

Managing a Portfolio of Infrastructure Projects With Several Delivery Choices in the Public and Private Sectors - the Case of Greece and the New International Airport

by

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Abstract

MANAGING A PORTFOLIO OF INFRASTRUCTURE PROJECTS WITH SEVERAL DELIVERY CHOICES IN THE PUBLIC AND PRIVATE SECTORS - THE CASE OF GREECE AND THE NEW INTERNATIONAL AIRPORT

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100 years ago the use of private infrastructure development was widespread around the world. However, after World War II, it became common practice, for most civil infrastructure projects in the Western World to be developed by the public sector. Today, there is a trend back to private sector involvement in all aspects of project delivery. These include the planning, financing, construction, operation and maintenance of projects.

Four delivery systems are discussed in this Thesis. These are Design Bid Build (DBB), Design Build (DB), Design Build Operate (DBO), and Build Operate Transfer (BOT). These four systems are used to represent the various combinations of responsibilities surrounding the delivery of a project.

Greece is a country which has a great need for infrastructure. Unfortunately public funds are scarce. The traditional approach to this problem would be to deliver as many projects as possible using the funding which is available, while simply delaying other projects until funds are made available. This however is no longer the case. Like many other countries Greece has realized that there is a positive correlation between infrastructure and the national economy. Also, there is great pressure from the EU for the development of a strong infrastructure system. Because of these reasons, Greece has tapped into the private market for the delivery of the projects for which it does not have the necessary resources. A discussion of Greece's infrastructure program is examined along with the benefits which the country is beginning to realize from alternate delivery systems.

One of the projects in the massive Greek Infrastructure Portfolio is the new International Airport. The Airport can be considered as one project or as several. The role of the government in its delivery was twofold. First it had to decide how to package the Airport Projects, and second, it had to decide how to deliver each package. Three packages were created. One included everything directly related with the operations of the Airport, another dealt with the new highway, and the third involved the development of the surrounding land. An attempt to evaluate the boundaries of each project is included. Also, the choice of delivery method is discussed. The Airport is considered as BOT by the press (even though, as defined in this thesis, it lies between BOT and DBO), the highway is BOT, and the development of the land is yet to be assigned a description.

Furthermore, the delivery of the Airport project is examined. The Airport itself is further separated into twenty seven projects which the government has lumped together and passed on to a concession company: Athens International Airport S.A. It is responsible for a large portfolio of projects to be delivered with limited resources. This company must decide: (1) what packages to split the Airport into and (2) how to deliver these packages. A method on deciding how to manage and deliver the portfolio is presented taking advantage of the benefits of alternate delivery systems.

Some of the conclusions which are reached in the paper:

- It is important to look at all the delivery methods and not to lock oneself into one method. They all have benefits which can only be realized if they are matched with a compatible project.
- The owner should have a clear understanding of what is required so that the project can be delivered properly. The planning is the most important part of the project.
- The benefits of alternate delivery system can be realized by owners in either the public or the private sectors.
- Lumping financial “winners” and “losers” facilitates delivery.

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CHAPTER 1: Introduction

Private infrastructure development is not a new concept. In fact, 100 years ago most major projects were being developed using very little support from the public sector. However, in the mid-1900's most infrastructure in the United States and in many other countries around the world became the responsibility of the government. It became common practice for governments to plan, finance, operate and manage infrastructure projects. Today there appears to be a shift away from the plenary public control of infrastructure project development. The public sector is tapping into the private markets for financing and/or development of infrastructure projects such as highways, powerstations, airports, and bridges to name just a few.

In this thesis it will be investigated how all the delivery options which exist today can be utilized to deliver projects where the owner is either in the public sector or the private sector. The point which is stressed mostly is that all of the delivery options should be examined, since each project (including its significant parts) is unique. Each delivery method has attributes which are aligned differently with particular projects.

This thesis uses Greece as an example of the public sector. Greece is a country which has had a commitment to government provided infrastructure. Recently, however, this country too has changed its attitude and is looking at other options for delivering its needed infrastructure. Greece has a relatively weak economy and also lacks a lot of needed infrastructure. The benefit of using alternate delivery systems as a means of

providing needed infrastructure in a country which cannot afford to deliver it via traditional means will be demonstrated.

The New Athens Airport

Brief History

Plans for a new airport to serve the Greek capital, Athens, first came about in 1975 under the administration of Prime Minister Constantine Karamanlis' plan for "long term regional economic development".¹ In 1976, the government performed a feasibility study to decide on a location for the new airport. The area of Zagani in Spata was selected from a list of 18 potential locations, as the most appropriate location. The Master Plan was presented to the government, and the year 2000 was set as a time limit for a new airport.

In 1978 the Greek Government established a state owned company called "Athens Airport S.A." Its purpose was to plan, construct, develop, and operate the new airport. The company was set up, to function along "private sector economic criteria, for the public sector's interest". That same year, all the necessary land was expropriated from the public and the earthwork commenced.

In 1982 there was a revision to the Master Plan,² and in 1987 all work was halted and the project was terminated. At that point about one third of the earthwork had been completed. The delays and final termination of the project were caused mostly by financial constraints. The country was going through an economic crisis, and thus there was no public money left to be allocated to the project.

¹ Athens International Airport, "Historical Background Timeline", 1996.

² Athens International Airport, "Historical Background Timeline", 1996.

In 1991 there was a new administration in office with a new agenda. It decided to recommence the Airport Project. An environmental impact study was performed by a group of foreign and Greek consulting engineers. This study examined the environmental consequences to the broader area of the airport.³

That same year, as the world trend for private/public partnerships in infrastructure was become more and more popular, the government decided that this project should be constructed and developed using the system of concession. Nine companies expressed interest in the RFQ. Four companies were invited in the RFP. The RFP invited the bidding groups to submit bids for the design, construction, financing, operation and maintenance of the new International Airport. The winning bidder would become a 65% equity owner (in partnership with the Greek government) of a new company called Athens International Airport. This company would be operated by the winning bidder. Athens International Airport would have the right to own and operate the airport for 50 years, after which the ownership would return to the Greek State. The selection criteria used included the quality of the proposal in meeting certain threshold criteria and the amount of cash which the bidder was willing to contribute for the 65% equity share. Also, the airport company was given the right to develop an area around the Airport.⁴ The four bidders were British Aerospace plc, the German group Hochtief AG, Lockheed Air Terminal, Inc., and the French Société Auxilaire d'Entreprises S.A. (SAE). The following year (1992) two consortia were short listed. These were Hochtief and SAE.

³ Athens International Airport, "Historical Background Timeline", 1996.

⁴ Request for Proposals: "The New International Airport at Spata" 23 December 1991. Article 1.1.

The consortium which was led by Hochtief was selected as the winner in July of 1993. However, a few hours before the signing of the agreement in September of 1993, the conservative ruling government fell and negotiations stopped. The results of the political elections brought a socialist government to power. The country was again ruled by Papandreou and his political party PASOK. The same party which ruled the country during the 1980's.

The airport however was also included in the agenda of the PASOK government. The government issued a new RFP. This new RFP changed several provisions of the original tender documents including the equity share of the Greek State in the project from 35 to 55%, the change in the term of the concession from 50 to 30 years, and the elimination of the right to develop a "buffer zone" surrounding the airport from the contract. The selection criteria remained the same - highest equity contribution. The two short listed consortia were only invited to resubmit bids. Several months later the French consortium filed a complaint with the European Union concerning the bidding procedure.

In October of 1994 the selecting committee chose the consortium led by Hochtief to be the partner of Greece in the construction, development and operation of the new International Airport. The final choice was made based on the highest contribution of equity which was approximately 8% of the total project cost.⁵ In July of 1995 the "Airport Development Agreement" was signed between the Greek State and the consortium. The companies which had formed the consortium were: Hochtief A.G., ABB

⁵ Infrastructure Finance, "Athens International Airport" September 9, 1996.

Calor, Emag Shaltanlagen AG, Krantz-TKT GmbH and Flughafen Athen-Spata Projectgesellschaft mbH.

In May of 1996 the European Union released the funding package after it ruled that the award was not made according to anti-competitive means. Following the release of funds, the agreement was ratified by parliament in June. Also, in June the new airport company was formed - Athens International Airport S.A. The next day, the construction contract was signed.⁶

September 5th 1996 was the day that work recommenced in the new Airport project.

The Project

The new International Airport has been named “Eleftherios Venizelos” after one of the most important political leaders of modern Greek history. This new airport will replace the existing outdated and over congested current international airport. The airport is currently the biggest infrastructure project in Greece.

The technical characteristics are summarized in Figure 1.1. The location which was chosen for the airport is a region 18 km from Athens. It is an area which is surrounded by hills, and is quite underdeveloped. Figure 1.2 is a plan view of the entire airport as it will be in its initial stage of operation.

⁶ Athens International Airport, “Historical Background Timeline”, 1996.

Total Cost:	DM 4.11 billion
Construction Period:	56 months
Total Passengers:	16 million/yr. initially expandable to 50 million/yr.
Number of Runways:	2 parallel for simultaneous take-offs/landings
Aircraft Movements:	Up to 600 take-offs/landings per day
Aircraft Stands:	89
Main Terminal:	4 levels, 14 jetways
Satellite:	10 jetways
Cargo facilities:	220,000 tons/year
Access:	Six lane access road from south. Available space for potential future rail link to city

Fig. 1.1. Technical Characteristics

A six lane highway is being built simultaneously using a separate concession. It is a 72km toll road, estimated at \$1.85 billion. Both the Airport and highway are expected to be complete by the year 2000.⁷ Because of the new Airport and Highway it is certain that there will be major commercial opportunities in the surrounding area. The government has not included the development of the area in either of the concessions. (As already mentioned the commercial development of part of the surrounding area was included in the conservative government's proposal, however the socialists removed that clause from the second proposal.)

In this thesis, the Airport, part of the Highway, and the development of the surrounding area will be considered collectively as a portfolio of projects - **“the Airport Project.”** The government chose to “unbundle” **“the Airport Project”** into these parts.

The Airport Company, AIA, is responsible for a portfolio of projects which is called the *Airport*. The bulk of the projects in its portfolio are being constructed by

⁷ Privatization International, “Athens Airport Link Finalized” April 1, 1996.

Hochtief and its partners who have been awarded a construction contract: the Identified Construction Contract (ICC). It includes the foundation work, terminal buildings, runways, lighting, etc. It is a “typical” Design Build contract. However, there are another 30 or so sub-projects which are not included in the ICC and are the responsibility of AIA to deliver. These include: the catering facilities, fuel farm, cargo facilities, hotel, convention center, parking garages, etc. AIA has planned to deliver some of these projects as DBB, while others are to be given out using alternate delivery methods.

The Thesis - what will be examined

The goal of this thesis is to gain a better understand of how the delivery methods, which exist today, can be used by project owners (or sponsors), either by the public or the private sector, as tools for delivering projects efficiently when there are limited financial resources. To achieve this goal, the case study approach will be taken using Greece as an example for the public sector, while for the private sector, the new Athens Airport will be studied.

What will be looked at are three things: (1) the choices the Greek government is making concerning the delivery of its infrastructure projects; (2) the choice which the government made concerning the Airport delivery; and (3) the choices which AIA has to make concerning the delivery of each project which it is in charge of.

The benefits of alternate delivery methods have been seen in many projects and in many countries all around the world. In this analysis it will be demonstrated that the benefits which the public sector is beginning to enjoy by using alternate delivery methods

can also be realized by a profit driven private sector which is placed in the same position as government planners.

This is not a thesis in transportation engineering. Rather, it is an analysis of a topic in Construction Management, or Infrastructure Development Systems. The airport is simply taken as a “megaproject”. Megaprojects have been defined as large projects such as dams, steel mills, highways, tunnels, and airports.⁸ These projects are ones which have a powerful appeal for symbolic as well as practical reasons.

The airport is not a simple business. It consists of many different businesses all different in the service that they provide. Yet, all these services are interrelated. This is why an airport was selected for this thesis. An airport is a “basket” of projects all of which must be delivered. How these are to be delivered will be examined.

From my analysis, I hope one of the biggest understandings which will come out is that one should not only think in a certain direction - there is an entire spectrum of delivery methods, each suited for a project. The Greek government chose to deliver the Airport using a Build Operate Transfer system. The Airport company, must now decide how to deliver each project in its “basket”. By choosing the most suitable delivery method for each project involved, the Airport company’s returns can be maximized.

⁸ Szyliowicz, Joseph S and Goetz, Andrew R. “Getting realistic about megaproject planning” in Policy Sciences. v28n4 Nov. 1995 p. 347-367

Figure 1.2 - Plan of Airport

MATCH LINE

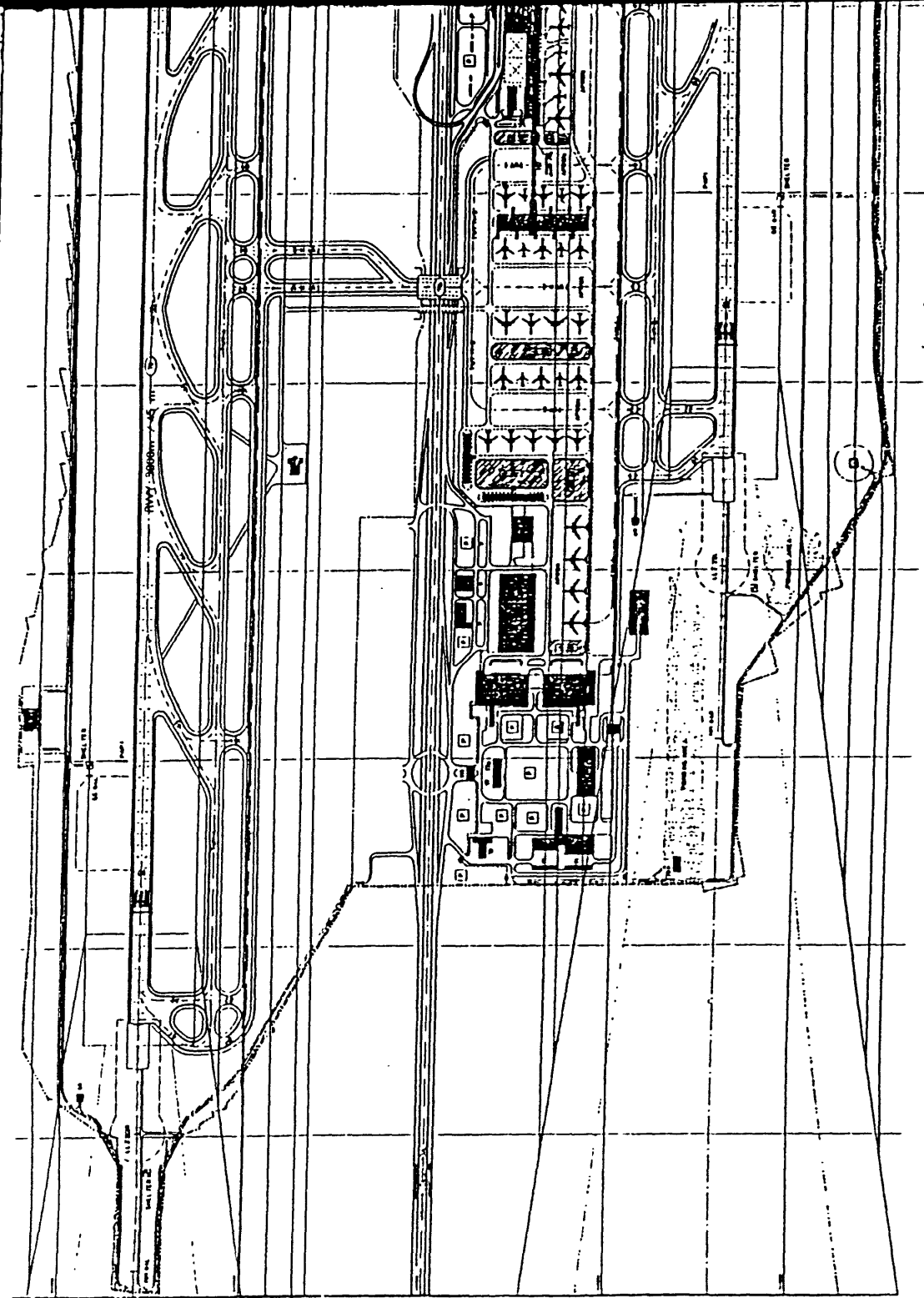
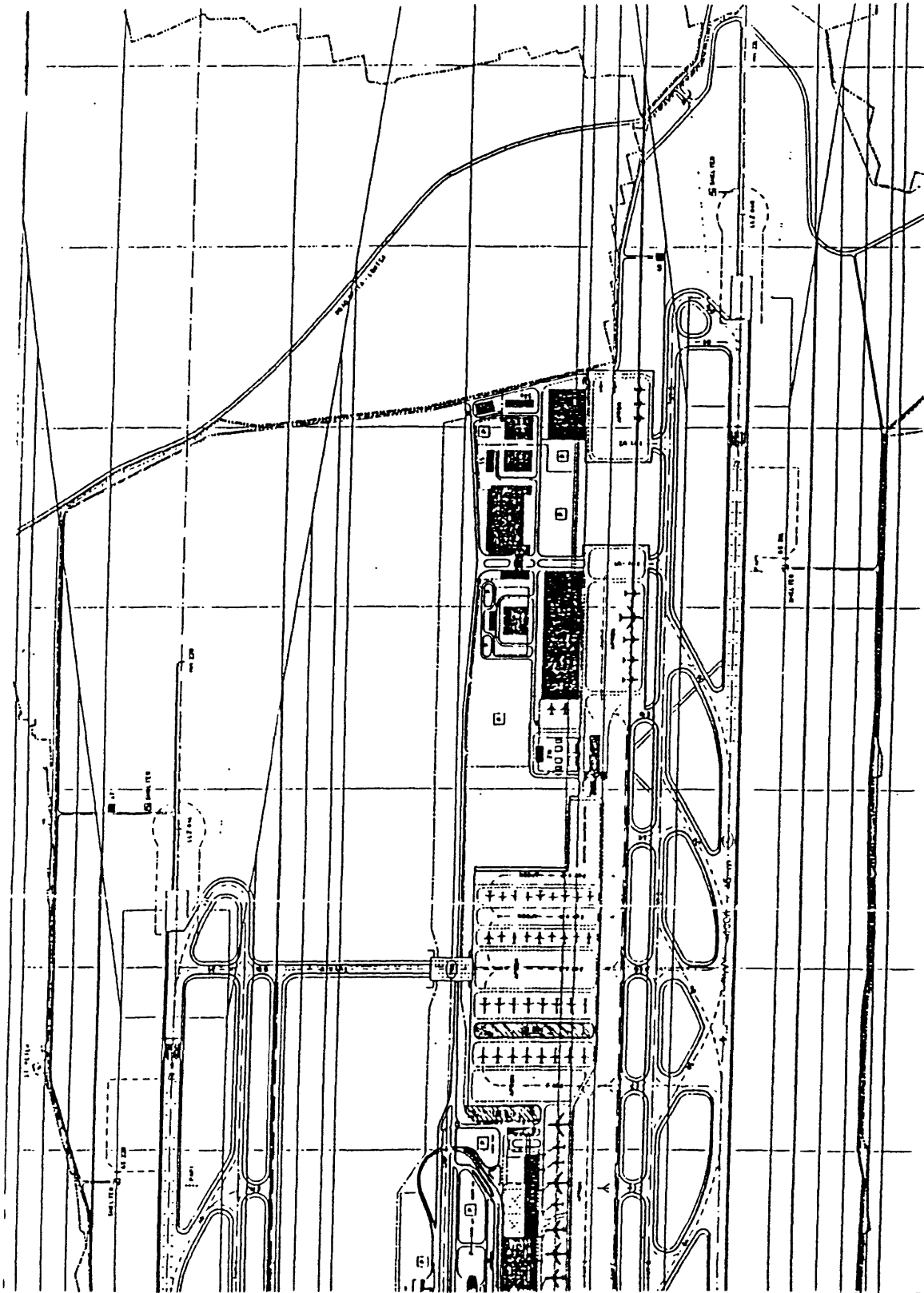


Figure 1.2 - Plan of Airport (continued)



MATCH LINE

CHAPTER 2: Background Information

Before any analysis can be made, certain background information must be presented. That is what this chapter is about. It begins with an introduction to the delivery systems which will be used in this analysis and how they are defined. Then there is a discussion of the European Union's strategy concerning infrastructure, and a description of the European Investment Bank.

Discussion of available delivery options

Delivery method is a term to describe how a constructed facility or "project" is to be "delivered". This includes design, finance, construction, operation and maintenance. "Traditionally," that is after World War II, infrastructure projects were delivered according to the following: (1) The government decides that it needs a new infrastructure project; (2) It then selects a design team to design it, and perform the engineering analysis; (3) Once this is done, it issues an RFP for the construction phase of the project; (4) The contracting team is then selected (usually based on the lowest bid); (5) When the construction phase of the project is complete, the project is handed over to the government and it then must operate the facility. Throughout the delivery the financing had been arranged by the government. This method will be referred to as Design bid build (DBB).

DBB has been the only way for governments to procure infrastructure in many countries since the 1950s. However, as public resources have become scarce and projects have become more complex, governments have been forced to change their priorities, and

several other delivery methods have re-emerged. These include design build, design build operate, turnkey, build operate transfer, and numerous other variations.

The traditional delivery method has not always been the “traditional” method. In fact if one is to look back in history, most projects have been traditionally delivered using a “system” approach (as will be discussed below), which many times included private funding.

Four generic delivery methods will be considered in this analysis. These are Design Bid Build (DBB), Design Build (DB), Design Build Operate (DBO), and Build Operate Transfer (BOT). These four names will be used as generic titles as there exist variations of each method. Miller⁹ has created a matrix based on project delivery and source of financing as a means of distinguishing each of the delivery methods. The matrix, is presented in figure 2.1 along with the location of the delivery method in each quadrant.

