  
Signing of Crossing Agreement by Canada and the State of Michigan
- **2013**  
Permit granted by US for construction
- **2015**  
Commencement of preparatory activities, including the purchase of US properties
- **September 2018**  
Signing of fixed-priced contract with private-sector partner
- **October 2018**  
Official start of construction
- **September 2024**  
**Estimated construction completion**

## Development

### POLICY AND PLANNING SETTING

The concept for the Gordie Howe International Bridge began in 2000, driven by the strong perceived financial benefits it would bring. The transport departments of Canada, the US, Ontario and Michigan came together to initiate discussions and eventually form the partnership that would drive the project forward.

The Canada-United States-Ontario-Michigan Border Transportation Partnership (the Partnership) was established in 2001 among Transport Canada, the United States Federal Highway Administration, the Ontario Ministry of Transportation and the Michigan Department of Transportation. The goal was to study and justify trans-border infrastructure improvement works in the Windsor–Detroit trade corridor.<sup>1</sup>

On 15 June 2012, the Government of Canada and the State of Michigan signed an agreement (the Agreement) to provide the framework for Canada and Michigan's roles and responsibilities toward the biggest and most ambitious cross-border infrastructure project between Canada and the US. The Agreement provides fundamental guidance on the design, build, financing, operation, maintenance, ownership, material procurement requirements and jurisdictional requirements of the Gordie Howe International Bridge project.

The agreement states the following conditions:

- The Government of Canada will pay all costs of the required land acquisition in Canada and Michigan and for the construction of an interchange to provide connections to the I-75 highway.
- Tolls for both Canada-bound and US-bound traffic will be collected on the Canadian side of the crossing and used to reimburse the Canadian Government for the funds it advances related to the project.
- All iron and steel for any bridge component in Canada and for any component of the project in the US will be sourced in either Canada or the US.
- The PPP agreement must contain provisions for community benefit plans/planning and for the involvement of the host communities in Canada and Michigan.
- The crossing will be publicly owned, jointly by the Canadian Federal Government and the State of Michigan.

<sup>1</sup> [https://www.michigan.gov/documents/buildthisbridge/Agreement\\_389284\\_7.pdf](https://www.michigan.gov/documents/buildthisbridge/Agreement_389284_7.pdf)

- The International Authority will be comprised of equal representation by Canada and Michigan.

The agreement created WDBA, with a role to direct and administer all aspects of the crossing's implementation, from financing to procurement and eventually operation and maintenance. From its inception, it was expected that the staffing of WDBA would adjust over time to reflect the expertise required to deliver the crossing at the various stages of the project. The role of WDBA would consequently change over the life of the project to adapt to project needs.

### CHALLENGES AND OPPORTUNITIES ADDRESSED BY THE PROJECT

The Partnership focused its efforts on addressing four transportation needs:<sup>2</sup>

1. **Redundancy** – Provide reasonable and secure crossing options leading to network redundancy. At the onset of the Partnership, the crossings included roadway bridge, rail tunnel, truck ferry, and passenger tunnels.
2. **Current and future travel demand** – Provide new border crossing capacity to meet increased long-term travel demand.
3. **Processing improvements** – Improve operations and processing capabilities at the border.
4. **End-to-end connectivity** – Improve system connectivity to enhance the continuous flow of people and goods.<sup>3</sup>

The events of 11 September 2001 (9/11) highlighted the importance of the corridor to the newly formed Partnership.<sup>4</sup> When border crossings were shut for the period following 9/11, the abrupt stop in trade had ripple effects on both economies that were felt for some time. The period of no trade demonstrated the impact of a reduction in trade at the crossing and underscored the detrimental effect of the mismatch in demand and capacity at the crossing. The importance of reducing travel times and increasing throughput became quantifiable and clear.

A subsequent Need and Feasibility Study validated that steps should be taken to expand infrastructure capacity in the Windsor–Detroit trade corridor through the construction of a new end-to-end transportation system that will link Highway 401 to the US interstate system with inspection plazas and a new river crossing between them.

### PERCEIVED LONG-TERM BENEFITS

The economic impact of the crossing is one of the driving justifications for the project. The potential economic impacts were assessed in a report conducted in 2004,<sup>5</sup> which found that by 2020, increased congestion and delay would cost the US more than USD2.2 billion and Canada more than CAD300 million (USD200 million) per year in lost production and output. The impacts of congestion would rise exponentially over the subsequent decade (2020 to 2030) and would lead to further production losses of USD11.4 billion per year to the US and CAD2.1 billion per year by 2030. These impacts amount to projected losses of USD40 billion between 2003 and 2020 and another USD60 billion by 2030.

From an employment perspective, nearly 12,000 full-time-equivalent jobs could be created by 2030, with over 4,700 in the Detroit area alone as a result of the crossing. In contrast, failure to relieve congestion in the Detroit–Windsor corridor could cost up to 6,000 jobs by year 2020 in Ontario, and over 31,000 by the end of 2030. The Canadian economy would lose over 35,000 jobs.<sup>6</sup>

Through these findings, the study validated that steps should be taken to expand infrastructure capacity at the principal border crossings between Michigan and Ontario to stave off the economic impacts of the 'do nothing' scenario.

<sup>2</sup> Interview with WDBA representatives, Heather Grondin (VP of Communications WDBA-AWP), Kevin Wilkinson (Controller at WDBA), Carmen Wayde (Deloitte Canada), Tom Barlow (Partner at Fasken Martineau DuMoulin)

<sup>3</sup> At the onset of the planning phase, the existing configuration required vehicles to pass through as many as 17 signalised intersections, extending crossing time, causing unnecessary delays and reducing user friendliness of the crossing

<sup>4</sup> Interview with WDBA representatives, Heather Grondin (VP of Communications WDBA-AWP), Kevin Wilkinson (Controller at WDBA), Carmen Wayde (Deloitte Canada), Tom Barlow (Partner at Fasken Martineau DuMoulin)

<sup>5</sup> [http://www.partnershipborderstudy.com/pdf/Economic%20Impact%20Report\\_FINAL\\_29Jan04WEB.pdf](http://www.partnershipborderstudy.com/pdf/Economic%20Impact%20Report_FINAL_29Jan04WEB.pdf)










































<sup>6</sup> At the onset of the planning phase, the existing configuration required vehicles to pass through as many as 17 signalised intersections, extending crossing time, causing unnecessary delays, and reducing user friendliness of the crossing



## ALTERNATIVE OPTIONS CONSIDERED

A Focused Analysis Area (FAA) was established in the Windsor–Detroit portion of the broad geographic area, based on the transportation needs within that corridor.<sup>7</sup> The current crossing facilities within the Windsor and Detroit area include freight train, freight ferry, automobile bridge and automobile tunnel. The capacities and demands of each facility were carefully considered when selecting the final alternative. The final crossing type and the location of the crossing were determined in the alternatives' analysis conducted in the environmental assessment (see Table 1).<sup>8</sup>

All options considered had to include border processing and roadway improvements, with new or improved border crossings, to satisfy the long-term transportation needs in the FAA, as shown in the assessment of transportation alternatives. For the medium- and long-term needs of the transportation network in the FAA, the assessment also supported the inclusion of travel demand management measures, with rail, transit and ferry service improvements, as part of a multi-modal strategy. Ultimately, a roadway crossing was selected because it best satisfied the overall objectives of the project.

Factor	Do nothing	Border processing	TDM	Rail improvements	Transit improvements	Marine improvements	New and/or expanded roadways
Transportation network improvement							
Transportation opportunities							
Governmental land use, transportation planning and tourism objectives							
Border processing							
Environmental feasibility							
Technical feasibility	N/A						

Shading represents the degree to which the alternative addresses each factor, relative to the other alternatives.



 →   
Low High

Table 1: Summary of evaluation of transportation alternatives

<sup>7</sup> <http://www.partnershipborderstudy.com>

<sup>8</sup> <http://www.partnershipborderstudy.com> (environmental assessment report)



## Procuring and financing

### PROCUREMENT MODEL

Initially, the crossing implementation was to include various types of procurement vehicles, with a PPP delivering only the bridge component.<sup>9</sup> The inspection plazas and other associated infrastructure were to be implemented using more traditional procurement methods. The intention was to keep the funding streams separate and leverage the private sector to operate and maintain portions of the project. As the project progressed, it became clear that aligning the timing of the various components would present a challenge potentially resulting in a partially completed project. Because each component was to be driven by a different party, it would be difficult to manage timing because there was no mechanism to ensure alignment of the various milestones.

Canada has a long history of successfully developing and implementing infrastructure projects using the PPP model. WDBA decided to leverage the deep experience in Ontario and across Canada to deliver the Gordie Howe International Bridge project via a PPP. The success of past, complex, high profile projects using this model provided a foundational maturity of the market that was tapped to increase the scope of this project.<sup>10</sup>

Eventually, the Gordie Howe International Bridge was fully converted to a PPP model for procurement. The PPP includes:

- design, build, finance, operation and maintenance of the Canadian and US ports of entry and the bridge
- design, build and finance of the Michigan Interchange (following construction, Michigan Government will be responsible for operations and maintenance of the Michigan Interchange).

Specifically, the selected private sector partner would deliver all infrastructure associated with the bridge, including:

- the bridge itself
- bridge approaches
- toll plazas
- customs and immigration facilities
- related interchange ramps for the I-75 highway.

Operation and maintenance of the bridge and the ports of entry will last for 30 years. WDBA will set and collect toll revenue for the Canadian Government, with the private sector partner receiving an availability payment based on performance.

Following a competitive tender process, it was announced on July 5, 2018 that the consortium Bridging North America (BNA) had been selected as the project's preferred proponent. BNA signed a CAD5.7 billion (USD4.4 billion) fixed price contract with WDBA for the project on September 28, 2018. Of the contract value, CAD3.8 billion (USD2.9 billion) was allocated to the construction phase, which was scheduled for completion by the end of 2024. The remaining CAD1.9 billion was allocated for the operations phase.<sup>11</sup> The contract value reflects the progress and service payments the Canadian Government will provide BNA with throughout construction and operation based on performance.

Utilising a PPP model improved value for taxpayers by reducing overall costs compared to traditional procurement. The PPP model for this project is projected to save approximately CAD562.8 million (or 10.7%) compared to delivery of the project using traditional procurement methods, as modelled by an independent value for money analysis.<sup>12</sup>

A key component of this PPP is that the government and the private sector share various aspects of risk. For example, cost overruns and delays to projects are shifted from the taxpayer to the private sector, but other foreseeable risks, such as foreign exchange risk, are borne in part by the public sector.

<sup>9</sup> <https://www.gordiehoweinternationalbridge.com/en/PPP-procurement>

<sup>10</sup> Interview with Windsor-Detroit Bridge Authority representatives, Heather Grondin (VP of Communications WDBA-AWP), Kevin Wilkinson (Controller at WDBA), Carmen Wayde (Deloitte Canada), Tom Barlow (Partner at Fasken Martineau DuMoulin)

<sup>11</sup> <https://www.gordiehoweinternationalbridge.com/u/files/Meetings/Financial%20Close/FINAL%20Fact%20sheet%20package%20ENGLISH%20PKG%202.pdf>

<sup>12</sup> [https://www.gordiehoweinternationalbridge.com/u/files/Meetings/Financial%20Close/Value%20for%20Money%20Report%20\(2018-09-27\)%20Final.pdf](https://www.gordiehoweinternationalbridge.com/u/files/Meetings/Financial%20Close/Value%20for%20Money%20Report%20(2018-09-27)%20Final.pdf)

## PRIVATE SECTOR INVOLVEMENT

The PPP process required a private sector partner to enter a contractual agreement with WDBA. A competitive bidding process was used to engage various consortia to select the winning tenderer. The consortia were required to provide all expertise necessary to deliver all aspects of the bridge financing, operation, construction and maintenance. To meet these requirements, the consortia became a complex combination of numerous entities.

BNA is comprised of the following engineering and construction entities:

Design-Build Team	Operations & maintenance team	Other partners
<ul style="list-style-type: none"><li>• Dragados Canada</li><li>• Fluor</li><li>• Aecon</li></ul>	<ul style="list-style-type: none"><li>• ACS Infrastructure</li><li>• Fluor</li><li>• Aecon</li></ul>	<ul style="list-style-type: none"><li>• AECOM</li><li>• RBC Dominion Securities Inc.</li><li>• Carlos Fernandez Casado and FHECOR Ingenieros Consultores, S.A. (CFC/FHECOR)</li><li>• Moriama &amp; Teshima</li><li>• Smith-Miller+Hawkinson Architects</li></ul>

A separate tender was called to engage a design consultant to act on behalf of WDBA to ensure compliance of the final design. Ultimately, Parsons was selected as the owner's representative consulting engineer.

## INFRASTRUCTURE FINANCING

Under the terms of the PPP contract, BNA is required to finance delivery of the project, with the Canadian Government providing progress payments (through WDBA) at various gateways required to support construction. Once construction is completed, BNA must finance aspects of its operation as well, as it is responsible for operating and maintaining the crossing. The consortium is paid during operation of the bridge through 'availability payments' provided by the Canadian Government based on performance metrics in the PPP contract.

Sophisticated financing was a consortium requirement during the tendering and evaluation process. The selection of the appointed consortium included an evaluation of its approach to financing and cash flow to ensure the financial health and, ultimately, the viability of the entity. Financial risks associated with cash flow during operations and maintenance must be borne by BNA.

Following the expiry of the operations and maintenance contract after 30 years of operation, tolls will continue to be collected by the Canadian Government, however the operation model is yet to be determined.

Separate to the PPP contract, the Canadian Government had invested CAD559 million between 2005 and 2018 to develop the project and enable

financial close on the PPP contract. This initial investment will be repaid to Canada using the toll revenues gained during operation.

The analysis of cash flows is used and reported by WDBA in its financial reports to inform shareholders of the operations' financial balance.

## FINANCIAL RISKS

It was estimated in a 2010 report that in its first year of operation (when opening was projected for 2016), the bridge would generate USD70.4 million in toll revenues,<sup>13</sup> with USD123.5 million in total gathered by 2025.

At several points, the project experienced setbacks due to funding issues; in particular, the inability of the US side to contribute to the construction costs. An agreement announced on 15 June 2012 ensured the project will proceed, with the Canadian Federal Government to fund bridge construction, land acquisition in Michigan and the construction of the I-75 on-ramps. On 18 February 2015 Canada announced that it would also fund the construction of a customs plaza on the US side of the bridge in Detroit's Delray neighbourhood. The plaza will have a budget of around CAD250 million and be recouped through tolls.<sup>14</sup> In order to cover the plaza's operational and staffing costs, the US Department of Homeland Security indicated that, in the first year of operation, the operations and staffing cost will be about

<sup>13</sup> [https://www.mlive.com/news/detroit/2010/06/mdot\\_report\\_detroit\\_river\\_inte.html](https://www.mlive.com/news/detroit/2010/06/mdot_report_detroit_river_inte.html)

<sup>14</sup> <https://www.cbc.ca/news/canada/windsor/250m-u-s-customs-plaza-to-be-paid-for-by-canada-1.2962166>

USD100 million, with an ongoing cost of USD50 million<sup>15</sup> per year. While no tolls will be charged on the US side, both US and Canadian bound travellers will pay tolls collected on the Canadian side.

In the end, Canada would fund all the construction activities required for the crossing. Portions of the Michigan side of the crossing qualified for funding under the FHWA scheme. The required design elements and processes were adhered to, ensuring compliance with FHWA federal aid requirements.

WDBA manages financial risks through financial reporting and risk analyses. WDBA provides regular reports on the financial situation of the crossing's construction.

### APPROACH TO CURRENCY RISK AND CREDIT RATINGS

At the onset of the project, three stages of foreign exchange (FX) risk were identified:

- bidding and financial close
- construction
- operations.