⁹ Miller, John B., Engineering Systems Integration for Civil Infrastructure Projects, Journal of Management in Engineering, September/October 1997, Vol. 13, No. 5, pp. 61-69.

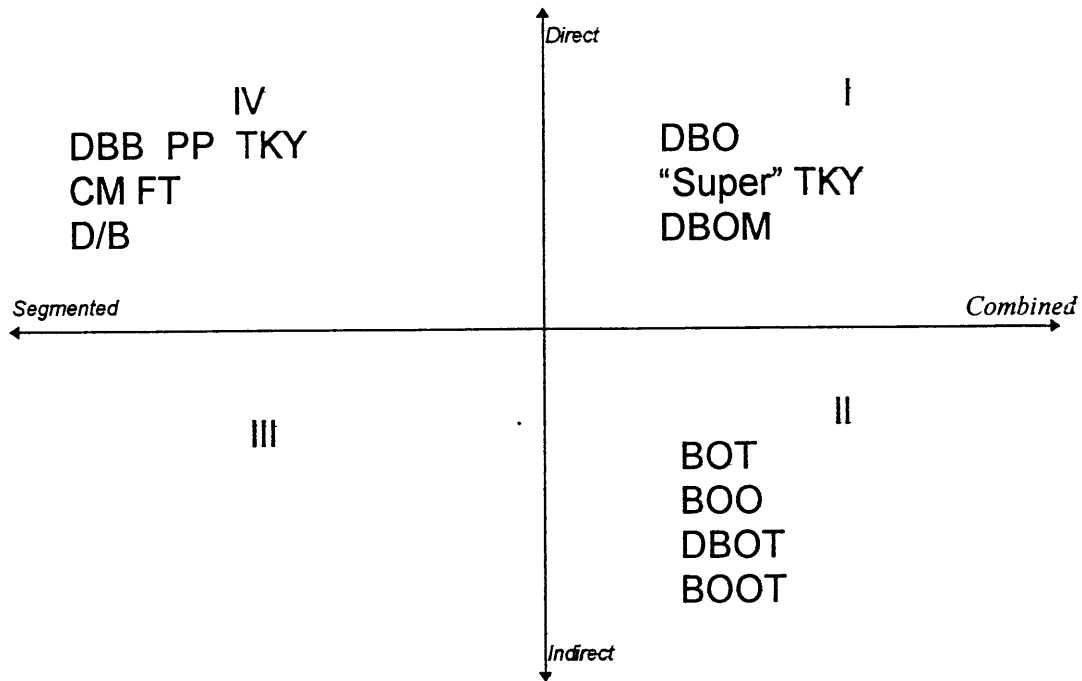


Fig. 2.1. Common Delivery Methods in Operation Framework¹⁰

The matrix is from the point of view of the group issuing the RFP (also referred to as the owner or promoter). It need not be a public sector owner. The vertical axis represents the funding source. Direct means that the promoter is the source of funding or assumes the funding risk for the project, while indirect means that the contracting body takes care of it. The horizontal line represents how the project is delivered. The steps to delivery are the following: planning, design, construction, operations, maintenance, and finance. Segmented means that these steps are contractually separated (taken one at a time in a sequence), while system means that they are combined together into one package.

¹⁰ Miller, John B., *Engineering Systems Integration for Civil Infrastructure Projects*. Journal of Management in Engineering, September/October 1997, Vol. 13, No. 5, pp. 61-69.

A short description of each of the delivery methods which will be looked at in this paper will follow:

Design Bid Build

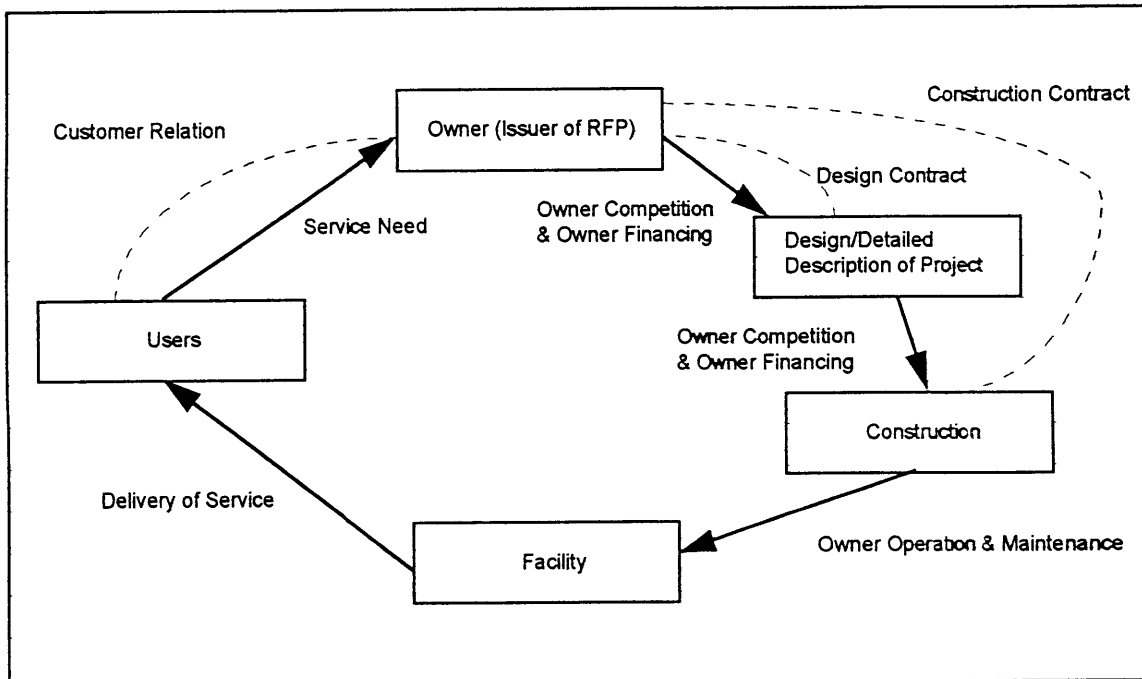


Fig. 2.2. Schematic of DBB

The design bid build system is summarized schematically in Figure 2.2¹¹. What is happening in this process, is that the promoter of the project has identified a need. He then holds a design competition to select a design team. The design team is selected to perform the architectural and engineering duties. Then once the design is completed a construction competition is held. Construction companies are invited to bid on the design, and the lowest qualified bidder is then selected. Once the construction phase is complete, the project is returned to the owner who must handle the operation and maintenance throughout the life of the project. Financing for all this is the responsibility of the owner.

¹¹ Figures are revisions of one found in The Privatization Book by Goldman and Mokuvos

This method works well if the project cannot carry its own weight financially; in other words, if revenues generated by the project are not enough to cover its investment or operating costs, and public funds are available, and dedicated to the facility. Disadvantages would be that the promoter must handle all the financing costs, the process takes time (since the steps cannot be overlapped), and there is no interaction between the design people and the construction people which could lead to cost savings.

Design Build

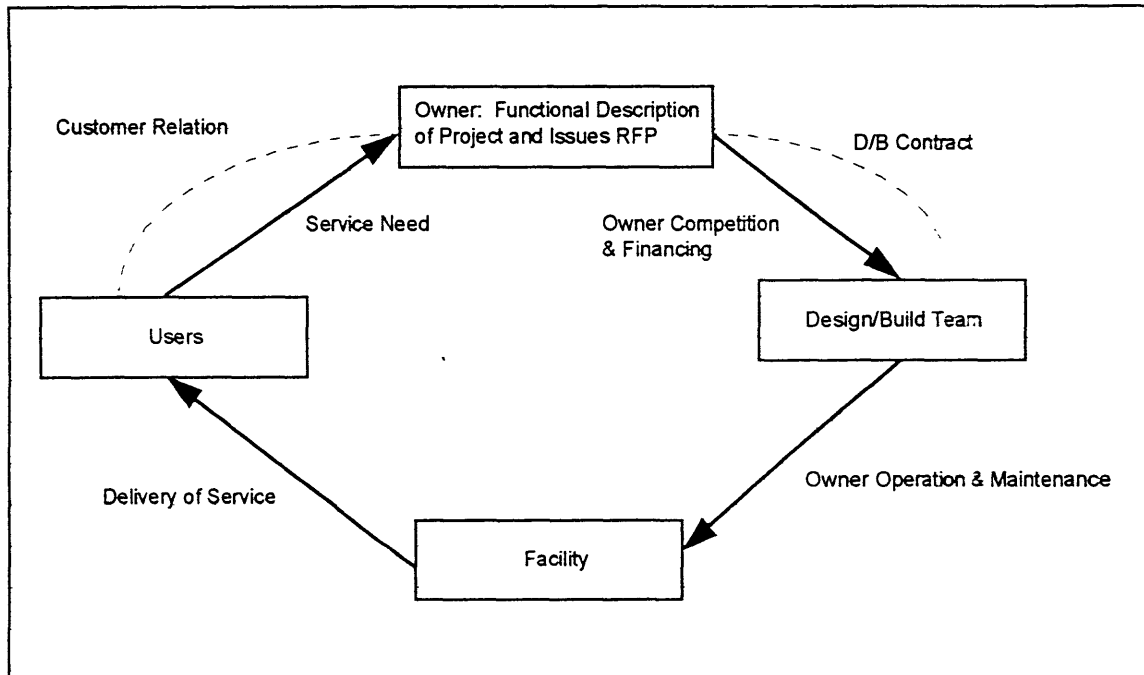


Fig. 2.3. Schematic of DB

The owner hires one team or business entity to perform both the design and construction of the project.¹² See figure 2.3. Operations, maintenance, and finance are

¹² Gordon, Christopher M., Choosing Appropriate Construction Contracting Method, Journal of Construction Engineering and Management, March 1994, Vol. 120, No. 1, pp. 196-210.

still the responsibility of the owner. By doing this, the design and construction phase of the project can be overlapped allowing the project to be completed faster and often at a lower cost. However, the promoter has lost a great deal of control over the design of the project and if factors such as aesthetics are very important, DB should not be considered. Except for the merging of the design and construction phases, DB resembles DBB.

Design Build Operate

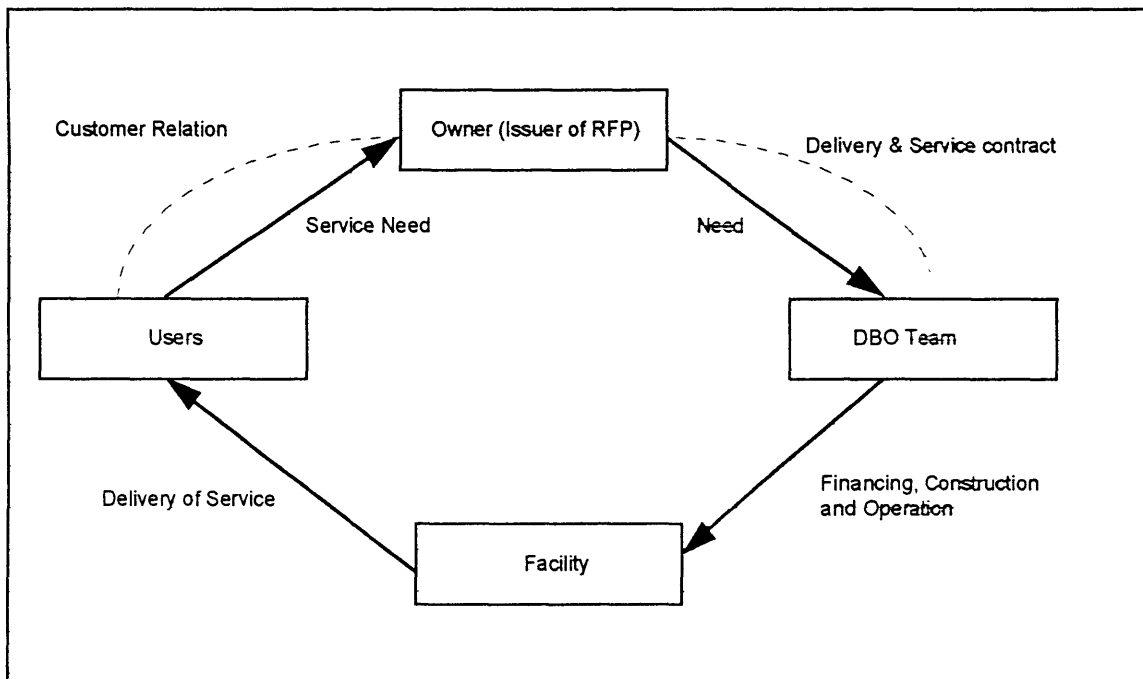


Fig. 2.4. Schematic of DBO

Miller¹³ defines Design Build Operate (DBO) as the “middle ground” between design-build and BOT. It is very similar to BOT (also located in the system side of the matrix). See Figure 2.4. The difference lies in the nature of the cash flows arranged by

¹³Miller, John B. “Infrastructure Development in Hong Kong”, *Aligning Infrastructure Development to Meet Current Public Needs*, MIT Thesis 1995.

the project promoter to the DBO team. These cash flows may take the form of competitively established fees for service, guarantees of usage, or minimum purchases.

In DBO, one entity is responsible for design, construction, maintenance, operation, and at the same time takes advantage of owner arranged cash flows sufficient to finance the facility. This allows for fastracking, and provides a long enough project for the DBO team to arrange (and pay off) both construction and long term project finance, based upon the strength of owner arranged cash flows during the operation of the project. Also, by placing the responsibility of delivery on one entity added efficiency is realized.

This method is usually used in projects which can be handled more efficiently by the private sector and where owner arranged cash-flow streams either encourage private sector competition and/or lower finance associated risk.

Build Operate Transfer

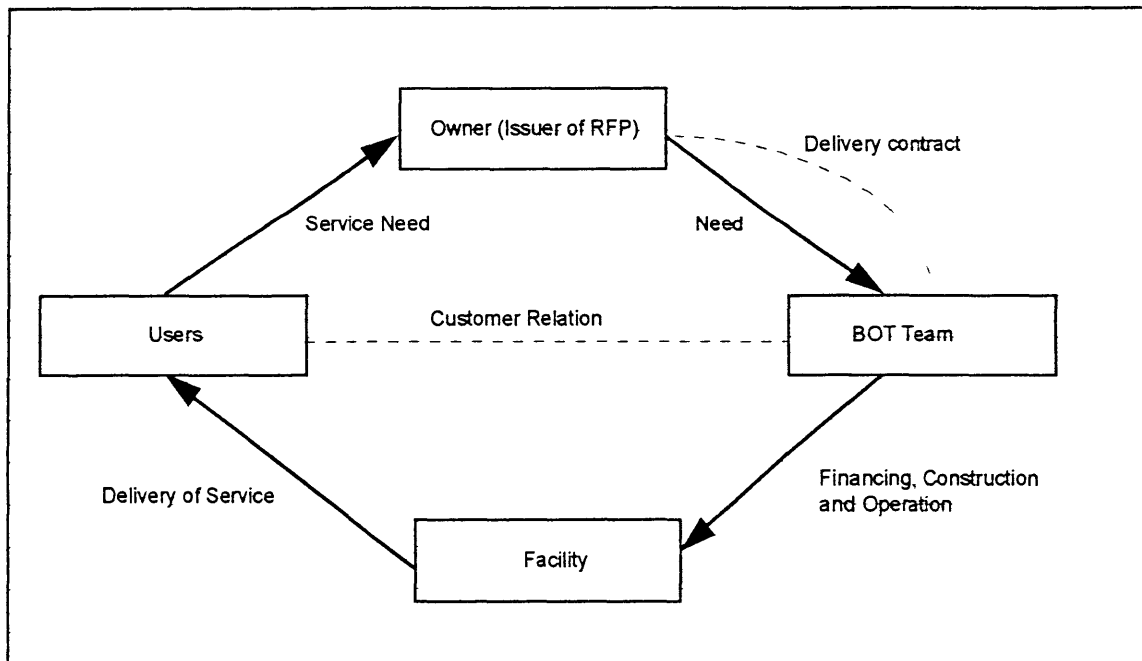


Fig. 2.5. Schematic of BOT

In a pure BOT arrangement, the owner/promoter establishes one team to provide the financing, design, construction, operation and maintenance of the project at the owner's financial risk. After a certain pre-arranged period of time, ownership of the project returns to the promoter. In its purest form the role of the owner/promoter is to identify the need, conduct preliminary studies, and issue the RFP. See figure 2.5. In a BOT arrangement the promoter does not offer guarantees such as minimum quantity purchased. Therefore the entire cash flow risk usually resides with the BOT team and not the promoter.

Good BOT candidates are projects which (1) are feasible in terms of design, construction and operation; (2) generate reliable and stable revenues; (3) offer a good return on investment to private sector participants.¹⁴

DBO and BOT have been incorrectly called "privatization", but the word has little meaning when one recognizes that all the common delivery methods rely on "private" sector funds to provide the components of civil infrastructure projects. Much of the literature simply equates DBO with BOT. However, the two are quite different. They are distinguished in terms of the fundamental nature of the financial risks taken by the DBO and BOT franchisees.

In many countries it has become accepted that DBO and BOT methods not only help finance the project but also bring efficiency to it. In general, selection of delivery

¹⁴ Miller, John B. "Infrastructure Development in Hong Kong", *Aligning Infrastructure Development to Meet Current Public Needs*, MIT Thesis 1995.

methods to the right side of Figure 2.1 (the System side) are believed to be more efficient because:¹⁵

- Competitive forces across a wider range of project elements tend to drive inefficiency out of the market-place
- Managerial and operational decisions can be made without the pressures of politics
- The repercussions of decisions are felt directly by the decision makers in terms of profits and losses

Understanding that there is a whole list of choices for delivery methods is very important for project planners. By matching the most appropriate method to a project, a more efficient outcome results. Also, in some cases if the alternate delivery methods did not exist the project would not have been delivered at all. This is especially true for BOT in dealing with the projects in developing countries. Many of those country do not have the resources to fund major infrastructure projects. Tapping into the private sector allows these projects to be completed. This does not imply that developed countries cannot take advantage of BOT. Indeed just the opposite may be true. By allowing projects to finance themselves, scarce public funds are released to be invested in other uses. However, it is also important to remember that BOT is not the solution for all projects. This is one of the key points of this thesis. Each delivery method is appropriate for certain projects in a given portfolio. By matching the two, a more efficient outcome is realized.

¹⁵ Goldman, Harvey and Mokuvos, Sandra. The Privatization Book. New York: Arthur Young International, 1984: p.15

Usually, the promoter is considered to be the government. This is because the public sector traditionally provides infrastructure to the community. However, as will be seen in this paper, the promoter can also be a private entity, and take advantage of the benefits which exist from project delivery alternatives.

The role of the European Union

“People and goods cannot move freely without the means to do so. The Union must now ensure that it has the transport systems which are up to the task.”¹⁶ The European Commission believes that by taking advantage of the free trade policy which exists in Europe, and combining it with a strong transport system, a greater level of prosperity for the Union will result. At the same time, by building this strong transport system, it is the belief of the European Commission, that people will be able to travel around more easily and freely and so the various cultures and peoples will be able to integrate with one another, making a stronger union.¹⁷

The problem which existed 10 years ago (and is being improved daily) is that instead of having a transportation network, Europe has more of a transportation “patchwork.” “Europe’s transport network features motorways which come to an abrupt end at frontiers, railways with incompatible power and signaling systems, and air services which are managed by 52 air traffic control centres...”¹⁸ The goal of the EU is to create a network which will better link all the member states. The European Commission has

¹⁶ European Commission, The Trans-European Network: Transforming a patchwork into a network. Luxembourg: Office for Official Publications of the European Commission, 1995

¹⁷ The Group of Personal Representatives of the Heads of State or Government, Report: Trans-European networks. Luxembourg: Office for Official Publications of the European Commission, 1995

¹⁸ The Group of Personal Representatives of the Heads of State or Government, Report: Trans-European networks. Luxembourg: Office for Official Publications of the European Commission, 1995

estimated this network to cost approximately ECU 400 billion by 2010. The network will include 70,000 km of rail track, 15,000 km of new roads (added to 58,000 km which are largely built), 267 airports of common interest, and waterways and seaports.

The Commission describes five “dividends” which will raise the quality of life for the peoples of Europe. These are economic, safety, reduced congestion, cleaner environment, and added choices for the traveler.

The Maastricht Treaty (November 1993) established trans-European networks in transport, energy, and telecommunications as objectives for the Union. The responsibility of creating the network remains with the Member states. However, the EU would (i) identify projects of common interest, (ii) back projects by financing feasibility studies and providing loan guarantees or interest rate subsidies, and (iii) take steps to ensure that the networks are “interoperable.” The EU is expected to act as a catalyst for the projects by trying to find ways around financial and regulatory obstacles for the member states.

In Essen (in 1994), the European Council endorsed a proposal which named 14 projects as Union priorities (includes PATHE and Egnatia in Greece). The Greek Airport was listed as a project of importance (but not priority). The projects of priority were chosen based on size, economic viability, attractiveness to private investors, and whether they could be launched within two years.

Because of the level of investments needed and the lack of funds available, the European Union hopes to optimize the use of public funds by combining them with

private. As a general rule, subsidies should not exceed the amount which is strictly needed to achieve a particular objective.

There are four options which the EU can exercise in funding projects. These are: grant financing, equity financing, loan financing, and guarantees.