#### Bidding and financial close

During this period, the tendering consortia needed to establish a baseline FX rate to assemble a competitive bid. To avoid unnecessarily increased bid prices as a result of FX, the Canadian Government assumed the risk at the bid stage. This was achieved by establishing a rate reset at the financial close of the tendering process. This realigned the bid prices to use the same FX rates at the time of evaluation. While precedence existed for this approach, a new mechanism for facilitating the rate reset needed to be developed by WDBA.

On 28 September 2018, a Project Agreement (contract) was executed between WDBA and BNA, signifying financial close. The conclusion of negotiations and the rate reset process enabled WDBA to provide protection for BNA against fluctuations in interest rates on debt and fluctuations in credit spreads on financing instruments. WDBA also protects the consortium against exchange rate fluctuations between the period when the proponents submitted bids and when rates were locked in for the Project Agreement (i.e. Financial Close).

### Construction

The contractor must purchase materials throughout construction. As a result of the procurement guidelines, the sources of the materials could be Canadian or American, so costs could be incurred in US dollars, whereas the project is financed using Canadian dollars. The risk associated with this exchange is entirely borne by the contractor.

The two countries will provide all iron and steel for any bridge component. Costs of the required land acquisition in Canada and Michigan, and for the construction of an interchange to provide connections to the I-75, will be paid by the Canadian Government.

### Operations period

In a DBOM contract, the consortium must account for costs during a lengthy operational period. WDBA acknowledges that asking a contractor to bear the FX risks associated with this operational period is not fair and may impact the long-term solvency of the consortium. The viability of BNA is essential to the success of the project. A mechanism was created to share the FX risks during the operations and maintenance period whereby payments can be made between WDBA and BNA in either currency. This allows for costs that are incurred by the contractor in one currency to be repaid in that currency, thereby reducing inefficiencies and eliminating the need to hedge.

Tolls for both Canada-bound and US-bound traffic will be collected on the Canadian side of the crossing and used to reimburse the Canadian Government for the funds it advances related to the project. The PPP agreement must contain provisions for community benefit plans and for the involvement of the host communities in Canada and Michigan.

<sup>15</sup> <https://www.gordiehoweinternationalbridge.com/en/dhs-announces-new-international-trade-crossing>

## Management

### POLITICAL AND OPERATIONAL COORDINATION

The International Authority is a joint Canada–Michigan governance entity responsible for monitoring compliance of WDBA with the Crossing Agreement signed by Canada and Michigan.<sup>16</sup> Six members with equal representation from Canada and Michigan make up the International Authority. Two members are appointed by Canada, one appointed by WDBA and three appointed by Michigan. The appointment terms for members of the International Authority will last until one year after the bridge opening.

WDBA is responsible for the design and delivery of the PPP procurement process, and for overseeing the construction and operation of the new crossing. WDBA will set and collect all tolls. WDBA is led by a Chief Executive Officer (CEO) and governed by a board of directors who are responsible for overseeing the business activities and other affairs of WDBA. Up to nine members, including the CEO, form the board. All directors are approved by the Canadian Government, with the Chair and CEO holding office for five years and the directors holding office for up to four years. WDBA's office is located in Windsor, Ontario.

### HARMONISATION OF RULES, PROCEDURES, AND TECHNICAL STANDARDS

Technical standards that were not made clear during the tendering process are communicated via technical reports provided by the study team.<sup>17</sup> Engineering designs submitted by BNA's consulting team are reviewed for compliance with chosen standards by the Owner's Engineer, Parsons.

### ARBITRATION ISSUES

Ultimately support for the bridge has been broad, especially among business owners. While some local residents have raised concerns, namely in response to a campaign by special interest groups, their issues have always been met head on by WDBA and its partners. The public's support of the bridge is ultimately the result of an extensive outreach program conducted by WDBA from the very early stages. They continually invite public comment and feedback on the public works, engaging local residents and stakeholders wherever possible to include them in the process.

### ACCOUNTABILITY

WDBA, as a Crown corporation, is accountable to the Parliament of Canada through the Minister of Infrastructure and Communities. As per the Financial Administration Act, the duties and responsibilities of the board are to set corporate objectives and direction, ensure good governance, monitor financial performance, approve budgets and financial statements, approve policies and by-laws, as well as ensure that risks are identified and managed.

### COMMUNICATION AND DISSEMINATION

As a public entity, transparency and public outreach are core functions of WDBA. As part of a community benefits plan, they conduct extensive public engagement to gather feedback on the project and the impacts it will have. The history of public engagement is extensive, starting from the onset of the project and continuing regularly through public meetings and other forms of engagement. Hundreds of meetings have been held on both sides of the border, including with schools, businesses, residents, transportation groups and others. Acknowledging the potential economic and logistical benefits, businesses have been very vocal in their support of the project, especially from the Michigan side of the crossing.

WDBA is committed to ensuring that communication with the public is maintained during construction so that community concerns are addressed as quickly as possible, and to address any disinformation campaigns spread by the bridge's opponents. Residents receive notifications of upcoming work, regular progress updates and a project contact to discuss questions and concerns. The results of the project's operation are communicated in WDBA reports.

<sup>16</sup> <https://www.gordiehoweinternationalbridge.com/en/who-we-are>

<sup>17</sup> [http://www.partnershipborderstudy.com/reports\\_us.asp#techreports](http://www.partnershipborderstudy.com/reports_us.asp#techreports)

## Conclusions

- **Public benefits** – Project benefits must be clearly identified and quantified for all parties. Economic benefits are critical, but so are impacts to the environment and sustainability. In the project, extensive economic analysis was completed to justify the project, and exhaustive environmental studies were conducted to satisfy the environmental agencies of both countries. The studies paved the way for broad public support as well as political support.
- **Public perception** – Economic studies were conducted to justify the project at a macro level. To maintain public support, especially in the areas directly affected by the project, local outreach programs play a key role. WDBA maintains strong ties with the affected communities including businesses and residents, involving them in public dialogue and gathering feedback regarding all major project activities. This involvement allows residents to be heard and their needs and worries to be considered, fostering a good relationship between the project and the community. A robust community outreach program should accompany the project, focusing on transparency, involvement and clarity of message.
- **Risk assessment and burden of risk** – Identifying risk early and ensuring just risk allocation will help ensure the viability of the project. In the case of the Gordie Howe International Bridge project, Canada used its experience in overseeing PPP projects to fully understand the complexities of using the PPP process in the crossing context. They could identify the risks associated with foreign exchange early on and develop a plan to address and mitigate the costs that the consortium would assume to address these risks.
- **Maturity of private sector and public sector** – The PPP process could be used because the Canadian Government had extensive understanding of the capabilities of the private sector to deliver a project of this scale and complexity. In fact, the maturity of the PPP process provided a solution to the critical problem of aligning construction schedules that were previously independent. By incorporating all aspects of the infrastructure works into a single PPP, WDBA could be reasonably confident that the sequencing of activities would align and result in holistic delivery of the project. This confidence was only made possible by the maturity of the private sector to deliver in a PPP context, and the public sector to oversee a project that requires sophisticated oversight.
- **Governance structure** – A strong oversight body with the interests of both countries in mind has played a critical role in the success of this project to date. WDBA is empowered by both countries to act for them, giving WDBA a level of authority that commands respect from the PPP partner, which ultimately encourages adherence to rules, regulations and project schedule.
- **Procurement** – Complex projects require understanding on both the public and private side during procurement. The public entity must demonstrate knowledge and sophistication when designing the Request for Proposal (RFP). WDBA considered all interests in the RFP process, ensuring that no one party (public or private) was expected to shoulder disproportionate risk. Through a robust RFP evaluation process, WDBA was able to identify strengths and weaknesses of the bidders to reduce the risk of a private sector partner that was unfit to deliver the project.





Source: Itaipu Binacional Press Office

# Itaipu Hydroelectric Dam



## Location

Paraná River on the border between Brazil and Paraguay

## Sector

Energy

## Procuring authorities

Government of Brazil, Government of Paraguay

## Project company

Itaipu Binacional

## Project company obligations

Design, build, operate

## Capital value

USD17.6 billion – 2018 value

## Start of operations

Completion of works: 1982

Start of electricity generation: 1984

## Contract period (years)

50 (Treaty of Itaipu: 1973–2023)

## Key facts

Co-owned project between Brazil and Paraguay



## Project highlights

The Itaipu Hydroelectric Dam is located on the Paraná River on the border between Brazil and Paraguay. The structure which serves to generate power is about 7.9 km long, with a maximum height of 196 m.<sup>1</sup>

The dam was developed during a period of conflict over land at the border between Brazil and Paraguay in the 1960s, as both countries perceived the untapped energy potential of the Paraná river. The joint signature of the Act of Iguaçu in 1966 and the Treaty of Itaipu in 1973 enabled the project to emerge as a binational and coordinated effort to build and manage the dam while sharing its costs and benefits.<sup>2</sup> Itaipu Binacional, a company jointly owned by Brazil and Paraguay, was created by the Treaty of Itaipu to build and operate the dam.

The construction of the dam began in February 1971 and cost USD17.6 billion (2018 prices) by the time the facility started operating in 1984.

The procurement of the project was widely exposed to corruption at the construction stage, as the politicians in power encouraged the selection of private companies that had ties with political figures. Since that period, the fight against corruption and fraud has been of major importance for Itaipu Binacional and has been managed by the establishment of a General Ombudsman's office, Ethics Committee, and Internal Audits and Compliance Advisory functions.

Today, the dam, with its 20 generating units of 700 MW capacity each, is the largest operational hydroelectric energy-producing asset in the world. In 2018,<sup>3</sup> the energy generated was used to supply nearly 90% of the electricity consumed in Paraguay and about 15% of that consumed in Brazil.<sup>4</sup> About 85% of the energy generated by the plant is used by Brazil.<sup>5</sup> The two countries have an equal right to the dam's production, but because Paraguay only consumes 15% of its share, it is obliged to sell the rest to Brazil, with 70% of the price covering the financing of construction. The Treaty, when originally signed, required Paraguay to sell its unused electricity to Brazil for USD124 million a year until 2023. In July 2009, the two countries signed a deal under which Brazil agreed to triple its payments to Paraguay.

Since its completion, the dam has risen as a project of the highest significance in the economic and diplomatic history of the two countries.

<sup>1</sup> Itaipu Binacional, Dam, <https://www.itaipu.gov.br/en/energy/dam>

<sup>2</sup> More information about The Act of Iguaçu and Treaty of Itaipu. Available at <https://www.itaipu.gov.br/en/company/official-documents>

<sup>3</sup> Latest data available

<sup>4</sup> Itaipu Binacional (2018). *Sustainability report 2018*. Available at: <https://www.itaipu.gov.br/en/social-responsibility/sustainability-reports>

<sup>5</sup> Ibid

## Project timeline

- **1966**  
Signature of the Act of Iguaçu
- **1971**  
Start of the design and construction work on the dam
- **1973**  
Signature of the Treaty of Itaipu
- **1982**  
Completion of the dam works and start of the formation of the reservoir
- **1984**  
**Start of electricity generation with the first generation unit**
- **1991**  
Installation of the last of 18 (original) generation units
- **2007**  
Expansion of the dam's generation capacity with the addition of two generation units, raising the dam's production capacity to 14 gigawatts
- **2009**  
Renegotiation of the agreement concerning the level of Brazil's annual compensation to Paraguay for the purchase of the latter's unused share of electricity
- **2023**  
Expiration of the Treaty of Itaipu and opening of renegotiations

## Development

### NATIONAL CONTEXTS

The Itaipu Hydroelectric Dam contract was signed and the dam built at a time when both Brazil and Paraguay were under military rule. The two countries had a long history of conflict and, in the 1960s, Brazil and Paraguay were in dispute over borderlands and the potential to produce hydroelectric power from water bodies on their shared border.<sup>6</sup> Territorial sovereignty was at the heart of a conflict from March 1965 to June 1966. The Act of Iguaçu, signed on 22 June 1966, ended the conflict and “marked the first official step toward what became the Itaipu Hydroelectric Dam” and laid the groundwork for the Treaty of Itaipu signed in 1973.<sup>7</sup>

The signature of the Treaty led to conflicts with Argentina, as the construction of the dam directly affects water flows received downstream on the Paraná river. This threatened Argentina's various plans for hydropower production, such as at the then-planned Corpus hydroelectric power plant. The conflict was resolved in the 1979 Tripartite Itaipu-Corpus Agreement, signed by Paraguay, Argentina and Brazil, which sets out downstream flow requirements with which Itaipu Binacional must comply.<sup>8</sup>

### POLICY AND PLANNING SETTING

The 1966 Act of Iguaçu proclaimed that Brazil and Paraguay would commonly explore the hydroelectric potential of the resources common to the two countries, and stated the agreement that the electricity generated would be evenly shared but could be sold from one of the two parties to the other at a fixed price decided by the countries, and not at ‘cost price’ as requested by Paraguay.<sup>9</sup>

The Treaty of Itaipu of 1973 further reinforced the joint agreement of both governments in “effecting the hydroelectric development of the hydraulic resources of the Paraná River.”<sup>10</sup> To that effect, the Treaty of Itaipu created a binational entity called Itaipu Binacional, founded in 1974 and co-owned by Brazil and Paraguay. The national administrations in charge of electricity in the two countries, Centrais Elétricas

6 Blanc, J. (2017). Itaipu's Forgotten History: The 1965 Brazil–Paraguay Border Crisis and the New Geopolitics of the Southern Cone. *Journal of Latin American Studies*. 50. 1-27. 10.1017/S0022216X17000049

7 Ibid

8 Kramer, A.; Hensengerth, O., Mertens, A. & Carius A. (adelfi, Berlin) (2012). *Assessment of RBO-Level Mechanisms for Sustainable Hydropower Development and Management*. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

9 Blanc, J. (2017). Itaipu's Forgotten History: The 1965 Brazil–Paraguay Border Crisis and the New Geopolitics of the Southern Cone. *Journal of Latin American Studies*. 50. 1-27. 10.1017/S0022216X17000049

10 Treaty of Itaipu Signed by Brazil and Paraguay – Law No. 5,899 of July 5, 1973. Retrieved from: <https://www.sec.gov/Archives/edgar/data/1439124/000119312508153744/dex41.htm>

Brasileiras (Eletrobras, Brazil) and the Administración Nacional de Electricidad (Ande, Paraguay), each share 50% of the entity's equity.<sup>11</sup>

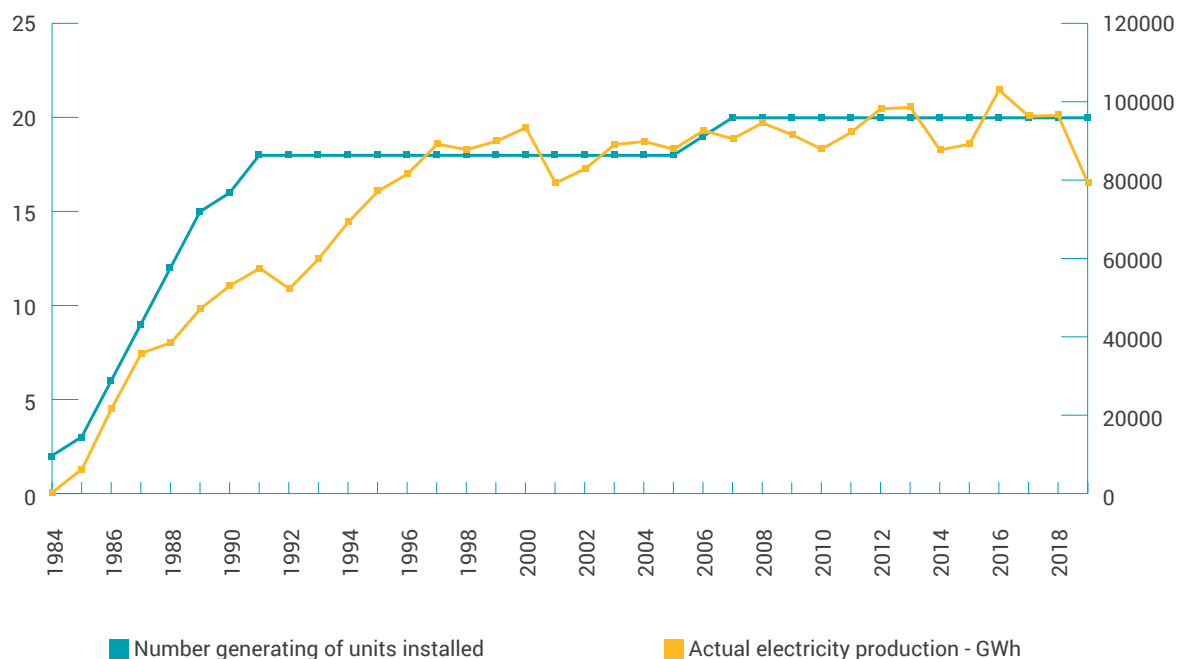
Annex C of the Treaty of Itaipu, which sets out the financial bases and provision of electricity services, will be reviewed by the two governments in 2023. This could lead to a revision of the rules of payment of royalties (see also the *Financing* section of this case study). This crucial date is highly anticipated by the two governments as it could lead to a shift in the approach to sharing the benefits of the project. No employees of Itaipu Binacional will be involved in the discussions.<sup>12</sup>

The Treaty of Itaipu also defines the conditions for the exploitation of the Paraná River by both countries for hydroelectric power, including the defined maximum number of generating units.

## CHALLENGES AND OPPORTUNITIES ADDRESSED BY THE PROJECT

The purpose of the dam was the production of electricity to supply Brazil and Paraguay with the power needed to contribute to modern industrial development. Although the development of the dam was progressive with the generation capacity incrementally increased, the dam was able to reach and plateau at the current level of energy production capacity within about 10 years of commencing electricity production operations (see Figure 2).

As Itaipu Binacional reports, "In 2018, the net energy generated was 95,883 GWh. Of the total, 80,839 GWh were provided for Eletrobras, which corresponds to 15% of the demand of the Brazilian market. For Ande, 15,044 GWh were supplied, serving almost 91% of the demand of the Paraguayan market."<sup>13</sup>



**Figure 1: Yearly electricity production in relation to the number of generating units installed**  
(Source: Authors, based on data from Itaipu Binacional<sup>14</sup>)

<sup>11</sup> Itaipu Binacional (2018). *Sustainability report 2018*. Available at: <https://www.itaipu.gov.br/en/social-responsibility/sustainability-reports>

<sup>12</sup> Itaipu Binacional (2020, April 8th). Video-conference interview

<sup>13</sup> Itaipu Binacional (2018). *Sustainability report 2018* (pp.33). Available at: <https://www.itaipu.gov.br/en/social-responsibility/sustainability-reports>

<sup>14</sup> Itaipu Binacional (2020). Production from year to year. Retrieved from: <https://www.itaipu.gov.br/en/energy/production-year-year>

## ENVIRONMENTAL AND SOCIAL ISSUES

At the time the Itaipu Hydroelectric Dam was built, hydroelectric power was already a common source of energy in Brazil. Indeed, water is an abundant resource of which the country wanted to take advantage. The decision in 1973 to develop the dam was also informed by the oil crisis at the time, which made hydroelectric power appear a more stable choice than fossil fuel-based energy sources.<sup>15</sup> The electricity produced in 2018 (95,883 GWh) corresponds to the equivalent energy contained in about 55 million barrels of oil.<sup>16</sup> While Brazil's electricity production is dominated by hydroelectric power plants, a large proportion of Brazil's energy consumption still originates from fossil energy sources.<sup>17</sup>

The construction of the dam incurred significant environmental and social impacts. At the time, Brazil and Paraguay did not have legislation supporting biodiversity protection. The Guaíra Falls, which most likely represented the greatest volume of falling water in the world until 1983, were submerged under the artificial lake created by the dam and dynamited to facilitate navigation. In addition, 65,000 people were displaced – 40,000 people on the Brazilian side and 25,000 people on the Paraguayan side. Resettlement occurred in coordination between governments and Itaipu Binacional, which paid compensation of USD190 million to the displaced populations.<sup>18</sup>

## PERCEIVED LONG-TERM BENEFITS

The dam is a major source of electricity for both countries, particularly Paraguay, for which the dam is a structural element of the country's economy.<sup>19</sup> Around 10% of the public revenues of the country are derived from 'royalties' (compensation payments) related to two binational hydroelectric facilities – the Itaipu and Yacyretá Hydroelectric Dams.<sup>20</sup> For Brazil, the dam is a source of energy obtained at stable prices. In both countries, it has contributed to the development of a whole region around the reservoir.

The Government of Brazil uses parts of the proceeds from the sales of generated hydroelectric power in social and environmental protection measures for local communities and habitats within and surrounding the dam reservoir, as prescribed by the Brazilian Constitution of 1988 and related legislation.<sup>21</sup> The allocation key provides that the areas most impacted by the dam receive the largest share of the revenues.<sup>22</sup>

Since 2003, Itaipu Binacional has been conducting social and environmental protection activities, as mandated by the Brazilian and Paraguayan Governments in 2005.<sup>23</sup> These activities are diverse and mostly aimed at educating the local population to live with the dam, benefiting both the local populations and the company in a win-win situation.

Activities include:

- agricultural productivity and fishery protection
- water quality control
- creation of protected areas for biodiversity around the reservoir
- development of aquaculture
- rehabilitation and development support for indigenous communities
- health services to local communities.

Itaipu Binacional also helped to develop infrastructure in the region, such as bridges and hospitals. In Brazil, where development has tended to be concentrated towards the coastal region, these initiatives have contributed to the development of inland regions.<sup>24</sup>

15 MacDonald P. (2016). *Itaipu Dam – the world's largest generator of renewable, clean energy*

16 Own calculation based on the conversion factor that 1 gigawatt-hour is equivalent to 588.44 barrels of oil equivalent

17 IEA, Country profile Brazil, available at <https://www.iea.org/countries/brazil>

18 Kramer, A.; Hensengerth, O., Mertens, A. & Carius A. (adelphi, Berlin) (2012). *Assessment of RBO-Level Mechanisms for Sustainable Hydropower Development and Management*. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

19 Konc L. (2015). Les impacts sur le développement économique du Paraguay de la construction et de l'exploitation d'Itaipu Binacional. Sciences Po & HEC Paris

20 World Bank (2018). Paraguay – Systematic Country Diagnostic (English). Washington, D.C.: World Bank Group. Available at: <http://documents.worldbank.org/curated/en/827731530819395899/Paraguay-Systematic-Country-Diagnostic>

21 In Brazil, according to the Law 8001, passed in 1990, electric utilities have to pay financial compensation from the exploitation of water resources.

22 Kramer, A.; Hensengerth, O., Mertens, A. & Carius A. (adelphi, Berlin) (2012). *Assessment of RBO-Level Mechanisms for Sustainable Hydropower Development and Management*. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

23 Itaipu Binacional (2018). *Sustainability report 2018*. Available at: <https://www.itaipu.gov.br/en/social-responsibility/sustainability-reports>

24 Itaipu Binacional (2020, April 8th). Video-conference interview

## Procuring and financing

### PROCUREMENT MODEL

The design and construction of the Itaipu Hydroelectric Dam was led by two consortia: Unicon (Brazilian) and Conempa (Paraguayan), while the electrical-mechanical assembly work was performed by Itamon (Brazilian) and CIE (Paraguayan).<sup>25</sup>

All contracts undertaken by Itaipu Binacional must comply with the criteria and modalities defined by its general bidding standard, which determines the selection of the most advantageous proposals for the entity, considering price, quality and impacts on sustainability.<sup>26</sup>

### INFRASTRUCTURE FINANCING

The costs of building the dam were assumed by loans guaranteed by the Brazilian Government. Indeed, Paraguay, which did not have the financial resources to build the plant, arranged a loan from Brazil to meet the initial capital demand plus other future investment needs. Itaipu Binacional states “the Fixed Assets in the 2018 Balance Sheet, in the amount of USD17.6 billion, may represent the price of the dam’s construction.”<sup>27</sup> That amount includes the financial charges incurred during the construction until each generator unit went online. The direct investment – without financial charges – averaged USD12 billion (2018 prices). The funds raised for the construction, including financial rollovers, totalled USD27 billion, in addition to the USD100 million in paid-in capital.<sup>28</sup>

The repayment of the debt is assured by sales of the energy to Eletrobras and Ande, which hire the installed power available.<sup>29</sup> Itaipu Binacional permanently puts at the disposal of the two companies a given quantity of power, fixed before production: the contracted power. As such, the Treaty of Itaipu “contributes to the predictability of revenues and cash flow and reduces the risks posed by hydrological crises [such as floods and droughts] that interfere with energy generation.”

Eletrobras and Ande only pay for the contracted power. If the actual production exceeds the defined quantity, the two companies are not charged additional costs.<sup>30</sup>

Itaipu Binacional has not been set up to commercially operate and deliver profits. As per the Treaty of Itaipu, the fare charged for the contracted power (defined as the unit cost of the electricity service) should be sufficient to cover all service costs.<sup>31</sup> The service costs include the following:

- **Royalties:** A financial compensation payment is due to the Brazilian and Paraguayan Governments for the use of the hydraulic potential of the Paraná River. The amount is defined in Annex C of the Treaty of Itaipu, as the equivalent of USD650 per GWh generated by the dam. This amount cannot be inferior, annually, to USD18 million, shared equally between the two parties.
- **Capital investment income:** This is payable to Ande and Eletrobras in the amount of 12% per year of participation in the paid-up capital, adjusted for inflation.
- **Operating expenses:** These include expenses for personnel, materials, goods and services.
- **Financial charges and amortisation:** These include costs of loans and financing.
- **Reimbursement of management and supervision charges:** These are payable to Ande and Eletrobras as compensation for their management and supervision efforts. The charge is calculated as the equivalent of USD50 per GWh generated by the dam.
- **Operating account income for the year:** This is the annual between revenue and the cost of electricity service.

The rate applied throughout the year 2018, and since 2009, was USD22.60 per kW of contracted monthly power.<sup>32</sup> The debt is expected to be repaid by 2023.<sup>33</sup>

25 Itaipu Binacional. FAQ. Available at: <https://www.itaipu.gov.br/en/press-office/faq>

26 Itaipu Binacional (2018). *Sustainability report 2018*. Available at: <https://www.itaipu.gov.br/en/social-responsibility/sustainability-reports>

27 Itaipu Binacional. FAQ. Available at: <https://www.itaipu.gov.br/en/press-office/faq>

28 Itaipu Binacional. FAQ. Available at: <https://www.itaipu.gov.br/en/press-office/faq>

29 Kramer, A.; Hensengerth, O., Mertens, A. & Carius A. (adelfi, Berlin) (2012). Assessment of RBO-Level Mechanisms for Sustainable Hydropower Development and Management. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

30 Itaipu Binacional (2020, April 8th). Video-conference interview

31 Itaipu Binacional (2015). *Sustainability report 2015*. Available at: <https://www.itaipu.gov.br/en/social-responsibility/sustainability-reports>

32 Itaipu Binacional (2018). *Sustainability report 2018* & Itaipu Binacional (2015). *Sustainability report 2015*. Available at: <https://www.itaipu.gov.br/en/social-responsibility/sustainability-reports>

33 Itaipu Binacional (2020, April 8th). Video-conference interview

## Sharing of costs and benefits

As per the Treaty of Itaipu, all the costs and benefits, as well as the implementation of social and environmental mitigation measures from Itaipu Binacional, are split equally between the two countries.<sup>34</sup> This means that the debt for the construction of the dam and its maintenance costs are also evenly distributed.<sup>35</sup>

Furthermore, the Treaty stipulates that the total quantity of energy generated must be bought by the two countries<sup>36</sup> and is divided equally, such that any surplus electricity not used by either country must be sold to the other at a price corresponding to the cost of generation defined in the Treaty.

In 2009, Paraguay used between 4% and 5% of its share of the electricity produced and in the first quarter of 2020 this figure rose to about 12.5%.

In accordance with the Treaty, Paraguay has thus been selling the rest of its share to Brazil. The treaty, when originally signed, required Paraguay to sell its unused electricity to Brazil for USD120 million a year until 2023. After Paraguay expressed concerns about this amount, the two countries signed a deal in July 2009 after several months of negotiation, under which Brazil agreed to triple its payments to Paraguay.

In parallel, and as per the Treaty, the Brazilian and Paraguayan Governments have been receiving 'royalties' (compensation payments) from Itaipu Binacional since the start of electricity production from the dam in 1985. They are paid on a monthly basis as financial compensation for the use of the natural resources of the reservoir.

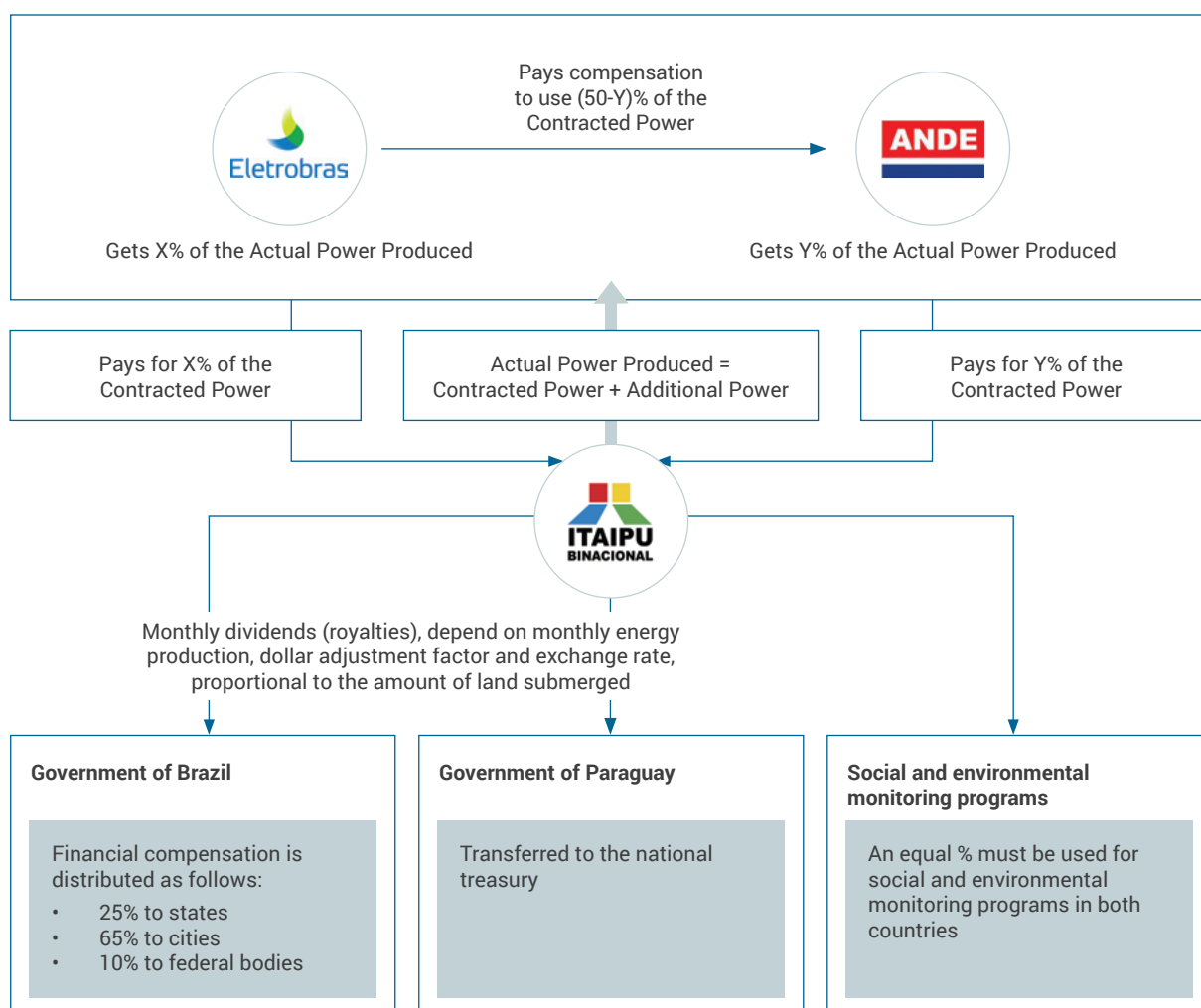


Figure 2: Main cost-sharing mechanisms (Source: Authors based on data from Itaipu Binacional)