The European Union has established four sources of funding for projects:

- I. Union Budget: in 1995, ECU 1.8 billion was allocated through 1999 for feasibility studies, loan guarantees, and grants.
- II. Structural Funds:
 - A. European Regional Development Fund: ECU 15 billion for transportation projects through 1999
 - B. Cohesion Fund: ECU 8 billion for Spain, Portugal, Greece and Ireland
- III. European Investment Bank
- IV. European Investment Fund: Began in 1994, the EIF had a capital of ECU 2 billion (1995). It is 30% privately owned. When it first began it provided only loan guarantees. Starting in 1997 it may provide equity financing as well.

The European Investment Bank

The European Investment Bank was founded by the treaty of Rome.¹⁹ Members of the Bank are the Member states of the European Union, and its mission is the financing of projects which promote the idea of European union. Most of its activities are within

¹⁹ European Investment Bank. Promotion of the European Completion: Investments in Greece. 1995

the Union, however there is some participation in countries outside of the EU. In 1996, ECU 23.2 billion were lent making it the largest financial institution in the world. Because of its AAA rankings and its not-for-profit objectives the EIB is able to lend funds under the best terms. Loans are given to both the public and private sector. For industrial projects, terms range from 5 to 12 years, while for infrastructure, they may exceed 20 years.

The EIB evaluates all projects which it is asked to finance. First it evaluates the projects economically and technically. Then it sees whether or not the projects meet other criteria, such as: the economic development of a region, improvement of European infrastructure, the promotion of the competitiveness of the European Industry, and protection of the natural environment.

Loans which are provided by the EIB can cover up to 50% of the cost of the project and so it is expected that the promoter seeks other sources of finance as well. Also, the funds are usually lent in the currency of the nation where the investment opportunity is located, and so the EIB must hold funds in all currencies.

CHAPTER 3: The government's strategy

Greece and Infrastructure Developments

Private project finance is not new to Greece; it was used over 100 years ago for the building of the Corinth Canal. The same was true for the electricity, water supply, and railway systems. However, private financing gave way to solely publicly financed projects until the late 1980's.²⁰ Build Operate Transfer methods have started to creep into the Greek infrastructure industry. Legislative reforms in 1984²¹ allowed other delivery methods such as Design Build and Build Operate Transfer for the delivery of infrastructure.

Currently over 75 major (and many more minor) infrastructure projects are either in the planning or construction stage in Greece²². These include: airports, bridges, subways, railways, ports, highways, tunnels, canals, electric power, water supply, natural gas, mining, telecommunications, hospitals, waste management, and tourism. Such a massive effort to upgrade the infrastructure is the result of an understanding by the politicians of the importance of strong infrastructure to the economy and pressures (along with funding) from the European Union.

²⁰ "Project Finance: A special report prepared by Commercial Bank of Greece." *Euromoney*. Sept. 1996. p. 20-23

²¹ Government Gazette, No. 23, 29 February 1984

²² "Greece Undertakes 75 Major Projects for Infrastructure and Development." *Business America*. May 17, 1993 v114 n 10 p. 17

The infrastructure projects planned are valued at over DRX²³ 8.3 trillion (approx. \$30 billion).²⁴ Expected amounts contributed by each of the available sources is seen in Figure 3.1.

Source	Amount (DRX)	Amount (ECU)	Amount (\$)	Percentage
Greek Public Budget	1,994 billion	6.84 billion	7.39 billion	23.7%
European Union	3,942 billion	13.51 billion	14.6 billion	47.1%
Private Funds	2,445 billion	8.38 billion	9.06 billion	29.2%
<i>Total</i>	<i>8,381 billion</i>	<i>29.73 billion</i>	<i>31.04 billion</i>	<i>100%</i>

Figure 3.1. Contributions to Infrastructure by Source.²⁵

The lack of funds from the Greek Budget is evident. The importance of EU funds for these projects is unquestionable. However, there is still a big gap between the project costs and the public (both Greek and EU) money available. This gap is hoped to be filled by the benefits of the alternate delivery methods and the use of private funds.

Major Projects

Egnatia and PATHE Highways

Considered one of the “Essen 14 priority projects” (chosen by the European Union as key for the implementation of the trans European Network (TEN)), PATHE is the north south axis which will link the port city of Patras to Athens to Thessaloniki and finally the border with the Former Yugoslav Republic of Macedonia²⁶. PATHE includes

²³ Exchange rate in 1997 between the Greek Drachmae (DRX) and the US dollar averaged approximately \$1=DRX270, and between Greek Drachmae and the European ECU approximately ECU1=DRX292. These figures were used consistently throughout the thesis.

²⁴ “The Construction Industry Contributes 7% of GDP and 6.3% of Employment.” EXPRESS, April 1997.

²⁵ “The Construction Industry Contributes 7% of GDP and 6.3% of Employment.” EXPRESS, April 1997.

²⁶ European Commission. The Trans-European Network: Transforming a patchwork into a network. Luxembourg: Office for Official Publications of the European Commission, 1995

the Rion-Antirion bridge, the Maliakos bay fixed link, and the Athens External Ring connecting to the new Airport. The bridge and the External Ring (also known as Attiki Odos) have already been tendered as BOT. While there is still talk concerning the Maliakos bay link, it most likely will also be delivered under a BOT scheme. The highway will be mostly upgrades along the existing 860 km distance. Total cost for PATHE is ECU 3880 million.

Egnatia Highway is the east-west axis which will link Igoumenitsa, Thessaloniki, and Alexandroupolis with the Bulgarian and Turkish border. The project involves the construction of 797 km of new motorways. Total cost is estimated at ECU 2500 million.

These two projects are crucial to the transport infrastructure of Greece. The results will be the significant reduction in travel time between important Greek cities, and the considerable improvement in road safety.

Rion-Antirion Bridge

The link is a 2.5 km cablestay bridge across the western mouth of the Gulf of Corinth connecting the Peloponnesse to Central Greece²⁷. The agreement is for a BOT arrangement and was signed in January of 1996. Total costs are estimated at DRX 210 billion. Breakdown from the various sources is as follows: State funds - DRX 92 billion, Equity capital - DRX 14 billion, and Loans (EIB and others) DRX 104 billion. The concession company is a consortium of eight companies led by GTM International and GTP BTP.

²⁷ "Project Finance", Euromoney: The 1996 Guide to Greek Financial Markets Supplement, Sept. 1996. p.21

Thessaloniki Metro

Thessaloniki is the second largest city in Greece, and also the capital of the Macedonia region in the north²⁸. The project is the construction of a subway system underneath the city which would contribute to improvements in the city's traffic conditions. The project will be delivered using a BOT system, without any government equity. Total cost for the project is estimated at DRX 400 billion. The project company is called Makedoniko Metro, with the Greek contractor Michaniki controlling the biggest share followed by Edistra SpA, AEG AG, Fidel SpA, and Tecnocenter Srl. It is estimated that the construction will take five years. The benefits which the city of Thessaloniki is expected to realize are similar to those of Athens (less traffic, less pollution, a better standard of living).

Maliakos Bay Link

The link in Central Greece will be a tunnel under the Maliakos Bay²⁹. The tunnel will be 4.5 km long, and would reduce travel time between Athens and Thessaloniki by an additional 40 minutes. Total cost for the project is 100 billion DRX (preliminary estimates). Most likely it will be given out as BOT. The Consortium will repay the expenses through the collection of toll revenues.

²⁸ "Project Finance", Euromoney: The 1996 Guide to Greek Financial Markets Supplement, Sept. 1996. p.21

²⁹ "Project Finance", Euromoney: The 1996 Guide to Greek Financial Markets Supplement, Sept. 1996. p.21

Natural Gas

The project involves the introduction of a new source of energy to the country, by diversifying away from petroleum as the primary energy source³⁰. The project involves bringing Russian and Algerian natural gas into Greece. The main pipeline is almost completely constructed. Russian gas will be carried by a 510 km pipeline from the Bulgarian border to the Athens area. The Algerian gas will arrive via tankers to a Liquefied Natural Gas (LNG) terminal near Athens. Total cost is ECU 1500 not including the distribution network. The project is DBB, financed mostly from European and Greek sources. The distribution network will have private financing and will be considered DBO.

Summary of Projects

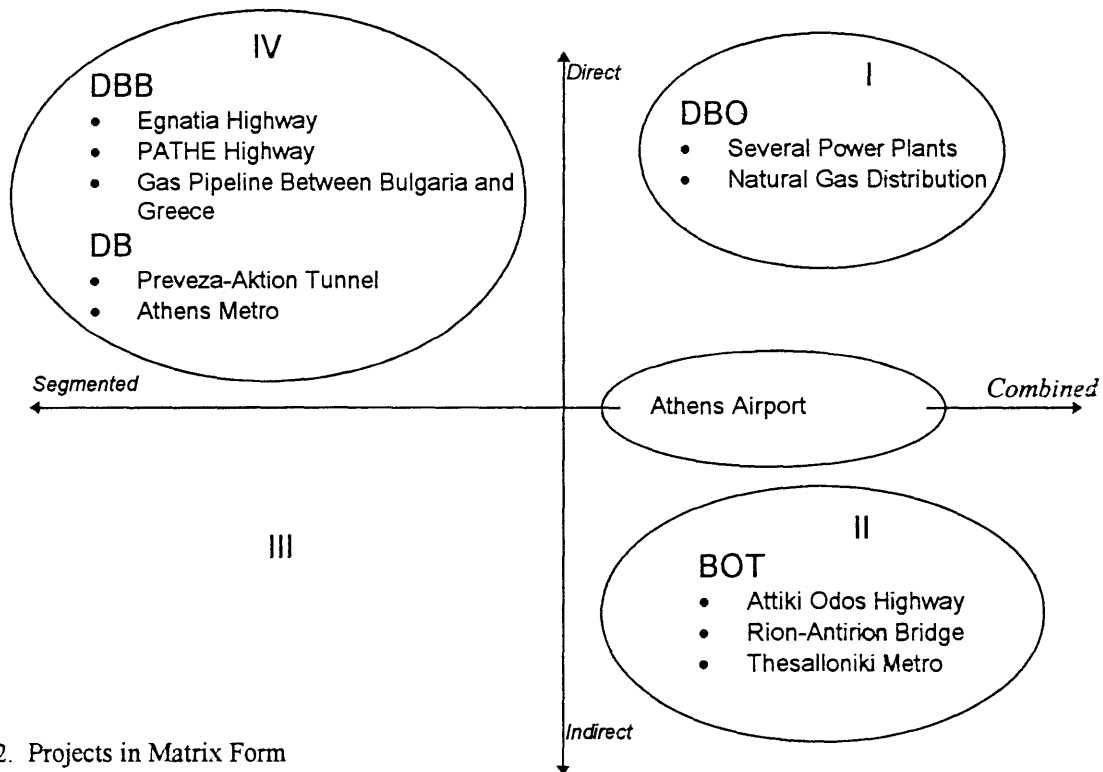


Fig. 3.2. Projects in Matrix Form

³⁰ "Works are Happening Despite the Elections", To Vima, Sept. 15, 996

For such a large “basket” of projects taking advantage of all the types of delivery methods (see figure 3.2) can and has done wonders. The results are as follows:

- Most of the 75 major projects have been planned for completion by the year 2000.
- Because of the volume of work, there are currently 30 construction companies listed in the Athens Stock Exchange (up from just 2 in 1990). This ultimately means that a lot of new jobs have, and are being created.
- The infrastructure developments and improvements will allow Greece to become “the south European junction for air, road and ship transport of people and cargo, both to and from, eastern and western Europe.”³¹

Of course, the various delivery methods above are not enough. Many of the above projects are part of the Trans-European Network (TEN), and so, the Community is making great efforts to help the Greek government in developing these projects. This aid is usually in the form of large sums of financing for projects which cannot be privatized. Also, privatization policies have been implemented due to pressures from the European Union for those projects which can be delivered in the private sector. It is very important for the success of the infrastructure projects that the two major political parties in Greece (both the government and the opposition) support the effort to modernize Greece’s infrastructure, and that they have placed infrastructure development as priorities in their agendas.

³¹ “Greece: a Blue Print for Investment”, ELKE: Hellenic Center for Investment, 1997

One of the biggest benefits of the use of private funds is that projects are no longer put on hold until public funds are raised. Projects which are possible to deliver using private funds (usually profit making projects) can be delivered immediately.

It is interesting to note how the Greek government is becoming more confident in the use of BOT. Comparing similar projects of different planning time periods such as the Preveza-Aktion tunnel with the Maliakos tunnel, and the Athens Metro with the Thessaloniki Metro, a shift from DBB/DB to BOT can be seen.

Decision of the Greek State - The Airport Projects

The Airport Projects are not just one project. They are all the projects which relate to the new airport. The government has chosen to package them as three separate projects:

1. The new airport;
2. The new highway;
3. The development of the surrounding area;

The airport

For the construction and operation of the new Airport, the government, in a partnership with the private sector, has set up a new company called Athens International Airport. This company, operating in the private sector, has primary shareholders the Greek State and a consortium led by the German contractor Hochtief AG. Its mission is to finance, construct, operate and maintain the new Athens International Airport for thirty

years. It is responsible for delivering all the projects³² which relate to the operations of the Airport within a closed area referred to as the “Restricted Development Zone.” The Airport Company is not permitted to perform any operations outside of this area.

Also, all of its operations are expected to be related directly with the business of managing the Airport. Any infrastructure development which is needed outside of the area will be provided to the Airport company by the Greek state. Such infrastructure would include road access, potential rail-link, and utilities. (As agreed upon in the Development Agreement.)

The new Highway

A new peripheral highway has been planned to serve the greater Athens Area since the early 1950’s.³³ The name of the highway is Attiki Odos³⁴, and a lot has changed from the original plan, including the addition of a segment leading into the new Athens International Airport. The total length of the highway is 72km. Approximately 15 km of the highway will be the only direct Airport-Athens link. The majority of the traffic on this portion of the roadway will be airport traffic.

The path of the roadway will surround the city linking the areas of Eleusis, Stavros, and Spata. The Stavros-Spata is the section which will carry the bulk of the Airport traffic. The road will be a six lane highway with room in the median for a potential rail link (to be planned in the future should the Airport require it).

³² See chapter 5 for a list and costs of all the projects.

³³ “The Bulldozers in Attiki Odos”, To Vima, Aug. 6, 1997

³⁴ Attiki is the name of the county in which Athens is located. Odos is the Greek name for road.

Tolls are proposed to be set at DRX500 (US\$2), payable at entry and exit points. It is expected that in its first year of operation it will absorb 6% of the Athens traffic.³⁵ This will result in time savings for drivers and reduction of pollution levels.

Attiki Odos will be delivered using a BOT scheme. For the delivery of this project three companies have been established ((1)Attiki Odos,(2) Joint Venture company of 14 Greek construction companies, and (3) a company owned by the French Transroute). Attiki Odos arranges the financing. Owners of Attiki Odos are the Greek Joint Venture (owning 93%) and Transroute. The Joint Venture of construction companies also has a contractual arrangement with Attiki Odos to build the project, while Transroute's Greek company has an operation and maintenance contract. Total cost is estimated at US \$1850 million. The breakup is \$135 million from the consortium, EU grants totaling \$210 million, a loan from the EIB for \$675 million, other loans (from commercial banks) for \$100 million and the remainder from the State budget.

The Surrounding Area

In the 50's and 60's, downtown Athens saw a great real estate boom.³⁶ The next two decades, the northern and southern suburbs enjoyed an even greater prosperity. Real estate agents predict that for the next few decades it will be the Spata area which will see major real estate development.³⁷

³⁵ "The Bulldozers in Attiki Odos", To Vima, Aug. 6, 1997

³⁶ For sake of argument, the term "project" is used to describe the Surrounding Area. It is not one project; rather it is a lot of private and public land. The term "development of the Surrounding Area" is the one which is described as a "project" onto itself. I chose to use the word "project" so as to make it comparable to the other two.

³⁷ "Stagnant Prices at Spata", To Vima, Oct. 13, 1996

The site where the new airport will be built lacks any “serious” development. Currently, it is mostly farm land with some small villages several kilometers away. Because of the introduction of the new airport and highway, along with the availability of large parcels of land, a lot of commercial activity is expected to spring up. Activities such as convention centers and hotels are certain to emerge, however, other businesses may also choose to move to this new area as is usually the case with airports and highways. Real estate brokers also believe that new residential areas will develop.

In 1992 a study was made to see what should be done with the area. However, neither the Central Government nor the municipalities have taken any actions to ease the development of this land. As of yet there has been no action in zoning the area so as to permit structured (and legal³⁸) development. Because of this there has not been the expected early movement around the real estate market in the area.³⁹

Neither the Airport Company nor Attiki Odos have any presence in the development of the surrounding lands. Nor do they have the right to operate outside of their stated purposes. An “innovative” approach to either of the concessions would have been to tie in the development of the surrounding area. By giving the land for development to the private entities, it would have ensured prompt development (since they would link it to their profitability).

³⁸ In Greece, it takes a long time for the public administrations to place an area within a “Development Zone”, and so many times a lot of businesses and residents build without getting all the necessary permits. A building which has been constructed without all the necessary permits cannot gain access to all the necessary utilities. Also, if an area is outside of a Developed Zone, key infrastructure (including telephone, potable water, sewer and local roadways) is not available.

³⁹ “Stagnant Prices at Spata”, *To Vima*, Oct. 13, 1996

Instead, the government has not touched the properties. It is letting the market develop itself, without having passed any zoning laws for the area. The area remains idle.

Conclusions

As already mentioned, the Greek State chose not to give out one massive concession for all three projects at the Airport. At the same time it did not give many tiny concessions.⁴⁰ Rather, it chose to split it up into three large parcels: anything directly related to the airport within the Restricted Development Zone went to AIA, the Highway became part of Attiki Odos, and the development of the Surrounding Area remains in the control of the public sector which has elected not to take any action yet.

In the Airport Development Agreement⁴¹, the government guarantees to AIA that a four lane highway will be constructed between Stavros and the Airport prior to airport opening, and between Athens and Stavros prior to twelve months after airport opening. Should the Stavros-Airport portion not be in operation, the government will pay the Airport Company the sum of 35,000ECU for each day (to cover lost profit) and also all the expenses of operations and maintenance. If the Athens-Stavros section is not complete 12 months after airport operation, and the Airport Company demonstrates that passenger traffic is not as projected in the agreement, the government will pay 25,000 ECU per day for loss of profit. These sums of money will be paid until the highway opens. Significant construction of the highway has not yet begun even though the Airport

⁴⁰ Examples of “many tiny concessions” would be the government tendering portions of the Highway, rather than the entire Highway, or tendering directly the fuel farm or the Cargo facility rather than the entire Airport.

⁴¹ Article 23.1 Airport Development Agreement

will be completed in 4 years. Many question whether or not the government will have the highway completed in time so as not to pay any liquidated damages.

In order for the government not to have to take up risks of liquidated damages resulting from the highway it could have packaged the airport contract in such a way so as to include the construction of these portions of the highway. Delay risks would thus be transferred to AIA.

One rational explanation as to why this was not done is that traffic studies have shown that the section of the toll highway leading into the Airport would be the most profitable, and so Attiki Odos may not have been as attractive to the private sector. Therefore, in order to get private financing for the entire project, they chose to include in the road package a money making section. The government then retains the risk of liquidated damages, yet it does not have to contribute financially to Attiki Odos. The compromise is potential costs vs. certain capital investments. It is likely that the government will pass the liquidated damages over to Attiki Odos. However, as of yet all the contracts are not completed.

A more nationalistic explanation would be that this project is small enough that a Greek company could play a role as an equity partner in the concession (in fact fourteen Greek companies are members of the consortium). No Greek Construction company has the capabilities to compete against foreign companies in a concession for a project the size of the Airport, however, they are able to compete in the highway project.

A similar explanation may be given for the development of the Spata region. The government is not willing to give out more than is required to the concessionaires. An explanation for this may be that they are not willing to “sell out” the entire Spata region to the “foreigners!” This is a sentiment which has been expressed by several Greek politicians, and their constituents concerning the privatization of key infrastructure. As mentioned earlier the development of part of the land was included in the original RFP. The socialist government however felt that it was giving Hochtief too much. At the same time, a structured development plan has not been made for the area and so this site might not be developed “properly.”

Hopefully the packages which the government chose to bundle were based on careful planning on its part rather than random choices. My view is that the Airport and the Highway were justifiably separated. Unfortunately though, there was poor planning in the Attiki Odos contract and so it has been inflicted by many initial delays. It is hopeful that they will be overcome promptly and the project will be placed back on track so as to avoid the hefty liquidated damages. However, since the government has not taken any action which would ensure “proper” development of the area, the land development should have either been passed on to the Airport company or the road company (as they both have financial interests in its development).

It is very often the case in Greece that zoning rules come in effect after a lot of construction has already taken place in an area. Because of this, there is no planning of the area in terms of roadways and utilities, and at the same time many businesses cannot function legally since licenses for operation cannot be given to their facilities.

CHAPTER 4: The Airport Company

Airport Ownership Models - World Wide

The worldwide model for ownership of large airports until the late 1980's had been public ownership. However, by that time, the airports had "grown to a point where they were large generators of revenues and profit, and also required significant investments for capital improvements."⁴² Moves were made in many countries to "privatize"⁴³ their nation's airports. The United Kingdom took the lead in this privatization effort by passing the Airports Act in 1986 which required that all medium and large size airports become private companies. BAA plc which was formerly known as the British Airports Authority became the first airport company to be quoted on the British stock exchange.

The form of public ownership varies from country to country. The following is a brief list of the type of ownership structures which exist internationally for the ownership of airports.

1. Ownership by a governmental agency or department. Airports are centrally owned and operated. Examples of this type of ownership would include most developing countries, as well as Canada, Sweden, Spain, Japan, Belgium, as well as the existing airports in Greece.

⁴² Ashford, Norman and Wright, Paul H. Airport Engineering, 3rd ed. New York: John Wiley & Sons, Inc., 1992: p. 9

⁴³ "Privatize" is used as a general term which includes both the denationalization of an existing facility or the use of a BOT type of project for the delivery of a new facility.

2. **Quasi-governmental organizations** which are set up by the government for the purpose of airport ownership and operations.

3. **Authorities for individual airports or for a group of airports** authorized by the government. The list of countries practicing this type of ownership structure includes: France, Italy, Germany, the Netherlands, and the United States.

4. **Private organizations.** Ownership and operation of a nation's airport is in the hands of the private sector. The level of risk which the private operator must face may range from full acceptance to a sharing with the public sector. In the United Kingdom all the Airports are owned by the private sector.

The Athens Case

Athens International Airport (AIA), is a corporation which was formed in order to design, finance, construct, maintain and operate the new Airport for a period of 30 years. The scope of work includes all projects which are located within airport grounds, except those which relate to air navigation and traffic control which will be delivered by the government through the CAA.⁴⁴

The Airport Company has been formed by an agreement between the Greek Government and a Consortium of German firms. The Airport Development Agreement (ADA) defines the roles and responsibilities of all parties concerned for the next 30 years.

⁴⁴ The CAA is the Greek Civil Aviation Authority which is similar to the American FAA

One of the clauses in the Agreement requires the Government to shut down the existing Airport as soon as the new one is operational.

AIA is operating according to regulations which affect private companies - these regulation concern staffing, management structure and profit motivations. It is a partnership of equity ownership between the Greek State and the private sector. The distribution of the share capital is seen in Figure 4.1. The amount of equity funds which are invested by the private sector total 40 billion DRX with an additional 13 billion DRX in subordinate debt. The total 53 billion DRX investment (\$190 million) is approximately 8% of the total project cost of 658 billion DRX.⁴⁵

Greek State	55%
Hochtief AG	36.125%
ABB Calor Emag Schaltanlagen AG	5%
Krantz T.K.T. GmbH	3.75%
Flughafen Athen Spata Projektgesellschaft mbH	0.125%

Fig. 4.1. Equity Distribution

The government's role is to issue the license to operate the airport, provide the land and part of the funding, guarantee the EIB loans and the EU grants, provide the road access, and also provide the CAA services. In terms of regulation, the government would regulate the airside charges and guarantee an open skies policy.

The company is governed by a Board of Directors which consists of nine members. Four are nominated by the Greek State and four by the other shareholders. The ninth director is selected by agreement between the Greek State and the private shareholders. The Chief Executive is proposed by Hochtief AG as the holder of the majority of the consortium shares.

⁴⁵ Athens International Airport, Athens Airport "Eleftherios Venizelos" Facts and Figures, 1996.

The Private Shareholders

Hochtief AG

HOCHTIEF is one of Europe's largest construction groups. The group's activities focus on design and planning, construction, project management, general and turnkey contracting. The group has extended its range of experiences internationally in the fields of property development, finance agreements and facility management for building civil engineering contracts.⁴⁶

ABB CALOR EMAG SCHALTANLAGEN AG

ABB Calor Emag Schaltanlagen AG, Ratinger, a wholly owned subsidiary of ASEA BROWN BOVERI AG, Mannheim, develops, manufactures, markets and services turnkey substations and associated products. At its Sales and Engineering Center in Mannheim it is also active as a general contractor for complete electrical and mechanical systems in facilities such as airports, sport complexes, large buildings and industrial plants.⁴⁷

KRANTZ-TKT GmbH

(DAG Group Balcke-Dürr AG)

KRANTZ-TKT with its main offices in Germany, is among the leading contractors for mechanical services in Europe. The company's business activities traditionally focus on the design, engineering and installation of mechanical services. Other key factors of

⁴⁶ Athens International Airport. The Private Shareholders. 1996.

⁴⁷ Athens International Airport. The Private Shareholders. 1996.

importance in the company's range of services are clean room technology, environmental services and facility management.⁴⁸

FLUGHAFEN ATHEN SPATA PROJEKTGESELLSCHAFT mbH

This company's founding member is the Frankfurt Airport Company, that is going to be a consultant to the new international airport.⁴⁹

Flughafen Frankfurt/Main AG (FAG), the Frankfurt Airport Authority, is the owner and operator of Frankfurt Airport. The shareholders of the company are the Federal Republic of Germany, the State of Hesse and the City of Frankfurt. Although all shares are publicly held, FAG is run like a private enterprise.

For the new Athens International Airport, Airconsult, the consulting group of Frankfurt Airport, was responsible for the overall planning and design of the airport and its facilities. Thus many concepts at the new Athens Airport resemble the Frankfurt Airport. Airconsult will also give inputs in the structure of the new airport company and will provide personnel for a transition period until shortly after the commissioning of the airport.

A Public/Private Partnership

Public/private Partnership is a very general term. Usually it is a partnership between private companies and some level of public government in order to provide a service. The word partnership does not have its ordinary meaning here. The "partners" are not jointly liable for the actions of the group nor for its individual members. Instead

⁴⁸ Athens International Airport. The Private Shareholders. 1996.

⁴⁹ Athens International Airport. The Private Shareholders. 1996.

the term partnership implies a certain level of cooperation between the two parties. There are no set rules as to how such a “partnership” should be structured.

The Athens Airport has been called a public/private partnership. In fact, this is spelled out in the Request for Proposals (RFP)⁵⁰, where the successful consortium is referred to as the “Government’s Partner.” How these partnerships are structured depends on the individual project. Usually franchise agreements fit in quadrant I or II⁵¹ of Miller’s Quadrants. The Airport Project has been characterized as BOT in the press, although much of the funding for the project is direct, and the project more likely straddles the line between Quadrant I and II.

The consortium currently owns 45% of the company while the government retained 55%. In ownership therefore they are 45%-55% partners. Responsibility is more difficult to quantify, and so a direct comparison cannot be made. However, if responsibilities are understood, it is possible to evaluate how “fair” the distribution of equity is.

The government’s goal is to provide a necessary service (the Airport) to the country. It concluded that the best way to provide this service is through a BOT type of arrangement.⁵² Structuring the BOT agreement properly is very important. Results in history have ranged from cases where the contractors made money and the projects were failures to cases where the projects were a success yet the developers went broke.

⁵⁰ Request For Proposals, Article 2

⁵¹ See Chapter 2

⁵² In the next chapter it will be shown how planners can chose from a portfolio of projects how to deliver each project.

What the government has given to the Airport Company is no small token. They are transferring the exclusive privilege to operate an international Airport. This Airport will serve Athens (a city of five million people) and its surrounding area. Also, Greece geographically is located between the Middle East and Europe. The level of service at the new Airport is expected to be greatly improved over the existing one so that more transit passengers will also choose to fly through Athens.

The Consortium would argue that they are making the Airport possible since they are providing investments, arranging debt financing, and bringing in their expertise. Ultimately, both sides are important to the Project.

The government decided on the selection criteria, and the terms of the agreement. It requested proposals from the bidders for a plan of how they envisioned the Airport. The selection was based on meeting the threshold technical requirements in their proposals, the plan in general, and the level of cash investment provided. The technical requirements were listed in the Request for Proposals. These included levels of service, compliance with international and national codes and standards, passenger and cargo capacity, runway capacity, and a lot of other technical requirements.

The government believed that indication of commitment is the best criteria for evaluation of the proposal. Because of this, the final decision of award, was based on what it saw as the measure of commitment, which is, the magnitude of the cash bid. Also,

the government did not accept unsolicited alterations to the technical requirements as criteria for evaluation of the bids.⁵³

The government's goal of the RFP and the selection process was to get the best outcome possible. The selection criteria appeared to be fair and clear. It is based on the belief that the Technical Requirements which the government has specified are the ones it wants the proposals to be judged on. Also, award to the highest bidder appears to be a fair judgment criteria, although it is questionable whether the 8% investment which the winning consortium offered is enough of an indicator of commitment. Especially when the consortium gets back its investment through the construction contract which its partners hold and so does not rely on long term payback.

It is good that the government set firm standards and did not accept unsolicited proposals. Unsolicited proposals are difficult if not impossible to compare and they do not give the transparency which is required in public contracts. By not setting minimum bid levels or some sort of tie with future cash flows, the government may not have received the levels of guarantees or commitments which it was seeking.

The Airport is described as a project of highest priority to the Greek government. This however does not mean that the government should have been foolish, and either given too much to the developers or have been rushed into a poorly structured deal. A "proper" deal would be one which gives the proper amount of guarantees, incentives, and returns so as to satisfy the promoter and the developer.

⁵³ Request For Proposals - Article 2.1.2 Selection Criteria

To demonstrate commitment to the project, the government guaranteed the following:⁵⁴

- The State will pursue a policy which maximizes the level of air service to and from Greece (Open Skies policy).
- A competing airport will not be built in Greece provided that the annual passenger traffic at the new airport does not exceed the 50 million (fully developed) design capacity.
- Road Access will be available prior to airport opening, as well as other infrastructure such as utilities capable of handling the airport needs.
- The airport company will have freedom to set its own rates (within certain limits regulated as not to restrict access to Greece).
- The Airport Company will enjoy special tax treatment.
- The existing airport will be closed as soon as the new airport is operational. The government will not hold the Airport Company liable for any costs of closing the existing airport.
- The government will not impose on the Airport Company any restrictions regarding the remittance of profits nor regarding the Airport Company's denomination of accounts in currencies other than the Greek Drachmae.

⁵⁴ Request For Proposals - article 5.1.1 Government Responsibilities

- The Greek State will do its best in securing loans for the airport. This would include guarantees of these loans equal to the lower of 40% of development costs for the project or 3 times the cash bid.
- The Greek State will not contribute funds from its own budget, rather all state grants will come from the Airport Development Fund (ADF). All departing passengers from Greek Airports pay a departure tax which has been in place since 1992. This tax is placed into the Airport Development Fund.

On the other hand, the government will monitor the Airport Company extensively to see that they are running an efficient and financially profitable Airport. The government reserves the right to terminate the agreement if it can prove that certain agreements have not been met.

It is interesting to note that the original RFP called for a longer lease period and percentage of ownership in the project yet the consortium had contributed the same amount of cash. The administration that time may have rushed into making a decision.

If the terms of the guarantees of the Greek government towards the Airport Company are not met, the government will have to pay for all the extra costs which are incurred by AIA due to each breach.⁵⁵

⁵⁵ Airport Development Agreement, Article 23.7

Challenges

There are several challenges which the Airport Company faces, or will face, as it manages the biggest infrastructure project in Greece. These can be summarized as either external or internal. Some examples of each follow:

External

The biggest concern which AIA has is to satisfy a large number of stakeholders, with partly conflicting goals. The public side wants a new, modern and efficient Airport which will upgrade Greece's infrastructure. The government wants this Airport quickly since it is important to the national economy. The private investors are mainly involved with the construction of the Airport. As shareholders in the Airport Company, they want a quick recovery of their investment so that they can move on to other projects.

Because the project is a public/private partnership, the decision making process is complicated because of many agreements, laws, and understandings. There is the Development Agreement between the Airport Company and the government, there is the ICC between AIA and the consortium, there is Parliamentary laws which permit these sort of projects under certain conditions, then there is the agreement between the Government and the European Union which forces Greece into a public private partnership. Furthermore, the EIB, as senior debt holder, has its own conditions which must be met. All these groups have placed deadlines and conditions on AIA which need to be met before continuing on to the next phase.

The size and type of project makes both the company and the project of highest public exposure. Because of this AIA tries to control what information is released, and to make certain that there is an understanding as to the way it operates.

Another key external concern is the role of Olympic Airways. Olympic Airways, as the key airline company of Greece, is an important business partner to AIA. It is estimated that 40% of the traffic forecasted for the new Airport will be from Olympic. However, Olympic is suffering major financial problems, and it is doubtful whether it will be able to finance and build its own facilities at the new airport. Of greater concern is whether it will survive in the future. The Greek government has made no commitments or promises of any passenger volumes including those from Olympic.

There may also be concern as to the role of the current Airport Administration. AIA's business is currently being performed by other public entities such as the current Airport Authority in Hellenikon and the Civil Aviation Administration (CAA). These agencies have their own inefficiencies, and fear the loss of control, which may cause instability in its transfer.

Internal

A major internal concern for AIA is the clash of different cultures. The company consists of a mixture of Greek and German nationals. These parties are trying to work together under local conditions. It is important for all parties to have an understanding of how each other works and what the local conditions are like.

At the same time as AIA is managing the construction of the Airport it must prepare for operation. It is important that while trying to control the construction it does not overlook the operation (or the reverse). It should give equal emphasis to both parts and not try to separate the two. The reason should be that design directly influences operations and maintenance costs and efficiency.

Financing

The total project is expected to cost DRX 658 billion. The sources and contributions to this project cost⁵⁶ are seen in Figure 4.2.

Share Capital (payable by consortium)	DRX 40 billion
Secondary debt (payable by consortium)	DRX 13 billion
European Union grants	DRX 73 billion
Greek State grants	DRX 44 billion
European Investment Bank loan (Greek State guarantee)	DRX 312 billion
Commercial Bank loan	DRX 98 billion
Airport Development Fund	DRX 78 billion

Fig. 4.2. Sources of capital

It is worthy to note that the loan from the European Investment Bank is the largest single loan ever given out by the European Investment Bank. The rate of the EIB loan is set at 15 basis points above its cost of capital fixed at the time of each drawdown.⁵⁷ Currently it is set at 8.3%.

Of the DRX 658 billion costs, only the DRX 520 billion is for “capital expenditure”. The remaining funds are for operating expenses, interest during construction, reserve funds, and the like.⁵⁸

⁵⁶ This “project cost” is not lifecycle cost. It is the cost of initial design, construction, finance and operation and maintenance during construction.

⁵⁷ Airport Development Agreement, Schedule 22

⁵⁸ Goldman Sachs International, Base Case for the Athens International Airport at Spata, January 1996.

Also, of the DRX 520 billion capital investment, 60% of the funds go to “direct construction costs”. The remaining 40% are defined as “indirect costs.” These “indirect costs” are to cover expenses such as design, construction management services, and contingencies. With design costs for these projects ranging at approximately 15% and the other items approximately the same, the 40% figure does not sum up. It is widely believed that this 40% is a high number and the consortium was able to secure it because of strong political influence.

The Consortium’s dual role

The consortium which owns 45% of the Airport Company, is also the group which holds the construction contract. Therefore, a dual role can be seen. They are both part owner and contractor. Many believe that this sort of contract would bring added efficiency to the project since the contractor would see the project as something long term rather than short term. However, if the contractor is able to separate the construction cash flows from the operation phase this efficiency may not be realized.

It is important that the Government and the Consortium agree to an Airport Company which will prevent the separation of Construction and Operation. This is done by requiring a financial investment from the Consortium to the Airport Company, by preventing (for a certain period of time) the transfer of the Consortium’s shares without

governmental approval, and restricting the payment of dividends for a certain period of time.⁵⁹

⁵⁹ Airport Development Agreement Article 37

CHAPTER 5: Building the Airport

The “Basket”

It has been mentioned in several parts of this study that the Airport is a collection of many smaller projects. All these smaller projects are dependent on each other so that the airport will function properly. The projects which *I* have chosen to break up the Airport into are the following:

1. Terminal building
2. Satellite terminal building
3. Police building
4. Building and Ground Maintenance Facility
5. Mobile Equipment Work Station
6. Catering Facility
7. IKA Clinic
8. Ramp Service
9. Sewage plant
10. Cargo Facility
11. Air Mail building
12. Veterinary building
13. Forwarders Building
14. Control tower
15. Fire/Rescue station
16. Hotel
17. Fuel Farm
18. Two Runways
19. Taxiways/Apron
20. Miscellaneous Roadways
21. Employee parking
22. Passenger parking
23. Earthworks
24. Aircraft bridges

- 25. Airfield light system and Power Station
- 26. Convention Center
- 27. Home Base facility - Olympic Airways headquarters

As mentioned in Chapter IV, AIA is responsible for the delivery of the entire basket according to the Development Agreement. The government has transferred “ownership” of all the projects to AIA, who in turn may transfer the responsibility of delivery to another party.

The role which AIA has can be compared to that of a General Contractor. A General Contractor signs a contract with the promoter to deliver a facility at a certain cost within a set time frame. The General Contractor then transfers pieces of the construction work to various trade subcontractors. When AIA acts in a manner similar to a General Contractor, it signs a contract which may not only include construction responsibilities but also design, financing, operation and maintenance.

For the airport company to deliver this entire basket, using conventional delivery systems, the cost would exceed 730 billion DRX (See Appendix I). As will be seen later, from all the available sources, AIA only has 520 billion DRX. To cover this 210 billion DRX shortfall, AIA is attempting to apply alternate delivery methods, in particular BOT, to some of the projects in the basket.

The Theory

The Airport Company must consider the following four items:

1. Maximize Returns to its investors including the Consortium and the Greek Government.

2.Limited Financial Resources

3.All projects must be completed

4.Tight schedule (Fasttrack Project)

The AIA is a company which is expected to function in the private sector. It is expected to bring financial returns to its stockholders. From corporate finance, it is known that the wealth of a firm's stockholders is highest if the firm accepts every positive net present value project. However, as is often the case, there are limited resources which prevent the company from undertaking all such projects (capital rationing is hinted)⁶⁰. Unfortunately though, unlike capital rationing, projects cannot be eliminated. By not performing one project the greater Project fails. Alternate delivery methods is the proposed solution to this problem. By choosing a different delivery method the sources of cash flows to the project are altered and expanded (the magnitude depending on the method and the terms) to the point where it can be completed.

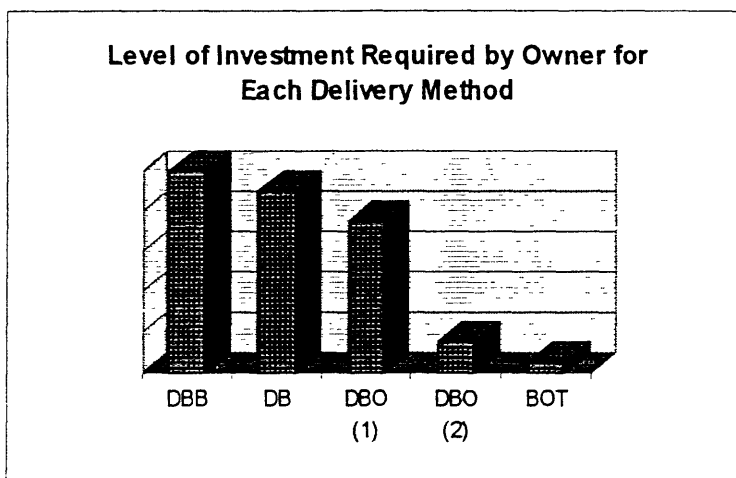


Fig. 5.1. Investment Required by Promoter

⁶⁰ Brealey, Richard A. and Myers, Stewart C. Principles of Corporate Finance. 5th ed. New York: McGraw-Hill, 1996.

Figure 5.1 shows in concept, the relative investment required from the promoter for different types of delivery methods. From the figure, DBB requires a lot of investment. One of the explanations for the higher level of investment in DBB relative to DB is because of the loss in time due to the sequential scheme. DBO requires significantly less promoter investment than DBB/DB, however there is often some investment in the form of subsidies or other form of guarantees. As seen in the figure, DBO(1) describes a situation where there are a lot of guarantees or subsidies, while DBO(2) has fewer guarantees or subsidies. BOT in its “purest” form requires close to no investment from the promoter. As delivery methods vary, the relative investment of third party private investors goes up as that of the promoter goes down.

The investment which is not made by the promoter in DBO or BOT projects must be made by another group. Many times the promoter has a better credit rating and is thus able to receive financing at a better rate. In other cases, such as in the United States, the public sector is able to issue tax exempt debt which carries a smaller finance cost.

Of course, along with the lower level of investment by the promoter comes less control over the project. This is true for all stages such as the design, construction and operation of the project.

The other benefit of mixing delivery methods in such a way is that if a project is a big financial, winner and it is given to the private sector, some of the “winnings” may be

“chewed” by the promoter by lumping in a “loser” (a project which cannot support itself). By doing this the promoter essentially gets the needed “loser” project for free.

It is important to note that projects should be matched with possible methods first. Then, the budget, which the promoter is willing to allocate, should be assigned. By doing it the other way around the project planner pre-selects the delivery method, and in a sense discriminates against other methods.

Capital Budgeting

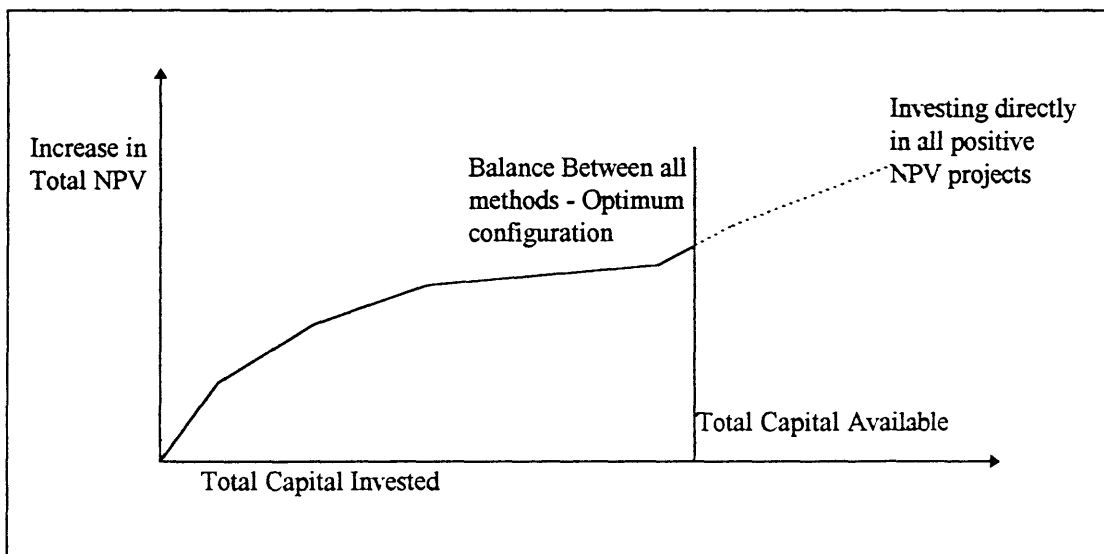


Fig. 5.2. Capital Budgeting and Positive NPV projects

Figure 5.2 displays the capital budgeting problem. By investing in all positive net present value projects, the firm maximizes its return. However, there are not enough funds available to invest in all the projects. What must be found is the optimum portfolio of investments which would allow the firm to maximize its present value without exceeding the available capital.