34 Kramer, A.; Hensengerth, O., Mertens, A. & Carius A. (adelphi, Berlin) (2012). *Assessment of RBO-Level Mechanisms for Sustainable Hydropower Development and Management*. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

35 LADB (2009). Paraguayan-Brazilian Dispute Over Itaipu Could go to International Arbitration. Available at <https://digitalrepository.unm.edu/notisur/13789>

36 Itaipu Binacional (2020, April 8th). Video-conference interview



The royalties are proportional to the amount of land submerged by the lake. According to Itaipu Binacional, Brazil has received USD5.7 billion in royalties since 1987, while Paraguay has received USD5.4 billion. In Brazil, Itaipu Binacional reports that “the financial compensation is distributed as follows: 25% to states, 65% to cities and 10% to federal bodies (Ministry of the Environment, Ministry of Mines and Energy, and the National Scientific and Technological Development Fund).”<sup>37</sup> The Brazilian Government must pass on the funds within 10 days of payment made by Itaipu Binacional. In Paraguay, royalties are transferred to the national treasury. The Paraguayan Government decides afterwards how to redistribute the compensation, depending on government priorities.<sup>38</sup>

There is no law or obligation defining which proportion of the royalties must be used to mitigate social or environmental aspects of the project; the domestic share of royalties is independent of the bilateral agreements.<sup>39</sup>

Itaipu Binacional, further to the Treaty, must spend equal amounts for social and environmental monitoring programs in each country.<sup>40</sup>

The fare, paid yearly by the two owners, is pegged to the US dollar. The values of royalties are calculated based on three variables: monthly energy production, the dollar adjustment factor and the exchange rate.<sup>41</sup>

## Management

### POLITICAL AND OPERATIONAL COORDINATION

The dam infrastructure is owned by the governments of Brazil and Paraguay. The two governments, through their national administrations in charge of electricity – Eletrobras and Ande, own Itaipu Binacional. Eletrobras and Ande each share 50% of the company equity. Itaipu Binacional, in return, is responsible for construction and operations of the dam.

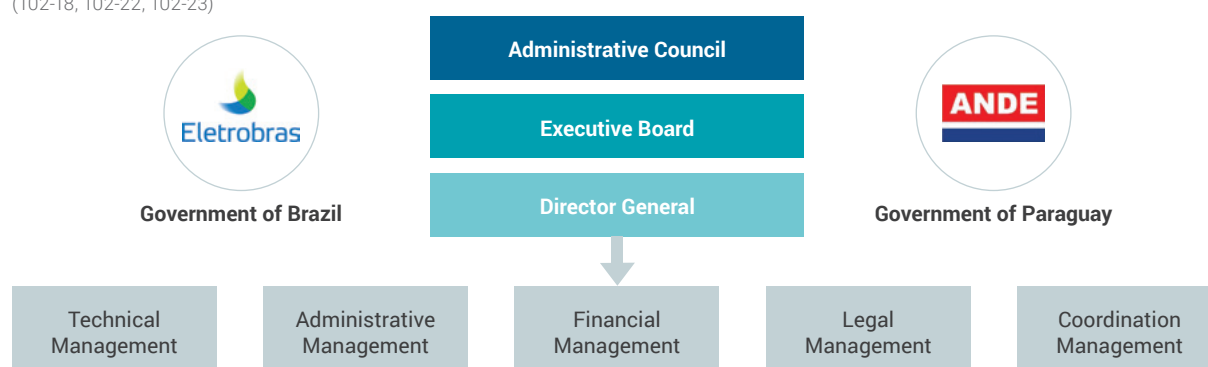
The company's administration is shared by both countries. It is composed of an Administrative Council (also called the Supervisory Board) and an Executive Board of Directors. The Treaty of Itaipu and the company's bylaws define the tasks and competences

of the boards. The appointment of the members of these two bodies is the responsibility of the Brazilian and Paraguayan Governments. Each position allotted to a country has its counterpart on the other side.

The Administrative Council comprises 14 members, made up of six directors from each country plus one representative from each country's Ministry of Foreign Affairs. The Executive Board consists of six members from each country, comprising one Director General and five department representatives (see Figure 3).

### Governance Structure

(102-18, 102-22, 102-23)



\* The General Ombudsman's Office, Internal Audit and Compliance Advisory are organisational units linked to the Administrative Council.

**Figure 3: Governance structure of the Itaipu Hydroelectric Dam (Source: Itaipu Binacional)**

<sup>37</sup> Itaipu Binacional. Royalties. Available at: <https://www.itaipu.gov.br/en/social-responsibility/royalties>

<sup>38</sup> Kramer, A.; Hensengerth, O., Mertens, A. & Carius A. (adelfi, Berlin) (2012). *Assessment of RBO-Level Mechanisms for Sustainable Hydropower Development and Management*. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

<sup>39</sup> Itaipu Binacional (2020, April 8th). Video-conference interview

<sup>40</sup> Kramer, A.; Hensengerth, O., Mertens, A. & Carius A. (adelfi, Berlin) (2012). *Assessment of RBO-Level Mechanisms for Sustainable Hydropower Development and Management*. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

<sup>41</sup> Itaipu Binacional (2018). *Sustainability report 2018*. Available at: <https://www.itaipu.gov.br/en/social-responsibility/sustainability-reports>

## CORRUPTION, ETHICS AND COMPLIANCE

Corruption was an important issue at the time of construction.<sup>42</sup> Today, the fight against corruption and fraud is central for Itaipu Binacional.<sup>43</sup> Itaipu Binacional's commitments to combat fraud and corruption are described in the company's Basic Policies and Guidelines, the Binational Sustainability Policy and the Ethics Code, applying to directors, officers, employees and the entire value chain.

The accounts of the company are jointly verified by external audits of the two partner countries and the results are communicated annually to the Executive Board and to the Administrative Council.<sup>44</sup> Auditors are changed every two years.<sup>45</sup> An independent binational Internal Audit group was established at the time the company was created and reports directly to the Supervisory Board. In addition, since 2006, Itaipu Binacional adheres to the rules of the Sarbanes-Oxley Act (SOX), whose central aspect is the identification of risks and the establishment of internal controls that certify the authenticity, integrity and transparency of the information used on the elaboration of financial statements.

The General Ombudsman's Office, an autonomous body created in 2009, serves as a communication channel between Itaipu Binacional and the public. The office receives suggestions, complaints, compliments and denunciations, and, after screening them, refers them to the relevant organisations. In parallel, the company formed an Ethics Committee that receives and evaluates any complaints about non-ethical conduct that constitutes an infringement of the values, principles and norms of the Itaipu Binacional Code of Ethics.<sup>46</sup> The committee is composed of six members, equally Brazilians and Paraguayans, who are employees appointed by the Executive Board with at least one representative of the Legal Management of each country. The mandate is three years, with one allowed renewal. Decisions are adopted by a majority of votes, in meetings held every two months. The general board and general directors receive reports and recommendations periodically.

A Compliance Advisory was created in both countries and responds directly to the Executive Board, with assignments to plan, coordinate, integrate and align the activities pertinent to the integrity system and compliance, the corporate risk management system and internal control processes.<sup>47</sup> In July 2017, Itaipu Binacional approved the binational integrity and compliance program, which considered anticorruption aspects in its scope.

## HARMONISATION OF RULES, STANDARDS AND PROCEDURES

As a security measure, Itaipu Binacional created in 1974 a Construction Consultants Board, a group of international dam engineering experts that every four years analyses the performance of Itaipu's construction structures, conducting inspections and analysing data to assess operating and safety conditions.

A multidisciplinary team, composed of Brazilians and Paraguayans from the plant itself, has been coordinating several studies over the last few years aimed at improving technology and equipment.<sup>48</sup>

## COMMUNICATION AND OUTREACH

Local communities are given the opportunity to influence the end use of the resources thanks to participatory mechanisms. Several channels are available for the population to make requests of Itaipu Binacional. The company's main tools for communicating with stakeholders and the public are the Ombudsman, the Contact Us rubric online, the corporate website and social networks (e.g. Twitter and Facebook). Itaipu Binacional also uses media relations and internal communication tools, such as Itaipu Electronic Journal (JIE) and Itaipu Panel Journal (JIM).<sup>49</sup>

Meetings are also organised with designated community group leaders, and once a year, Itaipu Binacional holds a 2–3 day meeting that anyone can apply to participate in, to discuss issues related to the dam.<sup>50</sup>

42 Straub, S., (2014). The Story of Paraguayan Dams Channels, Causes, and Consequences of Wrongdoings in Procurement. Yale Columbia Conference on Corruption in Intl. Business, Spring 2014

43 Itaipu Binacional (2020, April 8th). Video-conference interview

44 Annual financial statements are publicly available at <https://www.itaipu.gov.br/en/company/annual-financial-statement>

45 Itaipu Binacional (2018). *Sustainability report 2018*. Available at: <https://www.itaipu.gov.br/en/social-responsibility/sustainability-reports>

46 Itaipu Binacional (2018). *Sustainability report 2018*. Available at: <https://www.itaipu.gov.br/en/social-responsibility/sustainability-reports>

47 Ibid

48 Ibid

49 Itaipu Binacional (2015). *Sustainability report 2015*. Available at: <https://www.itaipu.gov.br/en/social-responsibility/sustainability-reports>

50 Ibid

## Conclusions

- **Strong governance and political support**
  - The Itaipu Hydroelectric Dam is an example of how an infrastructure project generating important economic wealth and constructed in a context of military rule and suspicion of corruption can evolve towards more transparent governance and socio-environmental support measures.
- **Collaboration and sharing of benefits**
  - One of the main challenges lay in the fact that the countries have very different sizes, needs and political agendas. The project was important for Brazil but was vital for Paraguay. The dam managed to transform tensions into collaboration, benefitting both countries.<sup>51</sup>
- **Lack of commercial incentives** – Due to the different needs and political agendas of each country at the time, the project was designed not to make a profit.<sup>52</sup> Itaipu Binacional has not been set up to commercially operate and deliver profits. The company produces electricity but is not responsible for its distribution.
- **Business partners** – Itaipu Binacional reports that any political tensions are not reflected in the company, with every decision being discussed and made in agreement between the two parties acting as partners. Its view is that it is crucial that both countries have the same power, no matter who is buying the most energy.<sup>53</sup>
- **Promotion of regional development**
  - Itaipu Binacional is helping the two governments develop the surrounding region (e.g. with the development of infrastructure such as bridges) as long as it does not jeopardise the company's budget. Investments are redirected to regions which might have been overlooked in the past.
- **Driver of economic development**
  - The dam is responsible for providing an important development boost to Brazil, but even more so to Paraguay. In Paraguay, royalties from hydroelectric power generation and sales have become a main source of public income and a key driver of the country's economy.
- **“Wonder of the Modern World”**
  - From a technical point of view, the Itaipu Hydroelectric Dam is one of the largest dams in the world and was named one of the ‘Wonders of the Modern World’ in 1994 by the American Society of Civil Engineers. It produces enough electricity to supply nearly 90% of the electricity consumed in Paraguay and about 15% of that consumed in Brazil.

<sup>51</sup> Itaipu Binacional (2020, April 8th). Video-conference interview

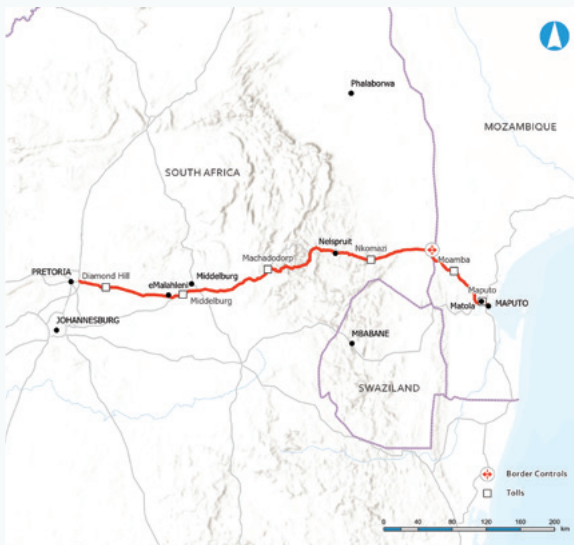
<sup>52</sup> Ibid

<sup>53</sup> Ibid



Source: TRAC N4

## N4 Toll Route



### Location

Pretoria, South Africa–Maputo, Mozambique

### Sector

Transportation & logistics

### Procuring authorities

Government of the Republic of South Africa,  
Government of Mozambique

### Project company

Trans African Concessions Pty Ltd (TRAC)

### Project company obligations

Design, build/rehabilitate, finance, maintain, operate  
and transfer

### Financial closure year

1997

### Capital value

ZAR3 billion (USD660 million – 1997 value)

### Start of operations

August 2000

### Contract period (years)

30

### Key facts

No governmental subsidies, 100% Project Finance

### Project highlights

The N4 Toll Route is a brownfield toll road concession of 630 km running from Pretoria, South Africa's administrative capital, to Maputo, the capital of Mozambique and a deep-sea port on the Indian Ocean. The project was structured as a public-private partnership (PPP) between the governments of South Africa and Mozambique and a private consortium for a 30-year period. It was the first cross-border transport PPP project in Sub-Saharan Africa and the first brownfield PPP of this scale in South Africa.

The N4 is one of the most important trade routes in the region, running across South Africa from Botswana to Mozambique. It runs through some of the most industrialised areas in South Africa, including processing, mining and smelting industries located in the cities of Johannesburg and Pretoria. Moreover, the western section of the N4 forms part of the Trans-Kalahari Corridor, a road network spanning approximately 1900 km across South Africa, Botswana and Namibia. The corridor starts in Pretoria and goes to the Port of Walvis Bay on the Atlantic Ocean in Namibia.

The rehabilitation of the N4 was the key project of the Maputo Development Corridor (MDC) program. The purpose of the program was to stimulate and facilitate trade and investment in three key economic regions – Gauteng and Mpumalanga (South Africa) and Maputo (Mozambique) – and connect them to the Port of Maputo.

The MDC was also incorporated under a broader Spatial Development Initiative (SDI) between the Governments of South Africa and Mozambique implemented in 1995. The SDI was a short-term investment strategy aiming to unlock inherent economic potential in specific spatial locations in Southern Africa. The SDI policy used public resources to leverage private investments in regions with a high potential for economic growth.

The N4 Toll Route contract with the private consortium Trans African Concessions (TRAC) was based on a build, operate, transfer (BOT) model with a capital value of ZAR3 billion (USD660 million, 1997 value). The project was financed through 20% equity and 80% debt finance negotiated by the concessionaire. TRAC assumed full traffic and demand risk. Revenue generated through the collection of tolls must fully cover operational expenditure and debt obligations, but both governments jointly agreed to guarantee the debt finance.

The rehabilitation and tolling of the N4 is considered a major success and demonstrates both the power of political cooperation between neighbouring countries and the benefits of a PPP in the right context. The N4 is still the only cross-border toll concession ever completed in Sub-Saharan Africa.