For the case of the Airport, projects cannot be eliminated, since they are required for the Airport to function properly, and also required by the development agreement signed between the Airport Company and the Greek State. However, for those few projects which are viable with more than one delivery method, cash flows from the promoter can be significantly altered by using different delivery methods. By mixing delivery methods, all the projects can be matched to delivery methods which comply with the budgeted time and funds, and produce the best possible maximum return to the company.

The Process

As already mentioned, by trying to deliver the entire basket using conventional delivery systems, there is a shortfall of DRX 210 billion. What is being proposed in this section is a way that the Airport Company can deliver the entire Basket by using alternate delivery systems to overcome the shortfall in funds. Three combinations will be demonstrated. In choosing which combination is “best” it is important to keep in mind AIA’s four objectives (mentioned earlier in this chapter).

A first step would be to try and eliminate delivery systems which are not compatible with each of the projects. Choosing which delivery system is compatible with what type of project was done by using a system of Drivers proposed by Gordon⁶¹. Drivers are sets of requirements or limitations which surround the project. They can be

⁶¹ American Society of Civil Engineers, “Journal of Construction Management”, Choosing Appropriate Construction Contracting Methods, Christopher M. Gordon, March 1994

restrictions to the project, the promoter, or the market. Examples of Drivers include, fasttrack projects, flexibility of design requirements, financing, expertise, and so forth.

Gordon defined the generic drivers of projects and assigned them to delivery methods. What is seen from the model is not the best method for each project but rather which methods are not compatible with it. There are some differences in what Gordon was looking at and what is required in this case. Gordon focused more around contracting methods by looking through the construction phase and not the entire life-cycle of a project. To make his method more compatible to what is being looked at, Design Build Operate (DBO) had to be added. The distinction between DBO and BOT projects would be defined by the amount of risk which the promoter would have to take up for the project to become a viable delivery.

Each of the project's unique characteristics were examined, and it was run through the model. After looking at each of the project's drivers the possible delivery methods for each of the projects was found. The results are summarized in Figure 5.3. A key alteration which was made to the model was not assigning funding to the project. Rather, what was looked at was the capability of the project to finance itself. Because this is a basket of projects rather than one project, it is important that we decide which projects to finance after we compare them all with each other.

Description	Delivery Options			
	DBB	DB	DBO	BOT
Terminal Building		x	x	x
Satellite		x	x	x
Police Building	x	x		
Building & Ground Maint.	x	x		
Mobile Equipment WS	x	x		
Catering	x	x	x	x
IKA Clinic	x	x		
Ramp Service	x	x	x	x
Sewage Plant	x	x	x	x
Cargo Facility	x	x	x	x
Air Mail	x	x	x	x
Veterinary Building	x	x		
Forwarders Building	x	x	x	x
Control Tower	x	x		
Fire/Rescue Station	x	x		
Hotel	x	x	x	x
Fuel Farm	x	x	x	x
Runways	x	x	x	x
Taxiways/Aprons	x	x	x	x
Miscellaneous Roadways	x	x		
Employee Parking (S)	x	x	x	x
Passenger Parking	x	x	x	x
Earthworks	x	x		
Aircraft Bridge	x	x	x	x
Airfield Light Sys & P S	x	x	x	
Convention Center	x	x	x	x
Home Base	x	x	x	x

Figure 5.3.

From Figure 5.3 various type of delivery options can be seen for each project. Available financing has not been taken into consideration yet. All projects are initially assumed to be delivered in Quadrant IV⁶². For example, the Terminal Building and Satellite buildings cannot be delivered using DBB, because they are fasttrack projects. The sequential characteristics of DBB eliminates it as a candidate for fasttrack projects. Other projects which are required, yet do not bring revenues to the project cannot be delivered (as currently configured) by a BOT method. A private developer would not be

⁶² See Chapter II

interested in a project which lacks profit generation. Several of these projects may be delivered by AIA using DBO processes by assigning portions of its guaranteed revenue streams to offset initial costs.

The next step would be to match funding with the project. Funding comes from five principal sources: the European community, in terms of grants, Greek government grants, loans from the EIB and other banks, and the consortium. Based on agreements the funding will follow the schedule seen in Figure 5.4. (allowing some shifting from year to year.)

	Total	1996	1997	1998	1999	2000
Airport Development Fund	57,841	5,259	24,997	8,868	13,743	4,973
EU Grants: Unconditional	43,755	10,939	10,939	10,939	10,939	
Conditional	72,925	18,231	18,231	18,231	18,231	
Consortium Equity	39,380	19,690		19,690		
Consortium Subordinate Debt	13,127	6,563		6,563		
EIB Loan	312,119	32,962	36,463	72,050	111,429	59,215
Commercial Loan	97,568	19,514	44,225	19,514	11,002	3,314
TOTAL All Sources:	636,714	113,158	134,855	155,855	165,344	67,502
TOTAL Non-capital expenses:	116,748	41,729	18,755	18,755	18,755	18,755
Remaining for capex:	519,966	71,429	116,100	137,100	146,590	48,747

Fig. 5.4. Funding from each source by year.⁶³

As mentioned, the Airport is a fasttrack project, and so the schedule is fairly tight with very little float. The Project started in July 1st of 1996 and is expected to be complete by November 1, 2000 (See figure 5.5 end of chapter). Because of this, the time when certain activities must be complete is crucial. Therefore, there is a further constraint in matching the projects with the available funds at a specific time frame.

⁶³ Airport Development Agreement. Schedules 13, 16, 22, 23

There are numerous possible combinations that AIA might consider in order to deliver the basket. The key questions include: (1) For DBO projects, what is the risk that AIA will be required to make up revenue shortfalls; and (2) for BOT projects, what is the risk that unpredicted shortfalls in revenues prevent the delivery of key elements of the project.

Figure 5.3 gives the available delivery options for each of the projects according to the Gordon method, modified for this project. Figure 5.4 summarizes the contributions available from each source for the duration of the construction period. Figure 5.3 shows the possible delivery options for each project, however it considers each project independent of each other and of the available funds. Figure 5.4 shows what funds are available from AIA for the construction period (however it does not give any indication of the type of distribution which should be made to each of the projects). For example, looking at the Terminal Building, it could be delivered as DB, DBO or BOT. All three are valid choices. However, which system should be chosen for each project will be based on an analysis of all the projects simultaneously, thus successfully matching appropriate combinations of DB, DBO, and BOT systems.

In a later section, the possible combinations of the delivery methods with each project will be seen. What will be done there, is a matching of funds, projects, and delivery method so as to come up with several realistic recommendations as to how the entire Airport can be delivered. It is important to note that the best outcome overall will not just pop out of the model. The goal of the model is not to replace the experience or the know-how of Project Managers or specifically Airport Project Managers. Rather it is

to be used as an added tool for them in deciding how to deliver the portfolio which they are asked to manage. Also, the model can serve as an understanding in how certain decisions are made concerning project delivery.

Basic Assumptions

In looking at Transportation projects, it is impossible to make conclusive forecasts of revenues and expenses. This is because there are so many factors which affect the predictions, that at best, any prediction would only be an “educated guess”. However, this is the best one can do in trying to understand a project which he is considering to invest in. The assumptions which will be made in this model will be presented and discussed below. The entire financial analysis is presented in Appendices I, II, III, and IV.

The construction costs for the entire Airport Project are seen in Appendix I. These are probably the most predictable expenses of the entire project. The requirements of the facilities have been spelled out in the RFP and the Master Plan. Therefore using traditional Construction Estimating, predictable costs can be made within reasonable values. Also, many of the contracts, including the ICC (which is a Design Build Guaranteed Maximum Price Contract) have already been signed, locking certain of the major costs at fixed values.

Construction costs for the Airport Project have been released. However, actual budgeted cost breakdowns are proprietary information since many subcontracts have not yet been awarded and so they have not been released. To estimate the costs of individual projects, typical unit prices for the area were used. This gave a reasonable breakdown of

the actual budget. The unit prices which were used were from Olympic Airways which predicted a 20% degree of error in their units⁶⁴.

Most of the cash flow projections are based on traffic volumes. Traffic volumes are also the most unpredictable values of the entire forecast. They are linked to factors such as general economic condition, tourism, political stability and perceptions of personal safety.⁶⁵ For the thesis, the traffic volumes are taken from the Master Plan. According to the Master Plan, there are three main methods to forecast air traffic: trend projection, econometric model, and market and industry survey⁶⁶. Because of the lack of data available, the forecasters had to make assumptions and implement all three traffic projection methods. Trend projection methods are good for short to medium term projections since they are based on historical trends continuing into the future. Econometric models tie the Gross Domestic Product and the price of air service to traffic forecasts. The traffic projections used in this study are seen in Figure 5.6.

	2001	2005	2010	2015	2020	2025
Passenger Forecast	12,810,005	14,615,086	16,902,956	18,865,741	20,820,577	22,798,421
Air Traffic Movement (ATM)	134,885	148,398	166,165	180,870	197,012	210,388
Cargo Traffic (tons)	143,000	185,000	240,000	308,774	397,530	501,764

Figure 5.6. Traffic Projections⁶⁷

The Greek government does not offer any guarantees to these projections except if Attiki Odos is not operational at the time of Airport Opening. If the highway is not operating at the time of Airport Opening, the government must pay the Airport Company

⁶⁴Olympic Airways S.A. Move of Olympic Airways S.A. to the New Airport. April 1997

⁶⁵Coopers & Lybrand, Project Assumptions Update Athens International Airport, May 2, 1995

⁶⁶Master Plan, Article 2.2 Forecast Methods

⁶⁷Master Plan, Article 2.1 Traffic Forecasts

liquidated damages as described in Chapter 3. Therefore, under normal conditions, the traffic risk lies with AIA.

As seen in Article 26 of the Airport Development Agreement, the Greek Government promises the Airport Company funds from the Airport Development Fund (ADF) until the year 2014. The ADF is a special fund which has been created by the Greek State in order to finance developments in the Nation's Airports. It can be considered as a cross subsidy for other airports. All revenues to the fund come from a departure tax at the Airports, and does not affect the National Budget. The amount which the Airport receives from the fund is linked to the number of passengers which go through the Airport. For the model, current rates are assumed, which are 5ECU for domestic and 10ECU for international departing passengers. Projections for the fund are seen in Figure 5.7. During Construction, the government guarantees up to ECU45 million⁶⁸ (13 billion DRX) from the ADF for construction purposes. Since during operation the amount received from the fund is linked to traffic and it does not affect the national budget, the ADF revenue risk lies with the Airport Company. On the other hand, during construction, the amount received from the ADF comes from revenues collected at other Airports. Since these government guaranteed funds are allocated to AIA, they cannot be used by other airports (which are all publicly owned).

	2001	2005	2010
Domestic	12,517,873	14,281,789	16,517,484
International	3,082,760	3,517,157	4,067,739
Total ADF (x1000DRX)	15,600,633	17,798,946	20,585,223

Figure 5.7. Airport Development Fund

⁶⁸ Airport Development Agreement, Article 26

The landing fees which will be levied are assumed to be 10ECU (2,917DRX) per passenger. This is taken from the Business plan and it is 30% above the average of the three highest charges levied at European airports in 1995. Because of the high cost of financing the new Airport, a high landing fee is required. As a proportion of travel costs the landing fees are very low and so it is unlikely that a high landing charge would impact the traffic forecasts. Traditionally governments have set the level of Airport landing fees. It is important to cover the risk associated with these fees, thus the government should be willing to enforce them.⁶⁹

Some other revenues are seen in Figure 5.8, and Figure 5.9.⁷⁰ The values in the Figures are for the first year, however they have been projected in the Appendices for subsequent years. It is important to note that these values take into consideration the withdrawal of duty free allowances from passengers traveling within the EU at the end of 1999. There is still some lobbying to keep these allowances in place.⁷¹ Therefore at best the values are quite speculative. Also, this risk rests with the Airport Company as there are no governmental guarantees. It can however transfer part of the risk over to other parties if it chooses to deliver the projects associated with these revenues in alternate systems.

⁶⁹ Coopers & Lybrand, Project Assumptions Update Athens International Airport, May 2, 1995

⁷⁰ Business Plan

⁷¹ Coopers & Lybrand, Project Assumptions Update Athens International Airport, May 2, 1995

Area	Revenue Contribution at airport Opening (millions per year)	
	ECU	DRX
Departures		
Duty Free	6.48	1890
Retail	6.50	1896
Lounges	2.30	671
Restaurants	2.28	663
Landside Areas	1.31	281
Total	18.87	5491

Figure 5.8: Targeted In Terminal Revenue

Item	Revenue Contribution at airport Opening (millions per year)	
	ECU	DRX
Office Rental	2.7	786
Other In-terminal space	2.1	611
Air activities, home base cargo terminals, airmail	4.2	1222
Commercial development, office park, hotel	2.8	815
Total	11.8	3434

Figure 5.9: Revenue Contributions from Property Development

Other sources of revenue include Aircraft Fueling, Aircraft Handling, and car parking. Originally all of the risk of each of these projects is borne by the Airport Company. However, depending on how it decides to deliver each of the projects, it can alter the level of risk which it is exposed to.

There are two type of expenses which the Airport Company faces. These are the “fixed” and the “variable” expenses. The fixed expenses include the Senior debt and the grants of rights fees. Variable expenses are the contributions to reserve fund, Subordinate Debt, Tax, and Operating Expenses. The variable expenses are all linked to the Operating Revenues of the Airport Company.

According to Article 22 of the Airport Development Agreement, the Airport company enjoys special tax status through the year 2015. For the analysis, all the

revenues are considered tax exempt through 2015. After that year a 35% tax rate is assumed.

Risks of the expenses are shared between the Airport Company, its investors, and the Greek Government. The Government has offered a guarantee to the primary Debt Holder, the EIB, for the repayment of the loan if the Airport Company is not able to meet its debt obligations. The investors have contributed equity and subordinate debt capital to the Airport Company. The repayment of this depends on the cash flow of the project. The Airport Company is expected to cover the operating expenses, the taxes, and the grant of rights fees from its cash flows.

Possible Combinations

The first combination is seen in Figure 5.10. Most projects are delivered as either DBB or DB. Catering, Cargo, Veterinary, Forwarders, Hotel, Parking Garage, Convention Center, and Home Base are BOT deliveries. This configuration produces all the non BOT projects within the fixed budget of 520.8 billion DRX for construction costs, (along with proper timing) with an IRR to the Airport Company of 13.75% (See Appendix II). This is the strategy which the Airport Company has chosen to go ahead with and is referred to as the “Base Case.” With this strategy, the Airport Company will concentrate on maintaining and operating the basic infrastructure of the Airport. The remainder of the facilities, which can be described as secondary, yet essential, would be delivered as concessions which the Airport Company would oversee.

Under this strategy, the Airport Company is giving a lot of its potential revenues to other business entities by only focusing on core activities. However, by concentrating only on core activities it can gain the advantage of a focus strategy.⁷²

A second choice, seen in Figure 5.11 and referred to as Alternate 1, would be for the Airport Company to subsidize the construction costs of delivering the Home Base. AIA would contribute 50% of the construction costs, thus taking a major financial burden off Olympic Airways. This would bring the Homebase project into Quadrant I making it DBO. However, because of the significant costs associated with the Homebase, AIA would not have to seek other delivery options for some of its other projects to make up for the cost of subsidizing the Homebase. In this Alternate it is proposed that it gives up the Runways, and Taxiways, along with Catering, Cargo, Veterinary, Forwarders, Hotel, Parking Garage, Fuel Farm, Ramp Service Equipment and Convention Center to BOT. The IRR to AIA for this combination of delivery would be 12.28% (See Appendix III). In this case, the Airport Company would essentially manage all the terminal operations of the Airport. This would be an interesting choice since Olympic Airways has a lot of financial problems, and many sources question its ability to provide for its own facilities. Therefore what is being demonstrated in this case is how AIA can mitigate some of its financial risks by subsidizing or aiding projects which cannot deliver themselves. However what must be looked at is how the loss in returns compares to the decrease of risk.

Key to the financial returns of the Airport Company is the role of Olympic Airways. Athens is expected to function as a “hub” airport for Greece, with Olympic as

⁷² Porter, Michael E., Competitive Advantage. New York: The Free Press, 1985.

its home carrier. Many of the traffic projections (which ultimately revenues are based on) follow the “hub” assumption. Approximately 40% of the projected passengers will be from Olympic. These passengers turn into revenues when one looks at landing fees, concessions, and other items which bring income into the Airport Company. The revenues from the Olympic passengers are split throughout the basket. Therefore, giving a boost to Olympic may help the Airport Company in the long run.

This choice, assumes that the Runways are delivered under a BOT scheme. Such a delivery was done recently in Colombia⁷³, where the concessionaire receives a portion of the landing charges.

The third combination of delivery methods is seen in Figure 5.12 and is referred to as Alternate 2. This case is similar to the base case, except that under this scheme, the Airport company delivers the Ramp Services and the Cargo projects in Quadrant IV. To fill in the gap it gives up the utilities such as the Sewage plant and the lighting system and also the Aircraft Bridges to the private sector. This delivery raises the IRR to 15.6%. What is being demonstrated in this case is a swap of a few projects, with similar costs (AIA is giving passing over 23.4 billion DRX and paying 24.9 billion DRX). The result is a gain in returns. In this case however, the Airport Company has to manage a more diverse portfolio. The diversity is not in the number of projects (which remains essentially unchanged), but rather in the type of projects. The cargo and the ramp services are projects which are more complicated from a managerial standpoint than the utilities and the aircraft bridges. Therefore they can also be considered to be more risky.

⁷³ Juan, Ellis J. “Airport Infrastructure: The Emerging Role of the Private Sector”, The World Bank, Washington, D.C. 1995.

Looking at the three cases, and comparing the capital investments made in each (see Appendices II-3, III-2, and IV-2), they all appear to be within the same range (520 to 525 billion DRX). However, individually the expenditures are altered since the projects in each portfolio are different. Observing these appendices (and also those which relate to operating expenses and revenues) one may think that all projects which are put out in the private sector are self supporting. This is not necessarily true. There are costs which the promoter must consider relating to these projects (for example some initial planning), however for simplicity they have not been included in the financial analysis.

To be able to compare these three schemes in a meaningful fashion, a sensitivity analysis was performed. This was done by altering the variables described in Figure 5.13. The results show how sensitive the IRR is to each change. Once the revised IRR was found, it was taken as a percentage of the original IRR. The percent change in IRR was recorded in the figure. Looking at the figure, conclusions can be drawn as to what action each combination is sensitive to. The base case is more sensitive compared to others in changes in passenger volume, while alternate 2 is more sensitive to changes in Air Traffic Movements. Alternate #1 generally did not react as much in shifts as Alternate #2 which is the most volatile.

	Base Case	Alternate #1	Alternate #2
Passenger Volume -10%	-8.92%	-8.22%	-10.61%
Passenger Volume +10%	12.61%	12.05%	11.7%
ATM Volume -10%	-0.21%	-0.33%	-5.52%
ATM Volume +10%	0.28%	0.41%	5.45%
Cargo Volume -10%	-0.28%	-0.41%	-0.97%
Cargo Volume +10%	0.35%	0.49%	0.91%
Operating Revenue -10%	-14.16%	-16.37%	-21.45%
Operating Revenue +10%	18.7%	22.96%	26.91%
Operating Cost -10%	7.15%	8.22%	15.03%
Operating Cost +10%	-5.59%	-6.84%	-13.52%

Fig. 5.13. Sensitivity Analysis.

From a managerial point of view, Alternate #2 is likely to have higher costs than those predicted since the company is involved in diverse businesses. On the other hand Alternate #1, being more focused, is likely to have lower costs. Because of the financial problems which Olympic is going through, it is likely that traffic forecasts will be affected. This would likely occur in the Base Case and in Alternate #2. Even if Olympic does not close all its operations it is very likely that some routes will be canceled. This will ultimately affect traffic. By giving Olympic the subsidy in construction some of the revenue risk will be eliminated.

What is seen from this process is that projects are matched with delivery systems using each project's characteristics, along with the funding available from other sources. This gives the possible choices. Which choice is ultimately chosen depends on the strategy which AIA chooses to follow for the entire package. From a managerial point of view one can roughly predict what is likely to happen with each decision which AIA makes as it

relates to delivering the portfolio. From the sensitivity analysis, a quick check on where the rate of return will go can be made.

The model which was examined in this chapter was created to demonstrate an approach that an entity which is given a portfolio to manage can follow. The results which are found in the financial analysis are quite speculative, and so hard conclusions as to what AIA should do cannot be given. However, as a process, the approach which an entity such as AIA should follow was demonstrated.

A further refinement of this process would be to repeat it from the beginning assigning alternate projects. This would result in a different portfolio with different financial returns. It would give a whole new set of possible options. As a theoretical process, performing this analysis would not contribute any new insight. However, in reality, this sort of analysis would be required in order to find the optimum combination of deliveries.