## Project timeline<sup>1</sup>

- **April 1994**  
First democratic elections in South Africa
- **October 1994**  
First democratic elections in Mozambique
- **August 1995**  
South Africa-Mozambique Agreement to revive trade relations
- **Autumn 1995**  
Launch of the SDI by the Department of Trade and Industry (DTI)
- **May 1996**  
Launch of the MDC
- **July 1996**  
Southern African Development Community (SADC) Protocol on Transport Communication and Meteorology
- **May 1997**  
30-year-concession agreement for the N4 Toll Road signed
- **March 1998**  
Start of construction works on the N4
- **December 1998**  
Opening of the first toll plaza, Middelburg (South Africa)
- **August 2000**  
Completion of the rehabilitation of the N4 from two to four lanes and start of operation
- **April 2003**  
Port of Maputo started operation with a 15-year-concession
- **March 2004**  
Establishment of Maputo Corridor Logistics Initiative (MCLI), first private sector corridor management institution in Africa
- **August 2004**  
Completion of the rehabilitation of an extension of the N4 road section between Witbank and Pretoria (contract amendment)
- **September 2007**  
Memorandum of Understanding (MoU) between South Africa and Mozambique on one-stop border post at Lebombo/Ressano Garcia to create a seamless border post and expediting crossing
- **August 2013**  
Adoption of Mozambique Customs Law, Revision of the Mozambique transit law

## Development

### THE POLICY AND PLANNING SETTING

The political situation in both South Africa and Mozambique in the mid-1990s (post-apartheid) was characterised by years of unfavourable political conditions leading to the decay of the Maputo Corridor. This key transport route connected South Africa's industrial heartland to the deep-sea Port of Maputo. The corridor was an integral part of the Southern African transport network, and a prime route for landlocked South African provinces to access the ocean.

South Africa faced significant challenges to reducing road infrastructure backlogs, and Mozambique faced severe infrastructure problems as a result of the Civil War that had raged from 1977 to 1992. Neither country was able to provide the immense financial resources to invest in the failing infrastructure, but each wanted to foster more vital transport and trade links.

The value of political stability in the region was first noted after both post-apartheid South Africa and post-civil war Mozambique held their first democratic elections in 1994 (the Heads of State at the time were Presidents Nelson Mandela and Joaquim Alberto Chissano). The stability allowed the SADC<sup>2</sup> and the Government of South Africa to promote new initiatives focusing on economic development, trade and regionalisation and with the specific objective of (re-) establishing the development axis between Tshwane (then Pretoria) in Gauteng and the Port of Maputo.

In 1995, the Governments of Mozambique and South Africa established a new cooperation framework agreement and the Spatial Development Initiative and the SDI strategy. South Africa was the key driver for the SDI and had a strong economic interest in the development of its neighbour, Mozambique. The economic strength of the two countries was unbalanced. In 1997, Mozambique's GDP was USD2 billion, compared with USD130 billion in South Africa.

The official purpose of the SDI was to promote regional development and macro-regional economic integration (due to an unequal pattern of spatial development during apartheid) and to re-establish trade and investment ties to rebuild the two

<sup>1</sup> SSATP (2014). Available at <http://documents.worldbank.org/curated/en/419461468202146203/Reviving-trade-routes-evidence-from-the-Maputo-corridor>

<sup>2</sup> SADC has 16 Member States, namely; Angola, Botswana, Comoros, Democratic Republic of Congo (DRC), Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, United Republic of Tanzania, Zambia and Zimbabwe.



economies by creating globally competitive spatial entities, new investment, infrastructural development and job creation.<sup>3</sup> For this purpose, an SDI Unit was created within the Development Bank of South Africa (DBSA).

One crucial component of the SDI was to involve the private sector in the process because both governments faced financial constraints and were not able to finance this critical infrastructure without private sector participation. According to the SDI paradigm, “the SDI aim to facilitate the creation of viable new jobs, as potential investment opportunities, identified through the process, are taken up by the private sector.” Therefore, PPPs became an integral part of the SDI policy.

Thus, DBSA provided funds to support rebuilding transport infrastructure that had been destroyed or neglected during the apartheid era. As part of this, approximately USD8 billion was allocated to the MDC under the first SDI between the Governments of South Africa and Mozambique, which was launched officially in May 1996.<sup>4</sup>

The MDC comprises five integral components:<sup>5</sup>

- rehabilitation of the N4 through a toll road concession
- rehabilitation and dredging of the Port of Maputo (15 years BOT concession since 2003, extended to 2033)
- establishment of an autonomous company to manage, operate and maintain the southern Mozambique rail network (Maputo Corridor Railway)
- a one-stop border post at Ressano Garcia (Mozambique)/Komatipoort (South Africa)
- further industrial investment projects such as Mozambique Aluminium Smelter (Mozal), Maputo Iron and Steel project, and the Pande-Temane Natural Gas Pipeline.

Because the MDC, and particularly the rehabilitation of the N4, was primarily seen as a transport initiative, the early development of the project as a PPP was led by the South African Department of Transport (DOT).

## CHALLENGES AND OPPORTUNITIES ADDRESSED BY THE PROJECT

There were several objectives associated with the project, including to:

- foster trade between South Africa and Mozambique to broaden economic activity, empowerment and development of communities within both countries
- facilitate regional and global trade through direct access to the Port of Maputo,
- foster regional integration
- balance regional disparities
- reduce transport cost by improving the efficiency of roads
- further develop exporting industries in the region.

The N4 Toll Route has facilitated the development of other infrastructure projects in the MDC, such as the Port of Maputo and the establishment of the Mozal aluminium smelter.

## PERCEIVED LONG-TERM BENEFITS

Delivery of the N4 Toll Route under the SDI has developed the N4 into a major component of South Africa’s connection with the global marketplace due to it being the shortest link to an export port for its industrial land-locked region of Gauteng. The N4 also allows hundreds of thousands of Mozambicans the possibility to access work and opportunities in South Africa.

The project has facilitated the development of communities situated along the route. Specific contractual conditions included the obligation for TRAC to subcontract 20% of the work to historically disadvantaged communities in South Africa and 40% to those in Mozambique. Approximately 5700 jobs were created during the initial phase, with construction workers receiving training on the job. In total, about 12,000 casual, temporary and permanent jobs have been created by the project.<sup>6</sup>

TRAC also developed three training centres along the route as a part of the company’s integrated community participation program. Over 20,000 members of the local communities were trained through various programs, including literacy and HIV awareness.

<sup>3</sup> Taylor (2000). Available at: [http://www.dpru.uct.ac.za/sites/default/files/image\\_tool/images/36/DPRU%20WP00-044.pdf](http://www.dpru.uct.ac.za/sites/default/files/image_tool/images/36/DPRU%20WP00-044.pdf)

<sup>4</sup> Söderbaum (2012). Available at: <https://www.routledgehandbooks.com/doi/10.4324/9781315613499.ch3>

<sup>5</sup> UNSSOC (2012). Available at: [https://www.esc-pau.fr/ppp/documents/featured\\_projects/south\\_africa\\_and\\_mozambique.pdf](https://www.esc-pau.fr/ppp/documents/featured_projects/south_africa_and_mozambique.pdf)

<sup>6</sup> Rogerson (2001).

## Procuring and financing

### PROCUREMENT PROCESS

The PPP process required a private sector partner to enter a contractual agreement with the two governments. A competitive bidding process was used to engage various consortia to select the private operator. The fast-track approach for quickening the pace of implementation allowed the N4 project to move from the Requests for Proposal stage to the selection of bidders in eight months, starting in March 1996. There was no request for expressions of interest. The DOT prequalified five potential bidders and invited them to submit initial bids.

In July 1996, the South African DOT and the Department of Roads and Bridges (DNEP) in Mozambique entered into a protocol agreement to establish an Implementing Authority for the preparation of the concession contract documents and to initiate the tender process. The idea was to have one government counterpart for the private operator, to simplify and streamline contract negotiations, construction oversight and progress reporting.

The DOT created the South African National Road Agency Limited (SANRAL), and the DNEP created the Administração Nacional de Estradas (ANE), which serve as the government authorities providing management of the N4.

In October 1996, the private consortium TRAC was named the preferred bidder. In May 1997, the concession agreement was signed by TRAC and the Governments of South Africa and Mozambique, represented by their respective national roads' agencies, SANRAL and ANE.

By December 1997, TRAC reached financial close and had raised the capital expenditure required for the construction phase with a total R1.5 billion (about USD330 million, 1997 value). In March 1998 the construction work started. The whole process from tender invitations to financial close was concluded between March 1996 and June 1998; this was unusually fast for a project of this scale.

### CONTRACTUAL MODEL

As mentioned previously, the BOT concession for the N4 was signed in May 1997 by TRAC, a privately-owned company which was established in 1997. TRAC was created as a special purpose vehicle (SPV) by Bouygues Group and two South African

construction companies, Basil Read and Stocks & Stocks. By signing the concession agreement, TRAC agreed to design, construct, rehabilitate and finance the government-owned road assets in exchange for the right to operate them for 30 years. The contract stipulates that TRAC has the right to charge and collect tolls from users of the N4. Tolls paid on the N4 are used to operate, maintain and upgrade the road. The roles and obligations of the various parties involved in the concession agreement are clearly defined in the contract. It differs from conventional contracts in that it primarily makes use of performance specifications<sup>7</sup> (rather than design specifications) for pavement quality.

Once the concession period expires in 2028, control and management of all assets covered by the concession will be returned to the two governments under a hand-back plan, which is contractually determined. The hand-back plan requires TRAC to return the road in a condition that meets prescribed engineering standards with a certain remaining design life. The road condition will be evaluated based upon inspections over the last three years of the concession period.<sup>8</sup>

Additionally, important to the SDI strategy, bids were required to include socioeconomic benefits to enable the empowerment of communities along the N4 through social and entrepreneurial development, employment generation, job training and skills transfer – especially in construction works.<sup>9</sup> Examples of how TRAC included these benefits are described in the Development section.

### INFRASTRUCTURE FINANCING

The concession value for the N4 was estimated to be worth approximately R3 billion (about USD660 million, 1997 value) with a total of R1.5 billion (about USD660 million, 1997 value) with a total of R1.5 billion (about USD330 million, 1997 value) allocated for the initial 3.5-year construction phase required to be negotiated at financial close. The private consortium entirely financed the project. The financing plan consisted of a combination of 20% equity finance by the private consortium and 80% debt finance from primarily South African banks. A breakdown of the initial financing structure at financial close is provided in Table 1. The project was implemented without government subsidies however the two governments have provided support by jointly guaranteeing the debt in case of TRAC's inability to service the loan.<sup>10</sup>

7 See Reference Guide for Output Specifications (2019). Available at: <https://www.github.org/infrastructure-output-specifications/>

8 UNDP (2012). Available at: [https://www.esc-pau.fr/ppp/documents/featured\\_projects/south\\_africa\\_and\\_mozambique.pdf](https://www.esc-pau.fr/ppp/documents/featured_projects/south_africa_and_mozambique.pdf)

9 World Bank Group (2014). Available at <http://documents.worldbank.org/curated/en/306311468027639111/Building-integrated-markets-within-the-East-African-Community-EAC-opportunities-in-Public-Private-Partnership-PPP-approaches-to-the-regions-infrastructure-needs>

10 ibid

This structure has been made possible by a balanced risk allocation.

## RISK MITIGATION

- **Demand risk and traffic volume:** Through assuming full traffic risk, TRAC faced demand and user-payment risk in Mozambique. Traffic volumes in Mozambique were not as high as forecast and disadvantaged communities were unable and unwilling to pay high toll fees. To mitigate this risk, TRAC cross-subsidised the Mozambican part of the road with higher revenues from more affluent South African users. It also provided substantial discounts to local users and public transport services on both sides of the border. On the other hand, the road facilitated further private sector investment in Mozambique, which in turn raised traffic volumes
- **Financial risk/currency risk:** Due to the cross-border nature of the project with two different currencies (the South African Rand and the Mozambican Metical), the project faces currency risk. The project's debt has been structured in Rand and the revenues are granted in Rand and Mozambican Metical. As a result, TRAC has to handle currency fluctuations. The depreciation of the Metical against the Rand with its substantial fluctuations has led to significant toll increases in Mozambique – up to 25% in 2006 and up to 40% in 2016.
- **Refinancing:** Due to a positive track record, established traffic volumes and stable market conditions, TRAC was able to refinance the project in 2006. This reduced TRAC's financial risk, because the funds were used to refinance existing debt on more attractive terms and also allowed the concessionaire to begin expansion work earlier than anticipated. It was the largest refinancing of an infrastructure project ever in South Africa.<sup>11</sup>

Table 1: TRAC initial financing structure (1997)

TRAC's initial financing structure		Value
<b>Equity (20%)</b>		<b>R331 million</b> (USD73 million, 1997 value)
<b>Sponsors</b> (construction companies)	40% owner of TRAC	R132 million (USD29 million, 1997 value)
Bouygues (France)	100% owner of SBB (contractor for design and construction)	
Basil Read (South Africa)		
Stocks & Stocks (South Africa)		
<b>Non-sponsor equity 60%</b>		<b>R199 million</b> (USD44 million, 1997 value)
South African Infrastructure Fund (SAIF) (SA)		
Rand Merchant Bank (SA)		
Commonwealth Development Corporation (CDC Group) (UK)		
South African Mutual Life Assurance Society (SA)		
Momentum Metropolitan Life Limited (SA)		
Sanlam Asset Management (SA)		
SCDM (Moz)		
<b>Debt (80%)</b>		<b>R1.324 billion</b> (USD292 million, 1997 value)
<i>*excluding other equity investor who also provided debt</i>		
ABSA Corporate and Merchant Bank (SA)		
Development Bank of Southern Africa (SA)		
First National Bank (SA)		
Mine Employees' Pension funds (SA)		
Nedcor Bank/Netbank since 2005 (SA)		
Standard Corporate and Merchant Bank (SA)		
<i>Loan maturities between 15 and 20 years</i>		
<b>Total financing initial capital cost</b>		<b>R1.665 billion</b> (USD365 million, 1997 value)

Source: Adapted from South African National Treasury (2001), US dollars, figures rounded

<sup>11</sup> African Infrastructure Investment Managers (AIIM). Available at: <https://aiimafrica.com/>

## Management

### POLITICAL AND OPERATIONAL COORDINATION

The project set-up and the contracting structure are illustrated in Figure 1.