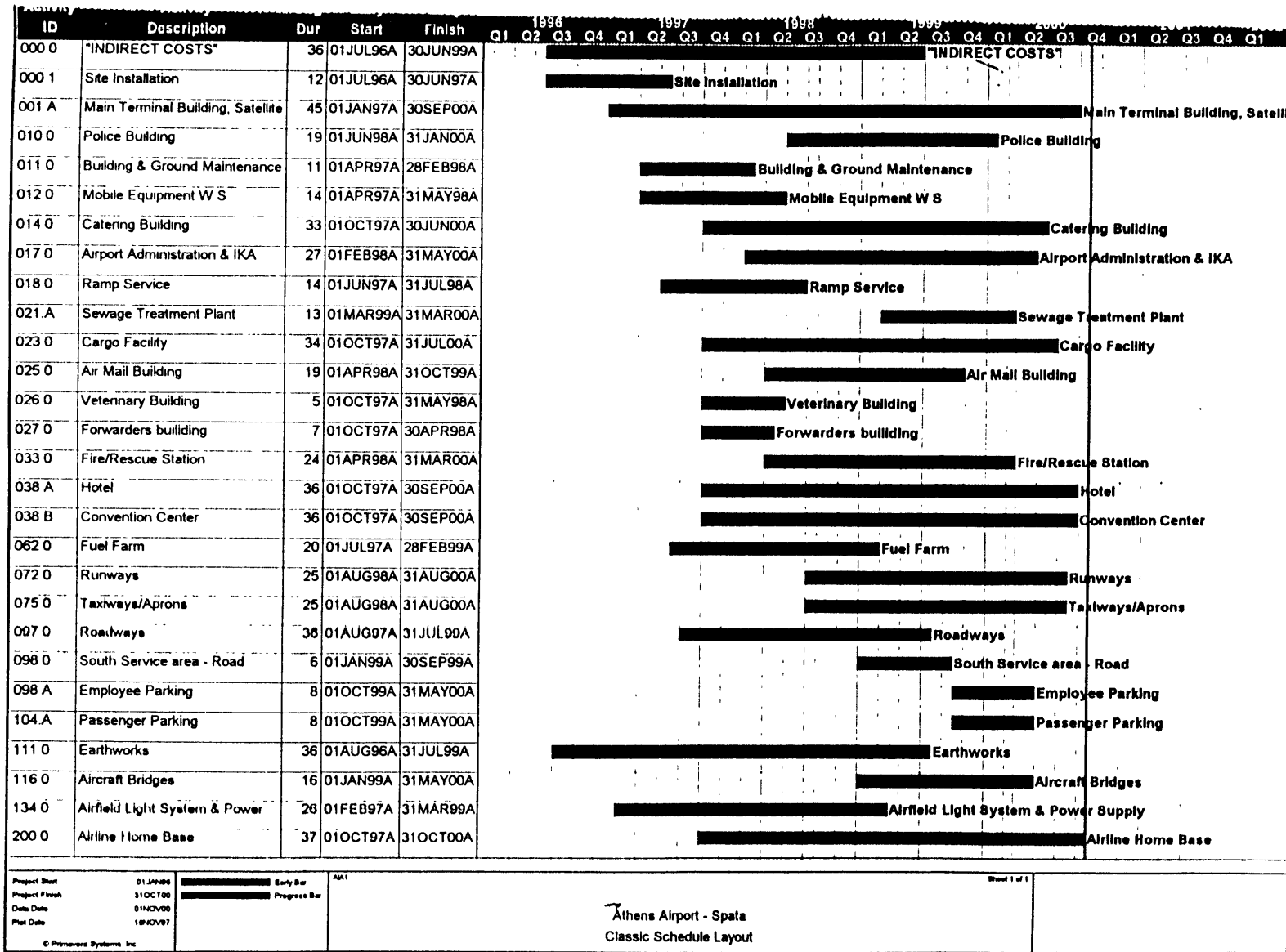


Figure 5.5. Schedule

Figure 5.10. Base Case Delivery

Description	Delivery Options			
	DBB	DB	DBO	BOT
Terminal Building		x		
Satellite		x		
Police Building	x	x		
Building & Ground Maint.	x	x		
Mobile Equipment WS	x	x		
Catering				x
IKA Clinic	x	x		
Ramp Service:				
Building	x	x		
Equipment				x
Sewage Plant	x	x		
Cargo Facility			x	x
Air Mail	x	x		
Veterinary Building with Cargo				
Forwarders Building			x	x
Control Tower	x	x		
Fire/Rescue Station	x	x		
Hotel				x
Fuel Farm				x
Runways	x	x		
Taxiways/Aprons	x	x		
Roadways	x	x		
Employee Parking (S)	x	x		
Passenger Parking				x
Earthworks	x	x		
Aircraft Bridge	x	x		
Airfield Light Sys & P S	x	x		
Convention Center				x
Home Base				x

Figure 5.11. Alternate #1

Description	Delivery Options			
	DBB	DB	DBO	BOT
Terminal Building		x		
Satellite		x		
Police Building	x	x		
Building & Ground Maint.	x	x		
Mobile Equipment WS	x	x		
Catering				x
IKA Clinic	x	x		
Ramp Service:				
Building	x	x		
Equipment				x
Sewage Plant	x	x		
Cargo Facility			x	x
Air Mail	x	x		
Veterinary Building with Cargo				
Forwarders Building			x	x
Control Tower	x	x		
Fire/Rescue Station	x	x		
Hotel				x
Fuel Farm				x
Runways				x
Taxiways/Aprons				x
Roadways	x	x		
Employee Parking (S)	x	x		
Passenger Parking				x
Earthworks	x	x		
Aircraft Bridge	x	x		
Airfield Light Sys & P S	x	x		
Convention Center				x
Home Base			x	

Figure 5.12. Alternate #2

Description	Delivery Options			
	DBB	DB	DBO	BOT
Terminal Building		x		
Satellite		x		
Police Building	x	x		
Building & Ground Maint.	x	x		
Mobile Equipment WS	x	x		
Catering				x
IKA Clinic	x	x		
Ramp Service:				
Building	x	x		
Equipment	x	x		
Sewage Plant				x
Cargo Facility	x	x		
Air Mail	x	x		
Veterinary Building with Cargo	x	x		
Forwarders Building	x	x		
Control Tower	x	x		
Fire/Rescue Station	x	x		
Hotel				x
Fuel Farm				x
Runways		x		
Taxiways/Aprons		x		
Roadways	x	x		
Employee Parking (S)	x	x		
Passenger Parking		x		
Earthworks	x	x		
Aircraft Bridge				x
Airfield Light Sys & P S				x
Convention Center				x
Home Base				x

CHAPTER 6: Conclusion

The Public Sector

One of the many roles of government is to encourage a higher standard of living for its people. This is done through growth of the economy. Historically economic growth and infrastructure has been positively correlated⁷⁴. It has been the government's responsibility to provide the infrastructure needs of its community. The way that the government delivers infrastructure is something which is in flux.

Today's communities have great demands in infrastructure. In many cases these demands cost more than the public budget can handle. Government planners decide on what is needed and how it should be delivered. They need not immediately eliminate projects because public funds are not available. Rather they should look for other means to finance and deliver these projects. Alternate project delivery methods can help. By tapping into private markets, "new" money can be found by creating attractive alternative investments for the public sector in infrastructure. Therefore, by alternative configurations of its infrastructure portfolio, and by utilizing all the available delivery methods, the public sector can assist more effectively in greater economic growth.

It is important to realize that each project delivery system has its own unique advantages and disadvantages, and so one must understand which method is most appropriate for each project. There is no set way of deciding which system is best for which project, however careful planning does eliminate those methods which are not

⁷⁴ Miller, John B. Aligning Infrastructure Development Strategy to Meet Current Public Needs. Doctoral Thesis. Cambridge: MIT 1995.

suitable. A public planner should approach the problem of matching systems with projects carefully, with an open-mind and should not discriminate on methods without justification.

The positive results for Greece have been demonstrated. Greece is a country with a weak economy and a strong historic commitment to publicly delivered infrastructure. By taking advantage of all the delivery methods available, it has been able to deliver most of the projects in its portfolio. The choice for new infrastructure no longer has to be either a new road, a subway system, a powerplant, or an airport. It can be all of them. At the same time public funds are released to be used for other aspects of the government budget.

The fact that the alternate delivery methods are available is not enough. It is one thing to have the tool and another to know how to use it. It is not possible for the government to pull out of the delivery process completely. Only the government knows what infrastructure needs it requires and it is responsible for performing the initial planning. This planning will attract private sector capital investment only if these projects are organized and structured in a certain way. Part of this task is the duty to select which projects to deliver with what method and also how to package the individual projects together so as to ease their delivery.

Many BOT concessionaires are not operators. Rather they are construction companies (as is the case in Athens). These companies see BOT as the only way for them to get construction contracts. It is important that the government makes sure that when it awards a BOT contract it does not only award a construction contract but a development

contract as well. The government must balance all aspects of the delivery to increase the likelihood that it will get a good product.

The Private Sector

With the re-introduction of alternate delivery methods (such as DB, DBO and BOT) for infrastructure in many countries, a new breed of companies has re-emerged. These are the “project companies.” Their duties are usually to design, construct, operate, own, and finance projects. Their goal is to maximize the returns to the investors.

A megaproject can be looked at as a portfolio of smaller projects. As in the public approach, diversifying the portfolio in the private sector by delivery method, permits more projects to be completed. The added parameter which the private sector must face is that it must bring competitive returns to its investors. By matching methods with projects “carefully” and “properly”, there are more vehicles available to maximize returns to the investors.

One of the constraints which the Airport Company has, that the public side does not, is the commitment to deliver all the projects within a portfolio. A government makes promises, the private sector makes commitments. AIA has signed a contract to deliver the entire Airport. For this Airport to work all the projects which have been discussed must be delivered. By using the optimization technique which has been presented the Airport Company is able to deliver the entire portfolio even though at first glance it does not seem to have all the required funds.

The optimization technique gives a selection strategy based on possible delivery methods and IRR. The company must still make the choice as to which strategy to follow in terms of management, returns to investors, and risk which it is willing to accept. The results of the optimization technique are not what the company should do, rather it gives the company a choice of what it can do.

In setting up the model for this analysis the goal was to be as realistic as possible. The Airport is a \$2.1 billion project. In breaking it up into separate smaller projects it was important that these projects made sense. Instead of a basket of twenty seven projects, it could have been a basket of one project or a basket of hundreds of projects. Therefore, defining the boundary of a project was the first step. The goal was to name a piece of the Airport a project if it could be looked at in subsequent steps as such. This would be in terms of delivery and management.

The Athens Airport was used as a case study of alternate delivery systems. The models which were built in Chapter 5 in order to demonstrate the use of alternate delivery systems were chosen arbitrarily although it was important that they were reasonable choices. There are hundreds of combinations which can be made. But understanding and recognizing that the project must ultimately create an airport limits the possible choices. One must keep in mind that for the model to work it should not only be theoretical but also practical. The practicality is seen from whether or not the choices make sense from a managerial point of view. This was the underlying perspective throughout the analysis.

The Analogy

Ultimately, the public and private sectors are analogous. Both are constrained by budgets and responsibilities. Both can and *should* utilize the entire gamut of delivery methods to achieve their goals. These goals are not necessarily the same.

The Greek situation is seen in Figure 6.1.

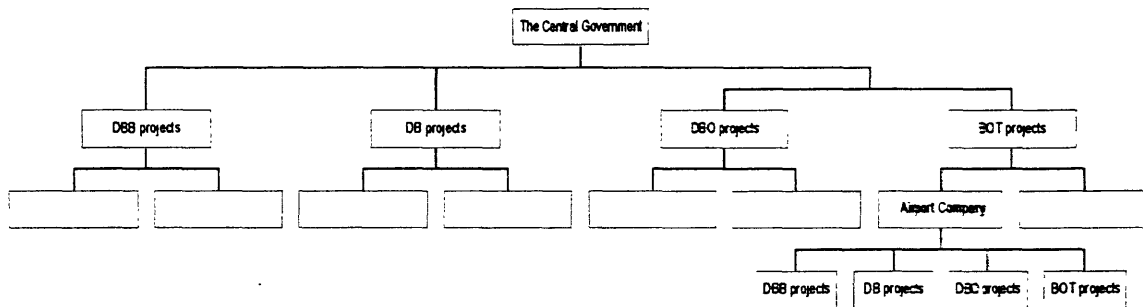


Fig. 6.1.

A valid question could be “Why is a private Airport company needed in the first place?” All the projects in the above chart which are attached to the Airport Company could have been treated as the responsibilities of the Central Government. In Hong Kong for example, the government, instead of giving out one giant contract, to the private sector, kept the excavation and basic infrastructure support work to itself, and awarded several BOT franchises to complete the fuel, cargo, maintenance, and catering facilities. The answer to the question most probably lies in transferring risk to those most suited to handle it. Collectively the risk of managing all the individual airport projects was too great for the Central Government, so it chose to transfer this risk over to a new entity which arguably, is better equipped to manage it. AIA’s strategy has included a further allocation of this risk to second tier BOT projects and what amounts to a hedging strategy

implemented through the award of second tier DBO franchises. Also, in many countries (including Greece) the private sector is much more productive than the public sector. Therefore there is also the productivity gain of private delivery, coupled with not having to manage so many activities in the public sector.

Comment about BOT

A legitimate question arises about BOT projects when there is a great deal of Governmental intervention. In the Airport project, the government not only is a big equity holder (55%), it also guarantees the loans of the project and the highway opening risk. Because of this action, even though the project has been called a BOT, a substantial argument can be made that AIA is really a DBO operator. However, the government has not guaranteed air traffic or revenue streams so it appears that this risk remains with the company. Yet, if the company is not able to pay the debt or becomes insolvent in the future, because, for example Olympic Airways ceasing operations, the government is stuck with the bill. Together with its 55% stake in AIA, the Greek government is directly connected to the success or failure of the AIA franchise. Therefore, it can be argued that the government indeed carries its share of the revenue risk. Issues like these are certain to arise as Governments, companies and banks learn more about the peculiarities of dealing with BOT projects.

Appendices

Appendix I

I-1: Total Capital Expenditure Required to Deliver the Entire Airport DBB/DB

Appendix II

II-1-1: Basic Assumptions

II-2-1..3: Base Case Proforma

II-3-1: Base Case Capital Investments

II-4-1: Sources and Uses During Construction

II-5-1..4: Debt Analysis

II-6-1: Operating Revenues

II-7-1..2: In Terminal Concessions

II-8-1: Catering

II-9-1..3: Airside Charges

II-10-1: Cargo

II-11-1..2: Ramp Services

II-12-1: Fuel Facility

II-13-1: Hotel

II-14-1: Passenger Car Parking

II-15-1..6: Home Base Lease

II-16-1: Operating Expenses

Appendix III

III-1-1..3: Alternate 1 Proforma

III-2-1: Alternate 1 Capital Investment

III-3-1: Sources and Uses During Construction

III-4-1..4: Debt Analysis

Appendix IV

IV-1-1..3: Alternate 2 Proforma

IV-2-1: Alternate 2 Capital Investment

IV-3-1: Sources and Uses During Construction

IV-4-1..4: Debt Analysis

Total Capital Expenditure Required to Deliver the Entire Airport DBB/DB

Assumptions:

To build the Capital Expenditure table below several sources were used since the actual values were confidential.

The construction schedule was provided by AIA. The costs were based on unit prices which were provided

by Olympic Airways multiplied by the project descriptions found in the Master Plan. There was

some adjustment based on "engineering judgment" to the cost of each of the projects.

Spending per period was based on "judgment" and total expenses per period provided by AIA.

PROJECT Name	Aggregate Cost	YEAR				
		1996	1997	1998	1999	2000
Indirect costs (40%)	208,130,000	81,191,298	13,451,208	27,036,302	44,783,996	41,667,196
Terminal Building	84,712,455	7,624,121	18,636,740	28,802,235	29,649,359	
Satellite	19,887,539	1,789,879	4,375,259	6,761,763	6,960,639	
Police Building	3,642,699			692,113	2,950,586	
Building & Ground Maint.	7,072,771		4,809,484	2,263,287		
Mobile Equipment WS	2,674,504		2,112,858	561,646		
Catering	4,000,000		40,000	1,560,000	2,280,000	120,000
IKA Clinic	4,356,217			2,857,292	1,524,676	174,249
Ramp Service	2,741,413		740,182	2,001,231		
Sewage Plant	8,264,436				7,768,570	495,866
Cargo Facility	6,632,450		66,325	2,387,682	3,913,146	265,298
Air Mail	2,365,877			1,040,986	1,324,891	
Veterinary Building	480,000		110,400	369,600		
Forwarders Building	681,600		231,744	449,856		
Control Tower	24,277,608	2,184,985	5,341,074	8,254,387	8,497,163	
Fire/Rescue Station	4,581,539			2,703,108	1,740,985	137,446
Hotel	21,470,400		214,704	6,441,120	13,096,944	1,717,632
Fuel Farm	10,550,000		1,266,000	9,178,500	105,500	
Runways	14,780,779			5,173,273	7,833,813	1,773,693
Taxiways/Aprons	40,995,835		14,348,542	21,727,793	4,919,500	
Misc. Roadways	5,489,239	93,317	1,756,556	1,838,895	1,619,326	181,145
Employee Parking (S)	981,815				225,817	755,998
Passenger Parking	733,500				188,705	564,795
Earthworks	69,992,766	2,099,783	14,698,481	29,396,962	23,797,540	
Aircraft Bridge	5,902,791				5,194,456	708,335
Airfield Light Sys & P S	9,256,169		2,776,851	5,090,893	1,388,425	
Convention Center	50,000,000		500,000	15,000,000	30,500,000	4,000,000
Home Base	118,252,750		1,182,528	31,928,243	73,316,705	11,825,275
Total	732,907,152	94,983,383	86,658,939	213,317,176	273,560,752	64,386,930

x1000DRX

Appendix II-1-1
Basic Assumptions

Traffic Volumes:

	2001	2005	2010	2015	2020	2025
Passenger Forecast	12,810,005	14,615,086	16,902,956	18,865,741	20,820,577	22,798,421
Air Traffic Movement (ATM)	134,885	148,398	166,165	180,870	197,012	210,388
Cargo Traffic (tons)	143,000	185,000	240,000	308,774	397,530	501,764

Source: Master Plan

In the Master Plan, Forecast for passengers is broken up for Transfer, International and Domestic/EU. Transfer for the 30 year period accounts for up to 3% of the passenger forecast. For simplicity, it will be assumed that 33% of the passengers are international while 67% are domestic/EU for the entire length of the project. This assumption is slightly off from the one used by AIA in that the ratios are constant.

Exchange Rates:

Throughout the thesis and these calculations the following exchange rates will be used: (Ave. 1995 values)

DRX/DM: 160.1
 DRX/ECU: 291.7
 DRX/\$: 280

Airport Development Fund:

The Airport Company will receive a special tax from the Greek Government of 5ECU per domestic and 10ECU per international departing passenger until the year 2013. This is referred to as the Airport Development Fund (ADF).

Assume 1/2 the passengers are departing:

	2001	2005	2010
Domestic	6,258,936	7,140,894	8,258,742
International	6,165,519	7,034,314	8,135,477
Total ADF (x1000DRX)	12,424,456	14,175,208	16,394,219

Taxation:

The Airport Company is exempt from taxes until the year 2015. After 2015 assume tax rate is 35%.