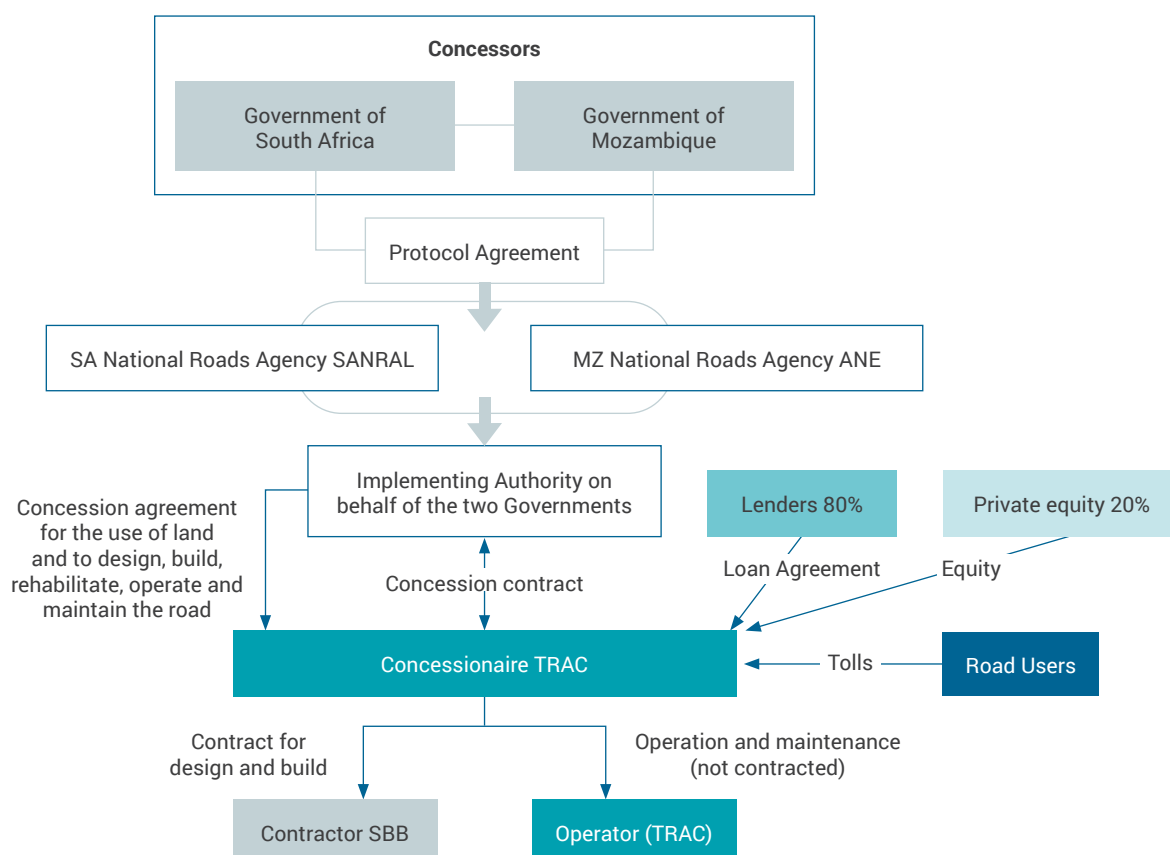


Figure 1: Overview of the N4 toll road concession structure, (Source: Ramboll, adopted from SSATP (2014))

The three construction companies, Bouygues, Basil Read and Stocks & Stocks, played a leading role in the concession structure. By the time the concession agreement was signed in May 1997, TRAC was 40% owned by these three companies. TRAC hired SBB consortium to undertake design and construction works, 100% owned by Bouygues, Basil Read and Stocks & Stocks (joint venture). TRAC took responsibilities of the operator to handle the operations and maintenance work itself. Labour and sub-contractors were sourced from both South Africa and Mozambique.<sup>12</sup>

#### Tariffs:

According to the concession agreement, the tariffs are set jointly by SANRAL, ANE and the concessionaire and can only be increased annually in line with the

Consumer Prices Index (CPI). Tariff increases cannot, therefore, compensate losses due to a decline in transport volume or increases in building materials or construction prices. SANRAL and ANE manage the expenditure and assure the proper use of funds.

The type of vehicle being driven determines toll prices on the N4. These are the categories of vehicles listed for the purpose of toll pricing:

1. light vehicles (no heavy axles)
2. medium heavy vehicles (at least one heavy axle)
3. large heavy vehicles (three to four axles).

The tolls are collected at six main toll plazas and four ramp plazas. Two toll plazas are located in Mozambique; the rest are in South Africa.

<sup>12</sup> SSATP 82014). Available at <http://documents.worldbank.org/curated/en/419461468202146203/Reviving-trade-routes-evidence-from-the-Maputo-corridor>

The concession was initially based on 0.20 Rand/km for a light vehicle and 0.50 Rand/km for heavy vehicles. Toll increases varied between South Africa and Mozambique, due to the exchange rate fluctuation between the South African Rand and the Mozambique Metical.<sup>13</sup>

The toll road (electronic tolling effective from 2012) is supplied with a high-quality monitoring system, as well as an effective load control system to prevent overloaded vehicles accelerating deterioration of the road. There are also six traffic control centres, each equipped with a scale capable of weighing long trucks in one operation. Three mobile units can be dispatched to any of 11 lay-bys situated on alternative routes surrounding the N4. There is a network of weigh-in-motion devices (WIM) on the road.<sup>14</sup>

#### Public perception:

An integral part of SDI projects was the fast-track approach allowed by DOT for quicker implementation; however, this precluded serious engagement of stakeholders outside of the financial sector. The speed with which the transaction was driven also resulted in bids being requested before Mozambique had a legal framework in place for toll roads. Furthermore, bids were requested before the Implementing Authority was established. SADC also had no real role to play.<sup>15</sup>

Most South African and Mozambican local officials were not consulted about many details of the project, including the toll tariff framework. The lack of participation of provincial and local government and communities led to limited communication about the project, which resulted in opposition to tolls. Local companies complained about negative impacts on their business and local residents complained that placing tolls on the N4 would separate them from schools, jobs and shopping opportunities. On the Mozambican side, the lack of participation in the project's structuring phase led to very little compensation during land acquisition, and a lack of job creation led to resistance from affected people and other interested groups.<sup>16</sup>

As a result, the concessionaire agreed to reduce tariffs for regular users and to begin providing services, such as 24-hour road patrols to assist motorists, to justify the cost to local commuters. The South African Government has continually shown strong support

for the toll road and attempted to appease residents adversely affected by the project. It was criticised that user fees increase the burden for the poor and disadvantaged, especially in Mozambique, leading to an elaborate scheme of cross-subsidisation from South African to Mozambican user fees with the provision of discounts to commuters and residents. To further convince road users and justify the reason for toll increments, efficient services are delivered, including the aforementioned 24-hour helpline and constant security patrol on the road.<sup>17</sup>

Another barrier was the delay of the rehabilitation of the Port of Maputo, which only started operating in 2003. This had a negative impact on the traffic flow on the N4, with enormous implications for the short-term financial success of the project. However, traffic demand steadily increased over the years, showing an acceptance of this PPP.

#### HARMONISATION OF RULES, PROCEDURES, AND TECHNICAL STANDARDS

The implementation of safety standards and the development of a one-stop border post improved the efficiency of the N4. Innovative technologies, such as the implementation of a load control mechanism and satellite tracking system, an electronic (automatic) tolling system and cross-border road safety management system, led to significantly increased road safety. Specifically: increased road safety:

- **One-stop border post:** To facilitate easy access and the flow of goods and people between South Africa and Mozambique, a single border facility has been developed at Komatipoort/Ressano Garcia. This facility reduces cross-border bottlenecks by providing a one-stop border control procedure. There is also an additional customs facility on the Mozambican side to speed customs clearing, limit paperwork, improve security control and, in general, facilitate trade and optimise the Maputo Corridor's freight transportation capacity. The project has been spearheaded by the Mozambique Customs Department which reports to the Minister of Finance.<sup>18</sup>

<sup>13</sup> UNDP (2012). Available at: <https://www.readkong.com/page/south-africa-and-mozambique-the-n4-toll-road-4175946>

<sup>14</sup> ibid

<sup>15</sup> World Bank Group (2014)

<sup>16</sup> Söderbaum (2012). Available at: <https://www.routledgehandbooks.com/doi/10.4324/9781315613499.ch3>

<sup>17</sup> Ibid

<sup>18</sup> UNDP 2012

- **Load control:** In order to prevent rapid road deterioration, TRAC assisted the two governments in establishing axle load control measures. In 2002, load control centres (LCCs) were established. In 2007 SANRAL and TRAC implemented further advanced load control measures at the traffic control centres (TCCs) to screen heavy vehicles and implemented satellite tracking WIM devices on the road.
- **Electronic tolling system:** The tolling system exists in both countries, and its rules are harmonised between the two countries.<sup>19</sup> In 2012, the High Court and Constitutional Courts (highest in South Africa on constitutional matters) endorsed SANRAL's approach to implement e-tolling on Gauteng freeways despite intense public agitations and protests against introduction. Furthermore, camera systems were installed at toll booths to prevent corruption, which increased customer satisfaction.
- **Road safety management system TIDS (Traffic Incident Data System):** TRAC was instrumental in the development of this system, which has now been adopted by other toll concessions in Europe.

## Conclusions

- **Public benefits** – Project benefits must be clearly identified and quantified for all parties. The project has not only benefited the two countries but has also fostered trade among other neighbouring countries such as Namibia and Botswana. The road has also facilitated further private sector investment in transport infrastructure.
- **Public perception** – As with any toll road, where the project company is collecting revenues directly from the user, stakeholder participation is essential. In the case of the N4 Toll Route, it was difficult to persuade the local people to pay tolls for an existing road. The fast-track approach as an integral part of the SDI policy which allowed the N4 project to move from the Requests for Proposal stage to the selection of bidders in eight months, precluded serious engagement with stakeholders outside of the financial sector. That led to rising opposition against the toll road. Efficient and in-depth stakeholder management is crucial for the success of a PPP. Extensive communication activities should be effectively targeted at stakeholders to increase project visibility and community awareness.
- **Socioeconomic development and knowledge transfer** – The project fostered regional integration and balanced historical regional disparities. With specific contractual conditions, the concessionaire was obliged to subcontract a share of local small companies in both countries, including training on the job for the construction workers. Also, an integrated community participation program was obliged to train the local communities on various programs, including literacy and HIV awareness (20,000 residents were trained).
- **Contract provisions** – The project has a detailed contract that focuses on performance (not design) specifications and outlines specific responsibilities, which helped the parties to avoid conflict.

<sup>19</sup> The main Mozambican legislation governing private toll roads is Decree No 31/86 July 16.



- **Risk assessment and burden of risks**
  - Identifying risk early and allocating it fairly will help ensure the viability of the project. For the N4 Toll Route, the financial and demand risk were fully allocated to the concessionaire.
  - Financial risk: The project was implemented without government subsidies, but the two governments jointly guaranteed the project debts.
  - User payment risk: The user pay principle was perceived to be unconstitutional (especially in Mozambique); tolls were introduced for the first time in Mozambique. Cross-subsidisation and substantial discounts for regular Mozambican users helped to reduce the user payment risk. The road facilitated further private sector investment in less-favoured areas (especially Mozambique), which in turn raised traffic volumes.
  - The N4 strongly benefited due to the fact, that the South African portion of the road accounted for more than 80% of the total project length and was already an established road, so revenues could be generated quickly.
- **Strong governance mechanism**
  - The N4 is indeed a cross-border project, but much of the speed with which it was implemented is attributable to the fact that it was developed and managed in the style of a single, national project, heavily driven by the South African DoT. Nevertheless, the project is considered a significant success and demonstrates the power of political cooperation between neighbouring countries and the benefits of a PPP. The N4 is still the only cross-border toll concession ever completed in Sub-Saharan-Africa.
  - The strong government commitment, support and regulatory framework, and policy actions developed for the N4 project were effective in accelerating delivery of the project.
- **Multi-sector approach** – The project demonstrates a political will for economic cooperation between neighbouring countries South Africa and Mozambique. It was developed taking a regional, multi-sector approach to transport.



Source: Drago Prvulovic/Øresundsbron

## The Øresund Fixed Link



### Location

Copenhagen, Denmark–Malmö, Sweden Northern Europe, Øresund Region

### Sector

Transportation

### Procuring authorities

Øresundsbro Konsortiet

### Project company

Øresundsbro Konsortiet

### Project Company obligations

design, build, finance, maintain, own and operate (DBFM00)

### Capital value

USD3.7 billion (DKK30.1 billion – 2000 value)

### Start of operations

2000

### Key facts

Government financed, 100% user funded

## Project highlights

The Øresund Fixed Link is a combined bridge and tunnel link across the Øresund Sound between Denmark and Sweden. It comprises:

- The Øresund Tunnel between Amager at Kastrup, south of Copenhagen, and the artificial island Peberholm.
- The Øresund Bridge, a combined girder<sup>1</sup> and cable-stayed bridge between Peberholm and Lernacken – south of Malmö, in Skåne.

The Fixed Link is composed of a motorway and a dual rail track. The total length is 15.9 km.

The Fixed Link is owned and operated by Øresundsbros Konsortiet, which is jointly owned by state-owned enterprises A/S Øresund and Svensk-danska Broförbindelsen (SVEDAB) AB. The latter is owned by the Swedish Government, while A/S Øresund is 100% owned by Sund & Bælt, which is owned by the Danish state (see also Figure 3).

The total cost of the Fixed Link, including the motorway and rail connection on land, was calculated at DKK30.1 billion in 2000 (circa USD3.7 billion, 2000 prices). The project received financial support of DKK780 million (USD96.6 million) from the Trans-European Transport Network (TEN-T). It is estimated that the entire Fixed Link, including the land works, will have paid for itself by 2050.<sup>2</sup>

The completion and opening of the the Fixed Link in 2000 marked an upturn in mobility at an international, national, regional and local level for one of the busiest and most important traffic routes between the Scandinavian peninsula and the European continent. The fast link to the centre of Copenhagen has also had a significant impact on the potential of Copenhagen's Kastrup Airport to attract more international flights. Further, it triggered the formation of a common labour and housing market, which lies at the heart of the political vision of the Øresund Region.

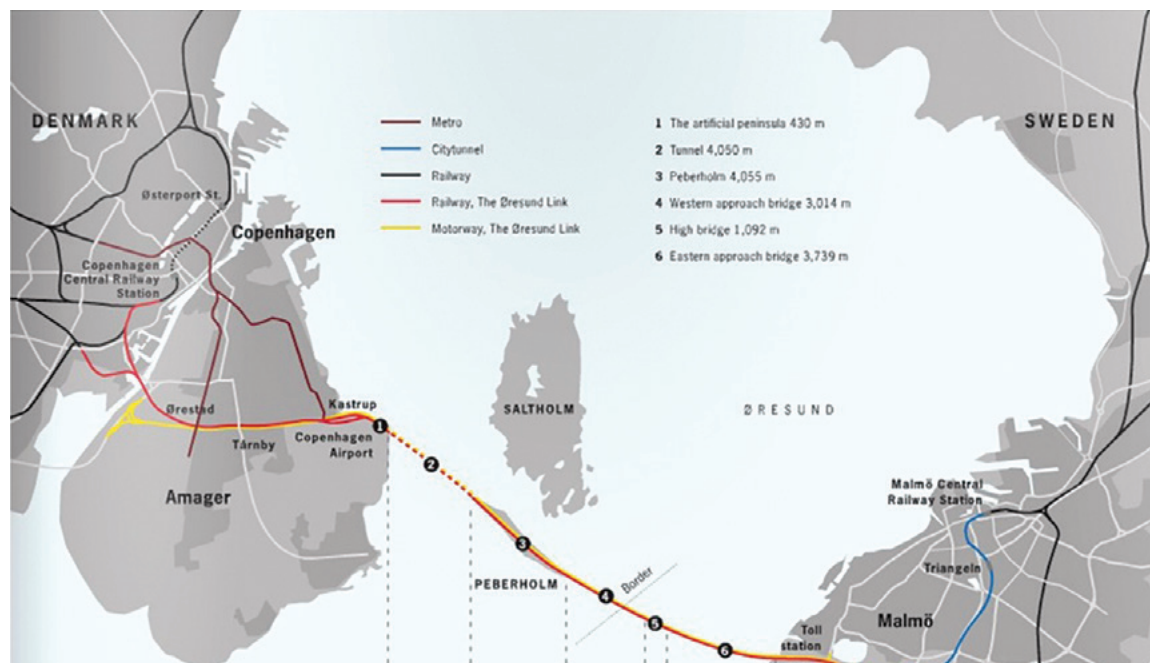


Figure 1: The Øresund Fixed Link (Source: Øresundsbros Konsortiet)

<sup>1</sup> Most common bridge structures. The beams (girders) support the deck.

<sup>2</sup> Øresundsbros Konsortiet (2019), Annual report 2019.

## Project timeline<sup>3</sup>

- **1930 and 1950's First proposals**  
for an alignment across the Isle of Saltholm
- **1973 Signature of an agreement** between Sweden and Denmark for the construction of a fixed link
- **1978 Agreement rejected**  
when Denmark decides against relocating Copenhagen airport to the Isle of Saltholm
- **1984 Øresund delegation (OD) appointed**, reviews studies from 1960s and 1970s to develop a new project
- **1985 Øresundsförbindelser report** presented by the OD, and agreement that the project must be financed outside the state budgets and be profitable on business economic terms
- **1986 Danish Parliament decides to build a fixed link across the Great Belt**  
This removes a Danish policy lock regarding an agreement on a fixed link across the Sound
- **1987 The Fasta Øresundsförbindelser (SOU 1987:41)** presents three alternatives
- **1989 The Fasta Øresundsförbindelser (SOU 1989:4)** narrows down the alternatives to either a combined road and railway link between Copenhagen and Malmö or a railway tunnel. The structure of the link should not affect the water flow
- **April-May 1990 Swedish Government votes** in favour of the combined road and railway link between Copenhagen and Malmö
- **23 March 1991 Signature of the Danish-Swedish Government agreement to build a fixed link across Øresund**
- **1992 Creation of the Øresundsbros Konsortiet** and application for permission to build and operate the link
- **August 1995 Beginning of construction** with the dredging of Øresund
- **1 July 2000 Opening of the Øresund Bridge**

## Development

### THE POLICY AND PLANNING SETTING

Denmark and the southern region of Sweden have been closely related through history. The Øresund Region, built around the metropolitan areas of Copenhagen (Denmark), Malmö and Lund (Sweden), is now one of the most well-known examples of European cross-border collaboration.