Appendix II-2-1

Cashflow From Operations:	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Operating Revenue (From II-6-1)						53,374,325	63,408,171	69,709,316	76,664,000	84,400,381	91,797,398
Operating Costs (From II-16-1)	(4,242,490)	(4,830,857)	(7,314,649)	(10,860,704)	(10,063,246)	(21,349,730)	(25,382,469)	(27,883,726)	(30,665,600)	(33,760,153)	(36,718,959)
Gross Operating Income	(4,242,490)	(4,830,857)	(7,314,649)	(10,860,704)	(10,063,246)	32,024,595	38,043,703	41,825,589	45,998,400	50,640,229	55,078,439
ADF Received (From II-4-1 (Constr.), II-1-1 (Oper.))	10,499,679	13,554,341	15,909,622	13,087,634	12,516,369	12,424,456	12,880,454	13,298,838	13,730,291	14,175,208	14,594,190
Grants of Rights Fee (From ADA Schedule 2)						(320)	(320)	(320)	(320)	(320)	(295,224)
EBITD	6,257,389	8,723,484	8,594,973	2,226,930	2,453,123	44,448,731	50,923,836	55,124,107	59,728,371	64,815,117	69,377,404
Tax Payable											
Cash Available for Senior Debt Service	6,257,389	8,723,484	8,594,973	2,226,930	2,453,123	44,448,731	50,923,836	55,124,107	59,728,371	64,815,117	69,377,404
Interest Payment on Senior Debt (From II-5-1)	3,035,671	6,717,710	13,797,649	24,066,148	27,326,213	33,729,677	32,881,999	31,994,321	31,126,843	29,531,770	27,874,358
Principal Payment (From II-5-1)	-	-	-	-	-	10,542,869	10,542,869	10,542,869	18,998,626	19,725,821	20,515,555
Senior Debt Service	3,035,671	6,717,710	13,797,649	24,066,148	27,326,213	44,272,546	43,404,868	42,537,190	50,125,269	49,257,591	48,389,913
CASH FROM OPERATIONS NET OF DEBT SERVICE	3,221,718	2,005,774	(5,202,676)	(21,839,218)	(24,873,090)	176,184	7,518,968	12,586,917	9,603,101	15,557,526	20,987,491
Investment Cashflow:											
Capital Expenditure (From II-4-1)	(94,983,382)	(83,047,235)	(146,002,185)	(150,348,448)	(46,458,723)						
Grants (From II-4-1)											
Greek Government Grant	11,071,555	11,071,555	11,071,555	11,071,555							
EU Grant	18,452,486	18,452,486	18,452,486	18,452,486							
Equity Capital (From II-4-1)											
Ordinary Equity Drawdown	19,928,768		19,928,768								
Subordinate Debt Drawdown	6,642,949		6,642,949								
Senior Debt Capital (From II-4-1)											
EIB Loan Construction Amount	27,126,182	39,182,263	72,336,466	108,504,729	54,252,364						
Commercial Loan Construction Amount	8,539,724	12,335,157	22,772,597	34,158,896	17,079,448						
Total Debt	35,665,906	51,517,420	95,109,083	142,663,625	71,331,812						
Net Project Cash Flow:	0	0	0	(0)	-	176,184	7,518,968	12,586,917	9,603,101	15,557,526	20,987,491
Value of Cash Reserve						176,184	7,695,152	20,282,069	29,885,170	45,442,696	69,443,177
Remaining for Sub. Debt									-	-	20,987,491
Sub. Debt Required		1,175,697	1,175,697	2,351,394	2,351,394	2,351,394	2,351,394	2,351,394	2,351,394	2,351,394	2,351,394
Cumulative Sub Debt		1,175,697	2,351,394	4,702,787	7,054,181	9,405,575	11,756,968	14,108,362	16,459,755	18,811,149	175,052
Sub Debt Paid									-	-	20,987,491
Remaining For Dividends									-	-	-
Equity & Sub Debt Cash Flow to Consortium	(26,671,717)	-	(26,671,717)	-	-	-	-	-	-	-	20,987,491
Equity Cash Flow to Consortium	(19,928,768)	-	(19,928,768)	-	-	-	-	-	-	-	-

x1000 DRX

Consortium Debt&Equity Irr. 13 75%
 Consortium Equity Irr 14 74%

Assumptions:
 15% of Total Debt is required to be placed in Reserved fund.
 Subordinate Debt is for 10 years at 12%

Appendix II-2-2

<u>Cashflow From Operations.</u>	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Operating Revenue (From II-6-1)	99,863,811	108,680,584	118,254,285	128,765,456	139,212,025	150,579,766	161,427,509	171,497,093	182,263,677	191,993,964
Operating Costs (From II-16-1)	(39,945,524)	(43,464,234)	(47,301,714)	(51,506,182)	(55,684,810)	(60,231,907)	(64,571,004)	(68,598,837)	(72,905,471)	(76,797,585)
Gross Operating Income	59,918,286	65,196,350	70,952,571	77,259,274	83,527,215	90,347,860	96,856,505	102,898,256	109,358,206	115,196,378
ADF Received (From II-4-1 (Constr), II-1-1 (Oper))	15,025,223	15,468,661	15,924,887	16,394,219	21,028,710	21,489,686	21,967,415			
Grants of Rights Fee (From ADA Schedule 2)	(295,224)	(295,224)	(295,224)	(295,224)	(295,224)	(295,224)	(295,224)	(295,224)	(295,224)	(17,279,457)
EBITD	74,648,285	80,369,787	86,582,214	93,358,268	104,260,701	111,542,322	118,528,696	102,603,032	109,062,982	97,916,921
Tax Payable								(35,911,061)	(38,172,044)	(34,270,923)
Cash Available for Senior Debt Service	74,648,285	80,369,787	86,582,214	93,358,268	104,260,701	111,542,322	118,528,696	66,691,971	70,890,938	63,645,999
Interest Payment on Senior Debt (From II-5-1)	26,149,029	24,349,941	22,470,753	20,504,575	19,311,604	18,016,037	16,609,052	15,081,066	13,421,673	11,619,573
Principal Payment (From II-5-1)	21,373,206	22,304,615	23,316,125	13,671,756	15,064,727	16,360,294	17,767,279	19,295,265	20,954,658	22,756,758
Senior Debt Service	47,522,235	46,654,557	45,786,878	34,376,331	34,376,331	34,376,331	34,376,331	34,376,331	34,376,331	34,376,331
CASH FROM OPERATIONS NET OF DEBT SERVICE	27,126,051	33,715,230	40,795,335	58,981,937	69,884,370	77,165,991	84,152,365	32,315,639	36,514,607	29,269,668
<u>Investment Cashflow.</u>										
Capital Expenditure (From II-4-1)										
<u>Grants (From II-4-1)</u>										
Greek Government Grant										
EU Grant										
<u>Equity Capital (From II-4-1)</u>										
Ordinary Equity Drawdown										
Subordinate Debt Drawdown										
<u>Senior Debt Capital (From II-4-1)</u>										
EIB Loan Construction Amount										
Commercial Loan Construction Amount										
<u>Total Debt</u>										
Net Project Cash Flow:	27,126,051	33,715,230	40,795,335	58,981,937	69,884,370	77,165,991	84,152,365	32,315,639	36,514,607	29,269,668
<u>Value of Cash Reserve</u>										
Remaining for Sub Debt -	27,126,051	33,715,230	40,795,335	58,981,937	69,884,370	77,165,991	84,152,365	32,315,639	36,514,607	29,269,668
Sub Debt Required	1,175,697	1,175,697								
Cummulative Sub Debt	-	-								
Sub Debt Paid	1,350,748	1,175,697								
<u>Remaining For Dividends</u>										
Remaining For Dividends	26,775,302	32,539,533	40,795,335	58,981,937	69,884,370	77,165,991	84,152,365	32,315,639	36,514,607	29,269,668
<u>Equity & Sub Debt Cash Flow to Consortium.</u>										
Equity Cash Flow to Consortium:	12,049,634	15,818,467	18,367,901	26,541,872	31,447,966	34,724,696	37,868,564	14,542,036	16,431,573	13,171,351
Equity Cash Flow to Consortium:	11,598,866	14,642,790	18,367,901	26,541,872	31,447,966	34,724,696	37,868,564	14,542,036	16,431,573	13,171,351

x1000 DRX

Appendix II-2-3

Cashflow From Operations:	2017	2018	2019	2020	2021	2022	2023	2024	2025
Operating Revenue (From II-6-1)	202,318,630	212,046,093	222,292,873	232,889,987	244,172,040	256,056,463	268,577,684	281,772,123	295,678,486
Operating Costs (From II-16-1)	(80,927,452)	(84,818,437)	(88,917,149)	(93,155,995)	(97,668,816)	(102,422,585)	(107,431,073)	(112,708,849)	(118,271,394)
Gross Operating Income	121,391,178	127,227,656	133,375,724	139,733,992	146,503,224	153,633,878	161,146,610	169,063,274	177,407,091
ADF Received (From II-4-1 (Constr), II-1-1 (Oper))									
Grants of Rights Fee (From ADA Schedule 2)	(18,208,677)	(19,084,148)	(20,008,359)	(20,960,099)	(21,975,484)	(23,045,082)	(24,171,992)	(25,359,491)	(26,611,064)
EBITD	103,182,501	108,143,507	113,367,365	118,773,894	124,527,741	130,588,796	136,974,619	143,703,783	150,796,028
Tax Payable	(36,113,875)	(37,850,228)	(39,679,278)	(41,570,863)	(43,584,709)	(45,708,079)	(47,941,117)	(50,296,324)	(52,778,610)
Cash Available for Senior Debt Service	67,068,626	70,293,280	73,690,087	77,203,031	80,943,031	84,882,718	89,033,502	93,407,459	98,017,418
Interest Payment on Senior Debt (From II-5-1)	9,862,492	7,537,101	5,228,928	2,722,251					
Principal Payment (From II-5-1)	24,713,840	26,839,230	29,147,404	31,654,080					
Senior Debt Service	34,376,331	34,376,331	34,376,331	34,376,331					
CASH FROM OPERATIONS NET OF DEBT SERVICE	32,692,295	35,916,949	39,313,756	42,826,700	80,943,031	84,882,718	89,033,502	93,407,459	98,017,418
Investment Cashflow:									
Capital Expenditure (From II-4-1)									
Grants (From II-4-1)									
Greek Government Grant									
EU Grant									
Equity Capital (From II-4-1)									
Ordinary Equity Drawdown									
Subordinate Debt Drawdown									
Senior Debt Capital (From II-4-1)									
EIB Loan Construction Amount									
Commercial Loan Construction Amount									
Total Debt									
Net Project Cash Flow	32,692,295	35,916,949	39,313,756	42,826,700	80,943,031	84,882,718	89,033,502	93,407,459	98,017,418
Value of Cash Reserve									
Remaining for Sub Debt	32,692,295	35,916,949	39,313,756	42,826,700	80,943,031	84,882,718	89,033,502	93,407,459	98,017,418
Sub Debt Required									
Cummulative Sub Debt									
Sub Debt Paid									
Remaining For Dividends	32,692,295	35,916,949	39,313,756	42,826,700	80,943,031	84,882,718	89,033,502	93,407,459	98,017,418
Equity & Sub Debt Cash Flow to Consortium:	14,711,533	16,162,627	17,601,100	19,272,015	36,424,364	38,197,223	40,065,076	42,033,356	44,107,838
Equity Cash Flow to Consortium:	14,711,533	16,162,627	17,601,100	19,272,015	36,424,364	38,197,223	40,065,076	42,033,356	44,107,838

x1000 DRX

Base Case Capital Investments:

PROJECT Name	Aggregate	YEAR				
		1996	1997	1998	1999	2000
Indirect costs (40%)	208,130,000	81,191,298	13,451,208	27,036,302	44,783,996	41,667,196
Terminal Building	84,712,455	7,624,121	18,636,740	28,802,235	29,649,359	
Satellite	19,887,539	1,789,879	4,375,259	6,761,763	6,960,639	
Police Building	3,642,699			692,113	2,950,586	
Building & Ground Maint.	7,072,771		4,809,484	2,263,287		
Mobile Equipment WS	2,674,504		2,112,858	561,646		
IKA Clinic	4,356,217			2,657,292	1,524,676	174,249
Ramp Service	2,741,413		740,182	2,001,231		
Sewage Plant	8,264,436				7,768,570	495,866
Air Mail	2,365,877			1,040,986	1,324,891	
Control Tower	24,277,608	2,184,985	5,341,074	8,254,387	8,497,163	
Fire/Rescue Station	4,581,539			2,703,108	1,740,985	137,446
Runways	14,780,779			5,173,273	7,833,813	1,773,693
Taxiways/Aprons	40,995,835		14,348,542	21,727,793	4,919,500	
Misc. Roadways	5,489,239	93,317	1,756,556	1,838,895	1,619,326	181,145
Employee Parking (S)	981,815				225,817	755,998
Passenger Parking	733,500				168,705	564,795
Earthworks	69,992,766	2,099,783	14,698,481	29,396,962	23,797,540	
Aircraft Bridge	5,902,791				5,194,456	708,335
Airfield Light Sys & P S	9,256,169		2,776,851	5,090,893	1,388,425	
Total:	520,839,952	94,983,382	83,047,235	146,002,165	150,348,448	46,458,723

x1000 DRX

Appendix II-4-1

Sources and Uses During Construction:

	Aggregate	1996	1997	1998	1999	2000
<u>Sources</u>						
Airport Development Fund	65,567,842	10,499,879	13,554,341	15,909,622	13,087,634	12,516,369
Greek State Grant	44,286,062	11,071,555	11,071,555	11,071,555	11,071,555	
EU Grant	73,810,103	18,452,486	18,452,486	18,452,486	18,452,486	
Ordinary Equity	39,857,535	19,928,768		19,928,768		
Subordinate Debt	13,285,899	6,642,949		6,642,949		
EIB Loan	301,402,024	27,126,182	39,182,263	72,336,486	108,504,729	54,252,364
Commercial Loan	94,885,822	8,539,724	12,335,157	22,772,597	34,158,896	17,079,448
Total Sources	633,095,287	102,261,543	94,595,802	167,114,462	185,275,299	83,848,181
<u>Uses</u>						
Capital Expenditure	520,839,952	94,983,382	83,047,235	146,002,165	150,348,448	46,458,723
Operating Losses	37,311,945	4,242,490	4,830,857	7,314,649	10,860,704	10,063,246
Interest During Construction	74,943,390	3,035,671	6,717,710	13,797,649	24,066,148	27,326,213
Total Uses	633,095,287	102,261,543	94,595,802	167,114,462	185,275,299	83,848,181

x1000 DRX

Appendix II-5-1

Debt Analysis:

	1996	1997	1998	1999	2000	2001	
Drawdown.							
EIB	301,402,024	27,126,182	39,182,263	72,336,486	108,504,729	54,252,364	
Commercial Bank	94,885,822	8,539,724	12,335,157	22,772,597	34,158,896	17,079,448	
EIB Loan:							
Principal		27,126,182	39,182,263	72,336,486	108,504,729	54,252,364	301,402,024
Interest Payment		2,332,852	5,702,526	11,923,464	21,254,871	25,920,574	25,920,574
Principal Payment							
Total Debt Service on EIB Loan		2,332,852	5,702,526	11,923,464	21,254,871	25,920,574	25,920,574
Commercial Loans:							
Principal		8,539,724	12,335,157	22,772,597	34,158,896	17,079,448	94,885,822
Interest Payment		702,819	1,015,183	1,874,185	2,811,277	1,405,639	7,809,103
Principal Payment							10,542,869
Total Debt Service on Comm. Loan		702,819	1,015,183	1,874,185	2,811,277	1,405,639	18,351,972
TOTAL INTEREST EXPENSE:		3,035,671	6,717,710	13,797,649	24,066,148	27,326,213	33,729,677
TOTAL PRINCIPAL PAYMENT:							10,542,869
TOTAL DEBT SERVICE:		3,035,671	6,717,710	13,797,649	24,066,148	27,326,213	44,272,546
		← CONSTRUCTION →					

x1000 DRX

EIB rate: 8.60% Repayment period (years): 25
 AF(17y, 8.6%) 8.768 8 years interest only; Annuity thereafter
 Annuity: 34,376,331
 Comm. Bank: 8.23%

Appendix II-5-2

Debt Analysis:

	2002	2003	2004	2005	2006	2007
Drawdown:						
EIB						
Commercial Bank						
EIB Loan:						
Principal	301,402,024	301,402,024	292,946,267	283,763,315	273,790,629	262,960,292
Interest Payment	25,920,574	25,920,574	25,920,574	25,193,379	24,403,645	23,545,994
Principal Payment			8,455,757	9,182,952	9,972,686	10,830,337
Total Debt Service on EIB Loan	25,920,574	25,920,574	34,376,331	34,376,331	34,376,331	34,376,331
Commercial Loans:						
Principal	84,342,953	73,800,084	63,257,215	52,714,346	42,171,477	31,628,607
Interest Payment	6,941,425	6,073,747	5,206,069	4,338,391	3,470,713	2,603,034
Principal Payment	10,542,869	10,542,869	10,542,869	10,542,869	10,542,869	10,542,869
Total Debt Service on Comm. Loan	17,484,294	16,616,616	15,748,938	14,881,260	14,013,582	13,145,904
TOTAL INTEREST EXPENSE:	32,861,999	31,994,321	31,126,643	29,531,770	27,874,358	26,149,029
TOTAL PRINCIPAL PAYMENT:	10,542,869	10,542,869	18,998,626	19,725,821	20,515,555	21,373,206
TOTAL DEBT SERVICE:	43,404,868	42,537,190	50,125,269	49,257,591	48,389,913	47,522,235

x1000 DRX

Appendix II-5-3

Debt Analysis:

	2008	2009	2010	2011	2012	2013
Drawdown:						
EIB						
Commercial Bank						
EIB Loan:						
Principal	251,198,546	238,425,290	224,553,534	209,488,807	193,128,513	175,361,234
Interest Payment	22,614,585	21,603,075	20,504,575	19,311,604	18,016,037	16,609,052
Principal Payment	11,761,746	12,773,256	13,871,756	15,064,727	16,360,294	17,767,279
Total Debt Service on EIB Loan	34,376,331	34,376,331	34,376,331	34,376,331	34,376,331	34,376,331
Commercial Loans:						
Principal	21,085,738	10,542,869				
Interest Payment	1,735,356	867,678				
Principal Payment	10,542,869	10,542,869				
Total Debt Service on Comm. Loan	12,278,225	11,410,547				
TOTAL INTEREST EXPENSE:	24,349,941	22,470,753	20,504,575	19,311,604	18,016,037	16,609,052
TOTAL PRINCIPAL PAYMENT:	22,304,615	23,316,125	13,871,756	15,064,727	16,360,294	17,767,279
TOTAL DEBT SERVICE:	46,654,557	45,786,878	34,376,331	34,376,331	34,376,331	34,376,331

x1000 DRX

Appendix II-5-4

Debt Analysis:

	2014	2015	2016	2017	2018	2019	2020
Drawdown:							
EIB							
Commercial Bank							
EIB Loan:							
Principal	156,065,969	135,111,311	112,354,553	87,640,713	60,801,484	31,654,080	0
Interest Payment	15,081,066	13,421,673	11,619,573	9,662,492	7,537,101	5,228,928	2,722,251
Principal Payment	19,295,265	20,954,658	22,756,758	24,713,840	26,839,230	29,147,404	31,654,080
Total Debt Service on EIB Loan	34,376,331	34,376,331	34,376,331	34,376,331	34,376,331	34,376,331	34,376,331
Commercial Loans:							
Principal							
Interest Payment							
Principal Payment							
Total Debt Service on Comm. Loan							
TOTAL INTEREST EXPENSE:	15,081,066	13,421,673	11,619,573	9,662,492	7,537,101	5,228,928	2,722,251
TOTAL PRINCIPAL PAYMENT:	19,295,265	20,954,658	22,756,758	24,713,840	26,839,230	29,147,404	31,654,080
TOTAL DEBT SERVICE:	34,376,331	34,376,331	34,376,331	34,376,331	34,376,331	34,376,331	34,376,331

x1000 DRX

Appendix II-6-1

Operating Revenues by Project:

	2001	2005	2010	2015	2020	2025
Terminal Building	20,209,027	32,413,617	49,829,749	70,649,599	90,058,595	113,969,325
Satellite	4,731,197	7,589,100	11,667,766	16,543,714	21,089,599	26,689,955
Police Building						
Building & Ground Maint.						
Mobile Equipment WS						
Catering	820,148	1,319,404	2,034,252	2,889,845	3,689,611	4,675,464
IKA Clinic						
Ramp Service	2,060,441	3,108,478	4,496,958	6,094,376	7,518,135	9,150,804
Sewage Plant	1,067,486	1,067,490	1,067,495	1,067,500	1,067,505	1,067,510
Cargo Facility	833,006	1,525,608	2,648,572	4,348,193	6,489,692	9,495,992
Air Mail	220,502	403,837	701,093	1,150,992	1,717,860	2,513,645
Veterinary Building	73,501	134,612	233,698	383,664	572,620	837,882
Forwarders Building	98,001	179,483	311,597	511,552	763,493	1,117,176
Control Tower						
Fire/Rescue Station						
Hotel	252,321	357,200	478,014	609,970	707,122	819,749
Fuel Farm	418,800	662,601	1,004,972	1,411,859	1,786,210	2,246,032
Runways	4,893,269	7,903,329	12,232,090	17,421,261	22,288,694	28,293,244
Taxiways/Aprons	13,790,123	22,273,019	34,472,255	49,096,282	62,813,591	79,735,506
Roadways						
Employee Parking (S)						
Passenger Parking	875,100	1,413,412	2,187,557	3,115,576	3,986,055	5,059,895
Earthworks						
Aircraft Bridge	1,009,913	1,631,154	2,524,559	3,595,543	4,600,123	5,839,392
Airfield Light Sys & P S	1,067,486	1,067,490	1,067,495	1,067,500	1,067,505	1,067,510
Convention Center	302,785	428,640	573,617	731,964	848,547	983,698
Home Base	651,220	921,906	1,233,719	1,574,287	1,825,030	2,115,710
Total Operating Revenues:	53,374,325	84,400,381	128,765,456	182,263,677	232,889,987	295,678,486

Note: The above table is a consolidation of Appendices II-6 through II-15 as they relate to the base case. Every fifth year is only shown.

Appendix II-7-1

In terminal Concessions:

Revenues:

Area	Revenue Contribution to Airport Co. per passenger	
	(ECU)	(DRX)
Departures:		
Duty Free:	0.54	157.5
Retail:	0.54	157.5
Lounges, etc:	0.19	55.4
Restaurants:	0.19	55.4
Landside Areas:	0.11	32.1
All Areas:	1.57	458.0

Source: Business Plan

Revenue Contribution from Property Development:

Item	Revenue Contribution per year In Millions	
	(ECU)	(DRX)
Office Rental	2.7	787.6
Other In-terminal Space	2.1	612.6
All:	4.8	1,400.2

Source: Business Plan

Appendix II-7-2

Concession Revenue per year:

	2001	2002	2005	2010	2015	2020	2025
Concession revenue:	5,866,585	7,028,242	9,475,373	14,665,164	20,886,509	26,722,117	33,921,027
Rental Revenue:	1,400,160	1,618,025	1,982,150	2,652,564	3,384,804	3,923,916	4,548,894
Total (x1000DRX):	7,266,745	8,646,267	11,457,523	17,317,728	24,271,313	30,646,033	38,469,921

This total Revenue will be split between the Main Terminal & Satellite Building.