Both sides share similar profiles of development (knowledge-based economies). In the two years preceding the opening of the Øresund Fixed Link, a major share of direct investments from both countries were directed to the Øresund Region.

For the development and operation of the Øresund Fixed Link, Denmark and Sweden are bound by the governmental agreement signed on 23 March 1991, which fixed fundamental design and construction principles, and regulated cooperation between the two countries.

### CHALLENGES AND NEEDS ADDRESSED

The Fixed Link aimed at acting as a catalyst for the whole Øresund Region by strengthening commercial ties and by promoting commuting and cultural exchange between Copenhagen and Malmö.

At the end of the 20th century, unemployment was affecting the region: "the decline of traditional industries and the closure of shipyards as well as car and textile factories had visible effects on unemployment figures on both sides of the Sound."<sup>4</sup> With the Fixed Link, Sweden saw an opportunity to address industrial unemployment in Malmö through access to Copenhagen's labour market. For Copenhagen, the construction of a fixed link was an opportunity to expand its production system, universities and services catchment area.

Strategically, the Fixed Link aimed at increasing the attractiveness and competitiveness of the whole region, by enlarging its educational offering and encouraging the development of new infrastructure – like the European Spallation Source<sup>5</sup> (ESS) facilities in Lund – to attract high-skilled labour and businesses. For Sweden, it was a major opportunity to improve connection with the European continent and the world – by road but also by air, thanks to the proximity of Copenhagen's Kastrup Airport, located at the Danish end of the Fixed Link. A few years after the bridge

<sup>3</sup> Own production, based on OMEGA centre Sweden, UCL London (n.d.) The Øresund link-project profile; Øresundsbros Konsortiet (2008), *Facts worth knowing about the Øresund bridge*.

<sup>4</sup> Nauwelaers, C., K. Maguire and G. Ajmone Marsan (2013), "The case of Øresund (Denmark-Sweden) – Regions and Innovation: Collaborating Across Borders", *OECD Regional Development Working Papers*, 2013/21, OECD Publishing.

<sup>5</sup> Multi-disciplinary research facility based on the world's most powerful neutron source.

opened, more than half of the exports from Sweden were directed to mainland EU countries while two-thirds of imports originated from within the EU.<sup>6</sup>

Easier and faster communication contributes increased commercial exchange, but also tourism. The bridge aimed to have an impact on the region's image and to create new opportunities for the development of leisure and tourism businesses.

The notion of "a fixed link to the continent" was of major importance when developing the project, but in the late 1980s, the ideas of regional development and building cross-border regions gained in importance.<sup>7</sup> The growing objective, which still stands high on the political agenda, was to forge the Øresund identity in a "culturally and linguistically similar but still diversified population" by fostering cultural exchanges.<sup>8</sup>

### ENVIRONMENTAL ISSUES

Environmental issues have been central throughout the project. In 1986, the OD started discussing the effects a fixed link would have on the water flows from the North Sea to the Baltic Sea. This issue became central in the development of the project and led to major environmental protests which culminated in the resignation of Sweden's Environment Minister Olof Johansson in 1994. To address the environmental issues, 3–6 m<sup>3</sup> of seafloor sediment were dredged to maintain water inflows.<sup>9</sup> Specific care was taken to avoid permanent damage and serious impact on seafloor fauna and flora during the dredging. In total, 14% of the cost of the Fixed Link was related to environmental measures and optimization.<sup>10</sup>

### LONG-TERM BENEFITS

After the bridge opening, labour market integration, measured by commuting, rose considerably – mainly from Sweden to Denmark. In 2018, 90% of Øresund commuters lived in Sweden and worked in Denmark.<sup>11</sup> Commuting by car reached a peak in 2008, with 20,000 vehicles passing the Sound daily compared with 3,000 in 1999.<sup>12</sup> Differences in salaries and housing prices (both higher in Denmark) and unemployment rates (higher in the Skåne region)

drove this pattern. In 2018, an average of 70,000 people were crossing the bridge daily; 55% by car and 45% by train.<sup>13</sup>

The type of trips changed over time. For vehicle traffic, commuting was the largest customer segment in the initial years of operation, but leisure travel gradually took over (in 2017, commuters and leisure travellers each accounted for one third of the car trips each).<sup>14</sup> Favourable fare policies implemented over the years, and the weakening of the Swedish currency, supported that pattern, with Danes shopping on the other side of the Sound, for instance. The remaining traffic – business, freight and coaches – kept increasing as the bridge offered a faster and better-located (customer wise) alternative to the Helsingborg-Elsinore ferry service, located north of the Fixed Link in the same functional region.<sup>15</sup>

The opening of the Fixed Link was accompanied by major infrastructure development on both sides.

New districts are continuing to be developed in the suburbs of Hyllie and Ørestad in Malmö at the Swedish end of the Fixed Link, with housing, shops and offices. The Fixed Link has also integrated the Malmö property market with Copenhagen's.

At the turn of 2012–2013, the price per square metre for a family home in the Malmö area was almost at the same level as in the Capital Region that encompasses Copenhagen and its surrounds. This reflects the demographic characteristics of prospective buyers and the economic connection the Fixed Link has made between the two regions.

The proximity to Kastrup Airport has helped companies and major research facilities to establish themselves in the region. Major logistics centres have been established near the E6 road around Malmö. Direct business collaboration between both countries emerged – like the merger of Copenhagen and Malmö ports. Finally, millions have been invested in improving adjacent transport infrastructure like Copenhagen metro or the city tunnel in Malmö.<sup>16</sup>

6 Øresundsbro Konsortiet (2020, February 25), personal interview

7 OMEGA centre Sweden, UCL London (n.d.) *The Øresund link - project profile*

8 Nauwelaers, C., K. Maguire and G. Ajmone Marsan (2013), "The case of Øresund (Denmark-Sweden) – Regions and Innovation: Collaborating Across Borders", *OECD Regional Development Working Papers*, 2013/21, OECD Publishing

9 OMEGA centre Sweden, UCL London (n.d.) *The Øresund link - project profile*

10 Øresundsbro Konsortiet (2020, February 25th), interview

11 Øresundsbro Konsortiet (2018), *The Øresund Bridge and its Region: 18 years*

12 Ibid

13 Ibid

14 Øresundsbro Konsortiet (2018), *The Øresund Bridge and its Region: 18 years*

15 Øresundsbro Konsortiet (2018), *The Øresund Bridge and its Region: 18 years*

16 OECD (2003), *OECD Territorial Reviews: Øresund, Denmark/Sweden 2003*, OECD Territorial Reviews, OECD Publishing, Paris



According to the Organisation for Economic Co-operation and Development (OECD),<sup>17</sup> the better cross-border mobility helped decrease cultural and communication barriers, since most Swedes and Danes living in the core of the cross-border area, even if not commuting themselves, get to know nationals that have worked on the other side of the Sound.

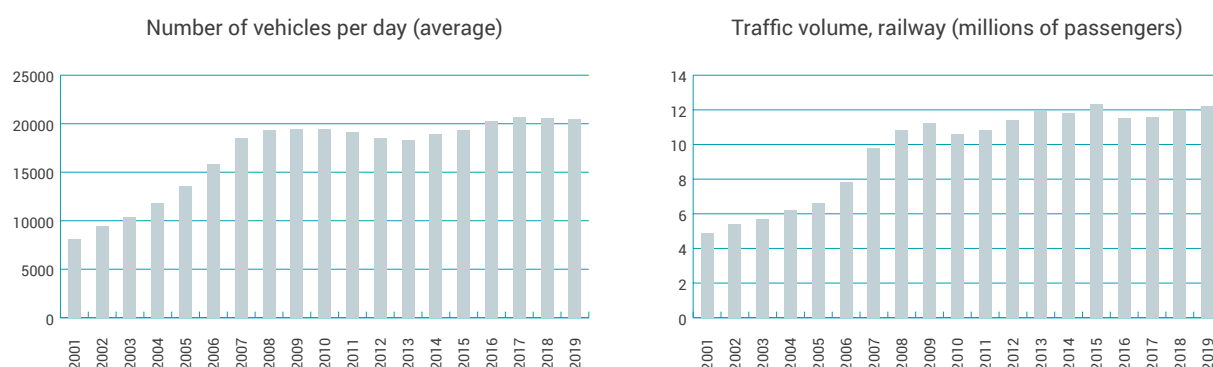


Figure 2: Traffic over the Sound (Source: Øresundsbro Konsortiet)

## Financing

### INFRASTRUCTURE FUNDING AND FINANCIAL OPERATIONS MODEL

The governmental agreement from 1991 explicitly stated that funding from the state budgets of the two signatory countries was not an option to deliver the Øresund Fixed Link.

The coast-to-coast section – which includes the tunnel, the artificial island, the bridge as well as the dredging and other environmental and safety measures – has been financed by loans taken on the international credit market. Øresundsbro Konsortiet is responsible for these loans. The cost of the coast-to-coast section of the link was calculated at DKK19.6 billion in 2000 (approximately USD2.4 billion, 2000 prices). The two states act as guarantors for the loans taken by Øresundsbro Konsortiet and pledged to share responsibilities towards creditors.<sup>18</sup> This section also received financial support from the EU's TEN-T funding programme. By the completion of the bridge, it was estimated that this support amounted to approximately DKK780 million (approximately USD96.6 million, 2000 prices).<sup>19</sup>

**NET DEBT IN 2000**  
**COAST-TO-COAST INFRASTRUCTURE**  
**DKK 19.6 billion (approximately USD2.4 billion)**  
**LAND WORK**  
**DKK 10.5 billion (approximately USD1.3 billion)**

In 2013, HH Ferries et al. (now ForSea), which operate ferries between Helsingborg and Elsinore, lodged a complaint with the EU Commission claiming that the Danish and Swedish state guarantees for Øresundsbro Konsortiet's loans are illegal according to the EU's state aid rules. After several years of procedure, this matter is still under investigation. A decision was expected in the second half of 2019 but was still pending in February 2020.<sup>20</sup>

The construction of the connecting land infrastructure on both sides of the Sound has also been financed by loans, taken by SVEDAB on the Swedish side (DKK2.6 billion in 2000, approximately USD300 million – not including the cost of the outer ring road, which was funded by the Swedish National Road Administration via state budget grants), and by A/S Øresundsförbindelsen on the Danish side (DKK7.9 billion in 2000, approximately USD1 billion).<sup>21</sup>

Toll revenues from road traffic and railway fees are the sole sources from which the debts of Øresundsbro Konsortiet and the two parent companies will be repaid. The loans taken by SVEDAB and A/S Øresundsförbindelsen for the connecting land infrastructure will be repaid thanks to dividends received from Øresundsbro Konsortiet. Initially, dividends were to be paid after the loans for the coast-to-coast section itself had been repaid. The initial payment was expected 25 years after the opening of

<sup>17</sup> Nauwelaers, C., K. Maguire and G. Ajmone Marsan (2013), "The case of Oresund (Denmark-Sweden) – Regions and Innovation: Collaborating Across Borders", *OECD Regional Development Working Papers*, 2013/21, OECD Publishing

<sup>18</sup> Ibid

<sup>19</sup> Ibid

<sup>20</sup> Øresundsbro Konsortiet (2020, February 25), personal interview

<sup>21</sup> Ibid



the Fixed Link,<sup>22</sup> and Øresundsbro Konsortiet's debt was expected to be repaid approximately in 2035.<sup>23</sup> However, in 2018, the two owners decided on a new dividend policy whereby the primary focus will be on maximum debt reduction in the owner companies.

The first dividend from Øresundsbro Konsortiet to its owners was paid in the spring of 2018 for the financial year 2017.<sup>24</sup> In the latest estimations, the entire Fixed Link and the land works are expected to be repaid in 2050.

**Table 1: Tolls for private customers as of March 2020, in DKK**

Single trip price (DKK)	Online ticket	Full price	Smut Tur	BroPass
Car (max 6 m)	355	390	105	170
Car with trailer/ caravan 15m Camper 6–10m Van 6–9m	710	780	210	340
Car with trailer/caravan over 15m Camper over 10m Camper over 6m with trailer Van over 9m	1350	1470	-	645
Motorcycle	195	210	52	80

The terms of the governmental agreement signed in 1991 included the prevention of unnecessary distortion of the region's traffic balance resulting from the new infrastructure. Existing transportation measures which will continue to operate – such as the ferry between Helsingborg and Elsinore operated by ForSea – are protected from competition with other transport means. Hence, the pricing mechanism for road fees, which are fixed by Øresundsbro Konsortiet, is based on the ferry taxes.<sup>25</sup> The price paid by users must cover all construction and operating costs, including maintenance and new investments. Value-added tax (VAT) is paid to the two governments.<sup>26</sup> In 2019, revenues from road traffic amounted to DKK1.5 billion (approximately USD200 million, 2019 prices), which was a 3% rise compared to 2018.

The rail fee is a fixed fee which was agreed upon in the 1991 Agreement and is paid equally by the two countries' national railway agencies. The railway administrations, in turn, charge the train operators for using the Fixed Link. The amount is based on a fee of DKK300 million in 1991 (approximately USD47 million, 1991 prices) and is index-linked.<sup>27</sup> In 2019, revenues from the railway amounted DKK512 million (approximately USD76 million, 2019 prices).<sup>28</sup>

The agreement with the guarantors stipulates that the currency of the loans can only be Danish Krone (DKK), Swedish Krona (SEK) and Euros (EUR). At the end of 2007, most of the loans were in EUR, with a small proportion in DKK and about 1% in SEK.<sup>29</sup> The toll for crossing the bridge is initially settled in DKK. Railway revenue is settled in DKK.

## FINANCIAL RISKS

Due to the pricing mechanism, Øresundsbro Konsortiet's revenues are closely associated with the development of the financing costs – mainly interest rates. They also directly depend on road traffic volumes. The road traffic expectations were not met in the first few years of operation, and income from car traffic was lower than expected. Indeed, the ferry connection between Helsingborg and Elsinore was still frequently used to cross the Sound.<sup>30</sup> Train traffic over the Fixed Link fared better than car traffic. However, given the financial structure of the project, the success of the train did not bring additional revenues to Øresundsbro Konsortiet, which receives fixed fees irrespective of ridership numbers. Because of that, the date of repayment of the loans was pushed several years into the future.

<sup>22</sup> Øresundsbro Konsortiet (2002), *Annual report 2002*

<sup>23</sup> Ibid

<sup>24</sup> Øresundsbro Konsortiet (2019), *Annual report 2019*

<sup>25</sup> OMEGA centre Sweden, UCL London (n.d.) *The Øresund link - project profile*

<sup>26</sup> Øresundsbro Konsortiet (2008), *Facts worth knowing about the Øresund bridge*

<sup>27</sup> Øresundsbro Konsortiet (2008), *Facts worth knowing about the Øresund bridge*

<sup>28</sup> Øresundsbro Konsortiet (2019), *Annual report 2019*

<sup>29</sup> OMEGA centre Sweden, UCL London (n.d.) *The Øresund link - project profile*

<sup>30</sup> Øresundsbro Konsortiet (2020, February 25), personal interview

Traffic volumes kept fluctuating over time, bringing uncertainties in cash flows. After the 2008 crisis, fluctuations in currency exchange rates, as well as the resulting relative price differentials, slightly changed commuter behaviour. While traffic increased by 10–17% a year between 2001 and 2007, it increased by just under 5% in 2008.<sup>31</sup>

Other factors can and have impeded cross-border mobility and led to a reduction of traffic – and hence of revenues – for the Fixed Link:

- Covid-19<sup>32</sup> (see box opposite)
- Free movement of people: In 2015, border controls reintroduced by the Swedish authorities to manage the flows of refugees constrained train traffic,<sup>33</sup> which led to a decrease in patronage. For the same reasons as stated earlier, this did not have a direct negative impact on Øresundsbro Konsortiet's economic situation. On the contrary, road revenues increased as commuters shifted from train to cars for their trips.<sup>34</sup>
- According to the OECD, discrepancies in tax, social insurance and pension regulations can also impact movements over the Sound: "The fiscal systems in both countries exhibit some differences that can distort location decisions and the free movement of labour and capital across the border."<sup>35</sup>
- Partial recognition of education and grades achieved between the two countries can dissuade students from studying in the neighbouring country.
- The fees for crossing the bridge by car are a frequently raised concern and have most likely caused some unexpected diversion of traffic.<sup>36</sup>
- Other infrastructure projects currently being developed in Europe might directly impact the traffic flows through the Link. The construction of the Fixed Link across the Fehmarnbelt between Germany and Denmark – expected to open mid-2029 – will most likely benefit the Øresund Fixed Link, with faster car and train journeys to the European continent. Scandinavia is Germany's seventh largest trading partner. Øresundsbro Konsortiet expects the Fehmarnbelt link to

increase road traffic on the Øresund Fixed Link by 1,000 vehicles per day.<sup>37</sup> On the other hand, the possibility of a tunnel between Helsingborg and Elsinore (Sweden to Denmark) could lead to traffic reduction, especially when it comes to freight traffic (see also the section on long-term benefits). The impact of such a project on the Øresund Fixed Link's traffic has not been assessed yet.<sup>38</sup>

### Partial closure of borders due to the spread of COVID-19

In 2020, the spread of the coronavirus compelled the Danish Government to close its borders with neighbouring countries such as Sweden. The Fixed Link remained open for freight traffic and trips from Denmark to Sweden. However, strict entry rules applied for trips from Sweden to Denmark – travellers could only enter the country if they had a valid reason, such as living or working in Denmark. Between 14 March 2020 – when the regulations entered into force – and 12 April 2020, car traffic was about 71% lower than during the same period in 2019. Train traffic was also severely reduced, with only one to two trains crossing the link per hour instead of six in regular times. However, positively, freight traffic has only seen a minor dip.

In its 2020 half yearly report, Øresund Konsortiet reported a 40% drop in traffic over the Jan–Jun period compared to 2019, with an equivalent drop in operating profit.

Travel restrictions began to ease in late June 2020 for people entering Denmark, depending on the level of infection in their country of residence.

### PRIVATE SECTOR AND PROCUREMENT

Øresundsbro Konsortiet is responsible for negotiations with contractors. Contracts are awarded following EU procurement procedures and national legislation – usually Danish legislation.<sup>39</sup> In the construction stage, negotiations were held from July to November 1995, and deals were signed with three consortia.<sup>40</sup>

31 Ibid

32 <https://www.globenewswire.com/news-release/2020/08/13/2077641/0/en/Half-year-report.html>

33 "Rail passengers crossing the Øresund Bridge had to change platforms and go through an ID check at Copenhagen Airport at Kastrup as well as a border check at the station in Hylle [Sweden]" (ibid.)

34 Ibid

35 OECD (2003), *OECD Territorial Reviews: Øresund, Denmark/Sweden 2003*, OECD Territorial Reviews, OECD Publishing, Paris

36 Ibid

37 Øresundsbro Konsortiet (2018), *The Øresund Bridge and its Region: 18 years*

38 Øresundsbro Konsortiet (2020, February 25), personal interview

39 According to our interviewee, the Consortium chooses which country's legislation will be applied

40 OMEGA centre Sweden, UCL London (n.d.) *The Øresund link - project profile*

- The construction of the immersed tunnel section was awarded to the Øresund Tunnel Contractors, a consortium consisting of NCC AB (SE), Dumez-GTM SA (F), John Laing Construction Ltd (UK), E. Pihl & Søn (DK), and Boskalis Westminster (NL). The value of the contract was DKK3.8 billion (USD700 million, 1995 prices).
- The contract for constructing the artificial island and dredging was awarded to the Øresund 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 DKK1.4 billion (USD0.3 billion, 1995 prices).
- 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 2-level approach bridges (with the motorway on the upper level and the railway on the lower level). The value of the contract was DKK6.3 billion (USD1.1 billion, 1995 prices).

Øresundsbro Konsortiet describes the procurement procedure for the construction as quite innovative. Responsibilities were clearly defined among the owner and building companies, which was described as not common at the time. As a result, the construction process went smoothly and efficiently. There has not been any overrun from the budget initially allocated for the construction of the Fixed Link until its completion.<sup>41</sup>

The procurement of cross-border train services is under the responsibility of regional transport authorities from the two countries – Skånetrafiken in Sweden and Trafikstyrelsen in Denmark.

## Management

### OPERATIONAL COORDINATION

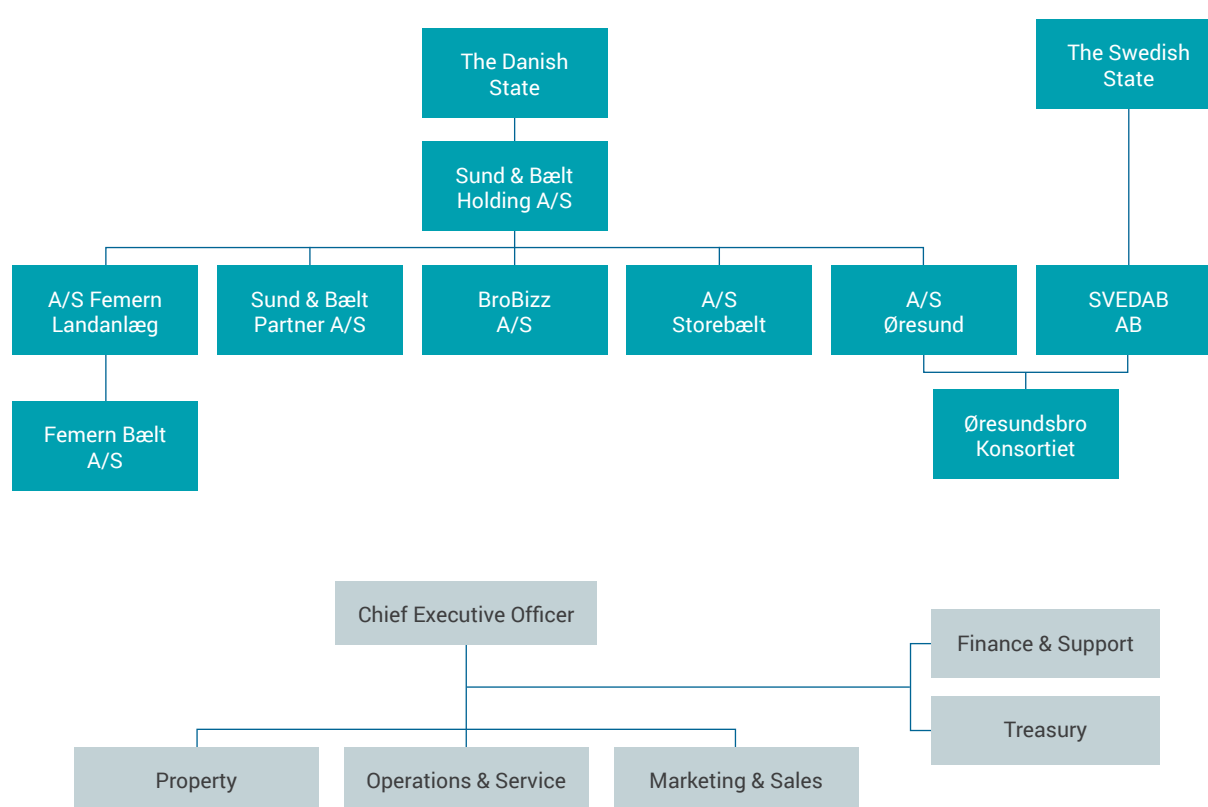


Figure 3: Øresundsbro Konsortiet ownership and management board (Source: Øresundsbro Konsortiet)<sup>42</sup>

<sup>41</sup> Øresundsbro Konsortiet (2020, February 25), personal interview.

<sup>42</sup> Øresundsbro Konsortiet (2020), *Organisation*, <https://www.oresundsbron.com/en/info/organisation>

The Øresund Fixed Link is owned and operated by Øresundsbro Konsortiet, a Danish-Swedish company established based on the agreement of 23 March 1991 between the Governments of Denmark and Sweden. Øresundsbro Konsortiet is jointly owned by A/S Øresund and Svensk-Danska Broförbindelsen (SVEDAB), two state-owned companies.<sup>43</sup> A/S Øresund and SVEDAB are responsible for the delivery and operation of the land works on their respective sides of the Fixed Link.

As defined in the governmental agreement, Øresundsbro Konsortiet's two owners each appoint four members to the Board of Directors and nominate its Chairman and Vice-Chairman every other year. The board of directors is responsible for managing Øresundsbro Konsortiet and deciding on major strategic and economic issues. None of its members serve on the company's daily management. Day-to-day management is delegated to Øresundsbro Konsortiet's CEO, appointed by the board, and to the five department directors of the management board in charge of operations and maintenance tasks including financial administration, marketing and sales, customer and payment services, road and rail operations, maintenance, development and administrative duties.<sup>44</sup> The consortium manages the rail infrastructure, but rail operators are responsible for traffic on the line.<sup>45</sup> The consortium is also responsible for environmental compliance. Øresundsbro Konsortiet reviews the Fixed Link's environmental impact and publishes an environmental report. In the design stage, the consortium was responsible for performing the environmental impact assessment (EIA). In 2020, about 170 people work for the Consortium.<sup>46</sup>

Traffic control and power management, as well as maintenance and railway safety coordination, are under the responsibility of Øresundsbro Konsortiet but performed by external parties.<sup>47</sup>

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.<sup>48</sup>

## POLITICAL COORDINATION

In the early project stages, the Swedish Department of Communications (DOC) and the Danish Ministry of Traffic (MOT) were responsible for background investigations and reports as well as negotiations below the minister level. Representatives and officials from the Swedish Road Administration, the Swedish Rail Administration, the Swedish State Railways and their Danish counterparts were also involved in the investigations and negotiations.<sup>49</sup>

In the design and construction stages, one of the main differences between the two countries' planning regimes concerned the formal procedures for environmental enquiries. In Denmark, the environmental assessment, through the report *Miljö Öresund 1991*, consisting of some 1,500 pages, was made public in March 1991, only a few weeks before the signing of the governmental agreement. In Sweden, the formal procedure required that the project had to be tested against different legal frameworks in several local jurisdictions before approval, which was a long and complicated process. This led to a controversial situation, in which construction on the Danish side began before the Swedish environmental enquiry was fully completed. As the environmental inquiry could influence the shape and design of the Fixed Link, but not the actual building of it, this issue did not become critical.

The planning regimes in Denmark and Sweden are, in many ways, different. In Sweden, the planning system grants extensive power to the municipal level, often referred to as the municipal planning monopoly. However, given the size and profile of the project, many of the relevant planning and decisionmaking processes were carried out at a higher political level.<sup>50</sup>

43 Øresundsbro Konsortiet, multiple sources.

44 Øresundsbro Konsortiet (2018), *Annual report 2018*.

45 Øresundsbro Konsortiet (2008), *Facts worth knowing about the Øresund bridge*.

46 Øresundsbro Konsortiet (2020, February 25), personal interview.

47 Øresundsbro Konsortiet (2018), *Railway operations - Network Statement 2020*.

48 OMEGA centre Sweden, UCL London (n.d.) *The Øresund link - project profile*.

49 OMEGA centre Sweden, UCL London (n.d.) *The Øresund link - project profile*.

50 OMEGA centre Sweden, UCL London (n.d.) *The Øresund link - project profile*.

## HARMONISATION RULES, PROCEDURES AND TECHNICAL STANDARDS

Øresundsbro Konsortiet established a specific safety procedure. The procedure is supported by statistical analysis (operational risk analysis) and is regularly updated based on experience gained from the Fixed Link's ongoing operation.<sup>51</sup>

Rail operations are regulated by the Network Statement, in agreement with Banedanmark and Trafikverket, which are both members of the Rail Net Europe (RNE), a collaboration among 40 different European infrastructure managers with the aim of facilitating cross-border rail traffic. RNE works to ensure that infrastructure managers' network statements follow a common document structure.<sup>52</sup> Technical standards for the railway on the Fixed Link are defined in the Network Statement. Other technical requirements, such as alignments, environmental constraints and main civil engineering principles, are defined in the 1991 governmental agreement.<sup>53</sup>

In collaboration with the relevant authorities in Denmark and Sweden, Øresundsbro Konsortiet maintains a comprehensive contingency plan, including an internal crisis response to handle accidents on the Fixed Link. The plan is tested regularly through exercises that meet requirements of the authorities and the EU.<sup>54</sup>

## COMMUNICATION AND DISSEMINATION

Øresundsbro Konsortiet includes a Marketing and Sales team, whose role it is to promote the Fixed Link and the region.<sup>55</sup> The Øresundsbro website contains information about Øresundsbro Konsortiet and the Fixed Link itself. The library gathers all documents published by the consortium, such as financial reports. But the website also provides operational information, such as real time traffic information for road transit in the bridge, weather conditions, fare policies and customer services (road traffic). Frequent travellers can subscribe to discount programs (such as bropass or bropass business) and access their user account.

## Conclusions

- **Governance structure:** One of the major success stories of the Øresund Fixed Link lies in its independence from the political system. Politicians initially defined the project's framework and strategy, but later, Øresundsbro Konsortiet was relatively self-reliant. The two owners appoint the members of the board of directors but are not involved in day-to-day operations. Moreover, the Fixed Link is partially independent from the government budgets and thus does not answer to a national budget objective.
- **Financial risks:** Øresundsbro Konsortiet revenues are directly dependent on user traffic and can be strongly impacted by external factors such as the closure of borders or competition from other modes. In the meantime, existing transport modes between Denmark and Sweden (such as the Helsingborg–Elsinore ferry) are protected by the governmental agreement signed in 1991. This included the prevention of unnecessary distortion of the region's traffic balance resulting from the new infrastructure. Hence, road fees are capped and calculated based on the ferry taxes.
- **Procurement:** The construction of the Fixed Link went smoothly and efficiently thanks to clearly defined responsibilities among the owner and building companies. There has not been any overrun from the budget initially allocated for the construction of the Fixed Link until its completion.
- **Cross-border collaboration:** The project could have led to national competition between Sweden and Denmark, but it did not. Instead, the two countries decided to collaborate and work together on the Øresund Region, for which the Fixed Link acts as a catalyst.
- **COVID-19 management:** Borders were temporarily closed in March 2020 on the Danish side, with the management of the COVID-19 crisis very different from one country to the other. This affected the border control measures. The crisis has resulted in a significant drop in traffic and therefore revenue, however Øresund Konsortiet is still operating at a profit.

<sup>51</sup> Øresundsbro Konsortiet (2018), *Annual report 2018*.

<sup>52</sup> Øresundsbro Konsortiet (2018), *Railway operations-Network Statement 2020*; Øresundsbro Konsortiet (2019), *Railway operations-Network Statement 2021*.

<sup>53</sup> Vincentsen, L. and K. Smedegaard Andersen (2018), *Risk Allocation in Mega-Projects in Denmark*, Working Group Paper, OECD Publishing, Paris.

<sup>54</sup> Øresundsbro Konsortiet (2018), *Annual report 2018*.

<sup>55</sup> Øresundsbro Konsortiet (2020, February 25), personal interview.

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