For simplicity, assume at a proportion according to their size:

Area of Building:

Main Terminal Building:	160,000
Satellite:	37,000

Source: Master Plan

Therefore, proportions are as follows:

Main Terminal Building:	0.81
Satellite:	0.19

Revenues, adjusted to each area:

	2001	2002	2005	2010	2015	2020	2025
Main Terminal Building:	5,901,925	7,022,349	9,305,603	14,065,160	19,712,742	24,890,179	31,244,606
Satellite:	1,364,820	1,623,918	2,151,921	3,252,568	4,558,571	5,755,854	7,225,315

x1000 DRX

Appendix II-8-1

Catering Facilities:

Assume:

8.9ECU (2596.13DRX) per departing International passenger

0.32ECU (93.34DRX) per departing Domestic passenger

Source: Business Plan

Passenger Mix:

67% International

33% Domestic

Assume 1/2 of the traffic is served by the catering:

	2001	2005	2010	2015	2020	2025
International	11,140,907	17,994,156	27,849,801	39,664,411	50,746,492	64,417,544
Domestic	199,402	322,062	498,460	709,920	908,269	1,152,956
Total (x1000 DRX)	11,340,309	18,316,219	28,348,261	40,374,331	51,654,761	65,570,500

Assuming Catering is a concession, the revenue to the Airport Company is the Following:

7% of profit+47,500ECU/Hectre (13,855,750DRX/Hectre). Catering requires 1.9 HA

Source: Business Plan

Year 1 Lease: 26,325,925 DRX

Revenue to Airport Company:

	2001	2005	2010	2015	2020	2025
Profit Share:	793,822	1,282,135	1,984,378	2,826,203	3,615,833	4,589,935
Lease:	26,326	37,269	49,874	63,642	73,778	85,529
Total (x1000 DRX)	820,148	1,319,404	2,034,252	2,889,845	3,689,611	4,675,464

Airside Charges:**Passenger Charge of 26ECU (7584 DRX)***Source: Coopers and Lybrand*

The basis of this charge is the sum of (i)passenger and (ii)ADF charges retained by the Airport Company, at 30% above the average of the three highest charges levied at European airports in 1995 on per passenger basis.

The ADF is the Airport Development Fund. It is a special tax which is collected in Greek Airports for the reconstruction of other Airports. It is approximately 16ECU.

Therefore, the Airside revenues are at 10ECU (2,917DRX) per passenger.

	2001	2002	2003	2005	2010	2015	2020	2025
Revenue (x1000DRX)	37,366,785	44,765,871	49,455,357	60,352,695	93,408,690	133,035,087	170,204,569	216,057,500

This figure will be split between the airside (Runways, taxiways) and the terminal as Passenger related charges charged directly to the airlines for the use of the terminal.

Proportions to be used:

Terminal	50%
Airside	50%

The Proportions are based on values found in Airport Infrastructure Finance concerning average revenues for European Airports.

	2001	2002	2003	2005	2010	2015	2020	2025
Terminal	18,683,392	22,382,936	24,727,679	30,176,348	46,704,345	66,517,543	85,102,285	108,028,750
Runways/Taxiways x1000 DRX	18,683,392	22,382,936	24,727,679	30,176,348	46,704,345	66,517,543	85,102,285	108,028,750

Appendix II-9-2

A further breakdown is made.

The Terminal consists of the Main Terminal Building, the Satellite Terminal, and the Loading Bridges.

Revenues are assumed allocated according to initial capital investment proportions.

Main Terminal:	77%
Satellite:	18%
Loading Bridges:	5%

Revenues:

	2001	2002	2003	2005	2010	2015	2020	2025
Main Terminal:	14,307,102	17,140,086	18,935,610	23,108,014	35,764,589	50,936,858	65,168,416	82,724,718
Satellite:	3,366,377	4,032,961	4,455,438	5,437,180	8,415,197	11,985,143	15,333,745	19,464,640
Loading Bridges:	1,009,913	1,209,888	1,336,631	1,631,154	2,524,559	3,595,543	4,600,123	5,839,392

Splitting the Airside into its components, according to initial capital investment, the proportions are:

Runways:	26%
Taxiways/Aprons:	74%

Revenues:

If DB

	2001	2002	2003	2005	2010	2015	2020	2025
Runways:	4,893,269	5,862,197	6,476,297	7,903,329	12,232,090	17,421,261	22,288,694	28,293,244
Taxiways/Aprons:	13,790,123	16,520,738	18,251,382	22,273,019	34,472,255	49,096,282	62,813,591	79,735,506

Appendix II-9-3
If BOT

Revenue is from lease according to size of area:

Lease at 47,500 ECU/HA. (13,855,750 DRX/HA)

	sq. m.	H.A.	Lease Price
Runways:	496800	49.68	688,354
Taxiways/Aprons:	2067560	206.756	2,864,759
			x1000DRX

Also, take 7% of yearly Revenues:

	2001	2002	2003	2005	2010	2015	2020	2025
Runways:	1,030,883	1,205,815	1,304,485	1,527,708	2,160,313	2,883,543	3,489,304	4,216,877
Taxiways/Aprons:	3,830,068	4,466,968	4,819,849	5,614,636	7,840,264	10,362,127	12,425,373	14,888,627

Appendix II-10-1

Cargo Facilities:

Business plan is set up differently for the Cargo Facility:

It is set up with a projected return to the Airport Company of 4.2 Million ECU (1,225 Million DRX) the first year. The Airport Company is assumed to take 15% of the revenues of the Cargo Concessionaire. Therefore, total Cargo revenues are projected at 8,167 Million DRX.

Going Backwards, a per ton revenue for cargo for the first year is: 57,111DRX

	2001	2005	2010	2015	2020	2025
Revenue (x1000DRX):	8,166,730	14,956,940	25,966,391	42,629,340	63,624,435	93,097,961
Revenue to Airport Company:	1,225,010	2,243,541	3,894,959	6,394,401	9,543,665	13,964,694
Lease:						

There are four projects which involve the Cargo Facilities.

These are: the Cargo Facilities, Air Mail Building, Veterinary Building, and Forwarders Building.

The amount of revenue allocated to each of the projects will be based on the following ratios:

Cargo Facility	0.68
Air Mail	0.18
Veterinary Building	0.06
Forwarders Building	0.08

	2001	2005	2010	2015	2020	2025
Cargo Facility	833,006	1,525,608	2,648,572	4,348,193	6,489,692	9,495,992
Air Mail	220,502	403,837	701,093	1,150,992	1,717,860	2,513,645
Veterinary Building	73,501	134,612	233,698	383,664	572,620	837,882
Forwarders Building	98,001	179,483	311,597	511,552	763,493	1,117,176
Total	1,225,010	2,243,541	3,894,959	6,394,401	9,543,665	13,964,694

Appendix II-11-1

Ramp Service Revenue:

"Aircraft Handling"

Charge:

763 ECU/ATM
222,567 DRX/ATM

Source: Coopers & Lybrand

	2000	2001	2002	2003	2005	2010	2015	2020	2025
Revenue (x1000 DRX)	30,020,963	35,743,138	39,092,566	46,757,135	70,062,997	97,315,727	122,884,094	152,128,018	
If Concession:									
4.5% of Turnover:	1,350,943	1,608,441	1,759,165	2,104,071	3,152,835	4,379,208	5,529,784	6,845,761	
Lease:									
Required Space:			Cost (ECU)						
Ground Area	1.3 Ha		47,500	61,750					
Building Area	12,400 Sq.m.		75	930,000					
Office Area	7,027 Sq.m.		205	1,440,535					
				2,432,285					
Source: Coopers & Lybrand									
Total Lease In DRX:	709,498 (x1000)								
Total Revenue (Including Lease):	2,060,441	2,428,337	2,636,453	3,108,478	4,496,958	6,094,376	7,518,135	9,150,804	

Appendix II-11-2

Equipment:

In order to calculate the costs of the equipment portion of this project, the following assumptions were used:

Personnel:

Labor 1800
 Supervision 200

Source: Master Plan

Labor Rates:

Labor 6,000,000 DRX
 Supervision 7,000,000 DRX

Source: Business Plan

Therefore annual labor Costs are:

12,200,000,000 DRX

For Operations and Maintenance assume extra 15%:

14,030,000,000 DRX

Equipment:

Number of Vehicles: 3,427

Source: Master Plan

Assume 5,000,000DRX average investment cost per vehicle:

Cost of Vehicles: 17,135,000,000

If DBB:

	2000	2001	2002	2003	2005	2010	2015	2020	2025
Added Investment Costs:	17,135,000								
Operating Revenues:		30,020,963	35,743,138	39,092,588	46,757,135	70,062,997	97,315,727	122,884,094	152,128,018
Operating Costs:		14,030,000	16,213,068	17,347,983	19,861,705	26,579,442	33,916,699	39,318,749	45,581,207

Appendix II-12-1

Fuel Facility:

Consumption Per Passenger:
85 lt/passenger

Source: *Coopers & Lybrand*

Jet Fuel Price (Spot):
48.4 US Cents/gallon (January 1995)

Source: *Airport Infrastructure Finance*

In Drachmae/Liter:
35.84

Assume all departing flights refuel, therefore only consider half the traffic value:

	2001	2005	2010	2015	2020	2025
Revenues: (x1000DRX)	19,512,200	31,514,990	48,776,180	69,468,305	88,877,477	112,820,975

If BOT Airport Company Takes: 0.0022 ECU/liter (0.642DRX/lt) plus 47,500 ECU/HA (5 HA total Area Required)

Source: *Business Plan*

Annual Lease: 69,278,750 DRX

	2001	2005	2010	2015	2020	2025
Fuel:	349,521	564,526	873,725	1,244,382	1,592,057	2,020,956
Lease:	69,279	98,075	131,247	167,477	194,152	225,075
Total: x1000 DRX	418,800	662,601	1,004,972	1,411,859	1,786,210	2,246,032

Appendix II-13-1

Hotel:

600 bed, medium to high priced

Source: Master Plan

Assumptions:

50% occupancy

90,000DRX per/room

(Typical case for the Athens Area)

Yearly Revenues:

9,855,000,000

Lease:

865,000

252,320,500

Source: Business Plan

	2001	2005	2010	2015	2020	2025
Lease:	252,321	357,200	478,014	609,970	707,122	819,749
x1000 DRX						

Appendix II-14-1

Passenger Car Parking:

For first year:

3 million ECU

875.1 million DRX

Source: Business Plan

Per passenger rate:

68.3 DRX/passenger

	2001	2005	2010	2015	2020	2025
Parking Revenue	875,100	1,413,412	2,187,557	3,115,576	3,986,055	5,059,895

For Employee parking assume the same revenue stream if given out as a concession.

Appendix II-15-1

Home Base Lease:

Assumption for this case is that Olympic Airways will not be able to construct its own facilities. AIA therefore delivers the facilities DBO by subsidizing the construction costs. The amount which it will require Olympic to pay back for the subsidy will be calculated using the Equivalent Annual Costs method. Operation and Maintenance of the facilities is still provided by Olympic. Also, an extra land lease is paid to AIA. The land lease is the same amount for BOT or DBO delivery.

Construction Costs:

118,252,750
x1000DRX

Assume subsidy of 50% of Construction Costs:

59,126,375

Expected Rate of Return:

12%

Annual Depreciation:

Assume Straightline over 25 years.

2,365,055

Annual Depreciation Tax Shield:

Assume constant taxes of 35% per year starting 2010

827,769

	59,126,375	1997	1998	1999	2000	2001	2002	2003	2004
Capital Investment		(591,264)	(15,964,121)	(36,658,353)	(5,912,638)				
Depreciation Tax Shield									
Total:		(591,264)	(15,964,121)	(36,658,353)	(5,912,638)	-	-	-	-
NPV @ 12%		(46,795,509)							
PV @ 2001:		(65,744,321)							

Appendix II-15-1

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
					827,769	827,769	827,769	827,769	827,769	827,769
-	-	-	-	-	827,769	827,769	827,769	827,769	827,769	827,769

Appendix II-15-1

25 year annuity factor: 7.84

Break-even annual After Tax Lease: 8,382,399
x1000DRX

Before tax, add 35% 11,316,239

Land Lease:

Total Required Area:
470,000Sq. M.

Source: Olympic Airways

Annual Lease @ 47,500ECU/HA (13,855,750DRX/HA)
651,220,250

	1997	1998	1999	2000	2001	2002	2003	2004
Ground Lease per year (x1000DRX)					651,220	752,550	805,229	861,595

IF DBO:

	1997	1998	1999	2000	2001	2002	2003	2004
Required Investment:	(591,264)	(15,964,121)	(36,658,353)	(5,912,638)				
Revenue: x1000 DRX					11,967,459	13,829,595	14,797,667	15,833,504

Appendix II-15-1

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
921,906	977,221	1,035,854	1,098,005	1,163,885	1,233,719	1,307,742	1,386,206	1,455,516	1,513,737	1,574,287

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
16,941,849	17,958,360	19,035,862	20,178,013	21,388,694	22,672,016	24,032,337	25,474,277	26,747,991	27,817,910	28,930,627

Appendix II-15-1

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
1,621,515	1,670,161	1,720,265	1,771,873	1,825,030	1,879,781	1,936,174	1,994,259	2,054,087	2,115,710

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
29,798,546	30,692,502	31,613,277	32,561,675	33,538,526	34,544,681	35,581,022	36,648,452	37,747,906	38,880,343

Appendix II-16-1

Operating Expenses (Excluding Those During Construction):

	2001	2005	2010	2015	2020	2025
Terminal Building	7,616,874	12,044,500	18,375,694	26,010,249	33,234,962	42,195,302
Satellite	1,788,177	2,827,630	4,313,974	6,106,302	7,802,414	9,905,990
Police Building	327,531	517,923	790,169	1,118,460	1,429,128	1,814,430
Building & Ground Maint.	635,944	1,005,613	1,534,214	2,171,635	2,774,837	3,522,949
Mobile Equipment WS	240,477	380,264	580,149	821,184	1,049,279	1,332,171
Catering	-	-	-	-	-	-
IKA Clinic	391,687	619,371	944,944	1,337,540	1,709,061	2,169,833
Ramp Service	246,493	389,777	594,663	841,728	1,075,530	1,365,499
Sewage Plant	743,092	1,175,046	1,792,709	2,537,526	3,242,359	4,116,518
Cargo Facility	-	-	-	-	-	-
Air Mail	212,727	336,383	513,202	726,423	928,197	1,178,444
Veterinary Building	-	-	-	-	-	-
Forwarders Building	-	-	-	-	-	-
Control Tower	2,182,908	3,451,814	5,266,261	7,454,236	9,524,755	12,092,685
Fire/Rescue Station	411,947	651,408	993,820	1,406,723	1,797,460	2,282,066
Hotel	-	-	-	-	-	-
Fuel Farm	-	-	-	-	-	-
Runways	1,329,006	2,101,546	3,206,224	4,538,314	5,798,895	7,362,311
Taxiways/Aprons	3,686,118	5,828,828	8,892,753	12,587,427	16,063,763	20,420,039
Roadways	373,257	590,229	900,483	1,274,606	1,628,646	2,067,739
Employee Parking (S)	68,761	105,569	161,062	227,978	291,303	369,839
Passenger Parking	65,952	104,290	159,110	225,215	287,772	365,357
Earthworks	-	-	-	-	-	-
Aircraft Bridge	401,378	634,696	968,324	1,370,634	1,751,347	2,223,520
Airfield Light Sys & P S	629,401	995,267	1,518,429	2,149,291	2,746,287	3,486,702
Convention Center	-	-	-	-	-	-
Home Base	-	-	-	-	-	-
Total:	21,349,730	33,760,153	51,506,182	72,905,471	93,155,995	118,271,394

x1000 DRX

The assumption made for operating costs is that it is 40% of the year's revenue. This is backed up by cases of various international Airports found in Airport Infrastructure Finance.

Once the total operating cost for the entire Airport were found they were distributed to each of the projects according to their size.

Appendix III-1-1

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Cashflow From Operations:										
Operating Revenue						50,868,122	59,773,064	65,098,409	70,932,022	77,386,320
Operating Costs	(4,242,490)	(4,830,857)	(7,314,649)	(10,860,704)	(10,063,246)	(20,347,249)	(23,909,226)	(26,039,364)	(28,372,809)	(30,954,528)
Gross Operating Income	(4,242,490)	(4,830,857)	(7,314,649)	(10,860,704)	(10,063,246)	30,520,873	35,863,838	39,059,045	42,559,213	46,431,792
ADF Received	6,656,708	10,730,980	11,257,844	20,648,499	16,391,212	15,600,633	16,173,201	16,698,540	17,240,290	17,798,946
Grants of Rights Fee (ADA Schedule 2)						(320)	(320)	(320)	(320)	(320)
EBITD	2,414,218	5,900,122	3,943,195	9,787,796	6,327,967	46,121,186	52,036,719	55,757,266	59,799,183	64,230,418
Tax Payable										
Cash Available for Senior Debt Service	2,414,218	5,900,122	3,943,195	9,787,796	6,327,967	46,121,186	52,036,719	55,757,266	59,799,183	64,230,418
Interest Payment on Senior Debt	3,393,211	6,000,824	12,680,291	24,524,820	27,490,212	33,932,107	33,059,221	32,186,336	31,313,450	29,709,005
Principal Payment	-	-	-	-	-	10,606,142	10,606,142	10,606,142	19,112,647	19,844,206
Senior Debt Service	3,393,211	6,000,824	12,680,291	24,524,820	27,490,212	44,538,249	43,665,364	42,792,478	50,426,097	49,553,211
CASH FROM OPERATIONS NET OF DEBT SERVICE	(978,993)	(100,702)	(8,737,096)	(14,737,025)	(21,162,245)	1,582,936	8,371,356	12,964,788	9,373,086	14,677,206
Investment Cashflow:										
Capital Expenditure	(94,983,382)	(89,289,956)	(135,065,221)	(174,253,487)	(50,597,667)					
Grants:										
Greek Government Grant	11,071,555	11,071,555	11,071,555	11,071,555						
EU Grant	18,452,486	18,452,486	18,452,486	18,452,486						
Equity Capital:										
Ordinary Equity Drawdown	19,928,768		19,928,768							
Subordinate Debt Drawdown	6,642,949		6,642,949							
Senior Debt Capital:										
EIB Loan Construction Amount	30,321,090	30,321,090	66,706,397	121,284,358	54,577,961					
Commercial Loan Construction Amount	9,545,528	9,545,528	21,000,162	38,182,113	17,181,951					
Total Debt	39,866,618	39,866,618	87,706,559	159,466,471	71,759,912					
Net Project Cash Flow:	0	(0)	0	(0)	(0)	1,582,936	8,371,356	12,964,788	9,373,086	14,677,206
Value of Cash Reserve						1,582,936	9,954,292	22,919,080	32,292,166	46,989,372
Remaining for Sub Debt									-	-
Sub Debt Required		1,175,697	1,175,697	2,351,394	2,351,394	2,351,394	2,351,394	2,351,394	2,351,394	2,351,394
Cummulative Sub. Debt		1,175,697	2,351,394	4,702,787	7,054,181	9,405,575	11,756,968	14,108,362	16,459,755	18,811,149
Sub Debt Paid									-	-
Remaining For Dividends									-	-
Equity & Sub Debt Cash Flow to Consortium:	(26,671,717)	-	(26,671,717)	-	-	-	-	-	-	-
Equity Cash Flow to Consortium:	(19,928,768)	-	(19,928,768)	-	-	-	-	-	-	-

x1000 DRX

Consortium Debt&Equity irr. 12.28%
 Consortium Equity irr. 13.19%

Assumptions:

Those concerning traffic, and individual projects are seen in Appendix II.

10% of Total Debt is required to be in reserve fund

Subordinate debt is for 10 years at 12%

Proforma was built as in the Base Case, Not all sheets appear in this appendix

Appendix III-1-2

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Cashflow From Operations:											
Operating Revenue	83,483,225	90,091,955	97,256,806	105,026,018	113,499,986	122,038,717	131,283,174	139,976,854	147,906,655	156,348,144	163,826,314
Operating Costs	(33,393,290)	(38,036,782)	(38,902,723)	(42,010,407)	(45,399,994)	(48,815,487)	(52,513,270)	(55,990,741)	(59,162,662)	(62,539,258)	(65,530,625)
Gross Operating Income	<u>50,089,935</u>	<u>54,055,173</u>	<u>58,354,084</u>	<u>63,015,611</u>	<u>68,099,991</u>	<u>73,223,230</u>	<u>78,769,904</u>	<u>83,986,112</u>	<u>88,743,993</u>	<u>93,808,886</u>	<u>98,295,788</u>
ADF Received	18,325,035	18,866,258	19,423,055	19,995,886	20,585,223	21,028,710	21,489,686	21,967,415			
Grants of Rights Fee (ADA Schedule 2)	(295,224)	(295,224)	(295,224)	(295,224)	(295,224)	(295,224)	(295,224)	(295,224)	(295,224)	(295,224)	(14,744,368)
EBITD	<u>68,119,746</u>	<u>72,626,207</u>	<u>77,481,915</u>	<u>82,716,272</u>	<u>88,389,990</u>	<u>93,958,718</u>	<u>99,964,366</u>	<u>105,658,303</u>	<u>111,151,575</u>	<u>116,219,438</u>	<u>121,291,120</u>
Tax Payable								(30,957,069)	(32,729,782)	(29,242,997)	
Cash Available for Senior Debt Service	68,119,746	72,626,207	77,481,915	82,716,272	88,389,990	93,956,716	99,964,366	105,658,303	57,491,700	60,783,880	54,308,423
Interest Payment on Senior Debt	28,041,646	26,305,962	24,496,078	22,605,612	20,627,634	19,427,503	18,124,161	16,708,732	15,171,575	13,502,224	11,689,308
Principal Payment	20,638,680	21,501,478	22,438,477	23,456,058	13,955,008	15,155,138	16,458,480	17,873,910	19,411,066	21,080,418	22,893,334
Senior Debt Service	48,680,326	47,807,440	46,934,555	46,061,669	34,582,641	34,582,641	34,582,641	34,582,641	34,582,641	34,582,641	34,582,641
CASH FROM OPERATIONS NET OF DEBT SERVICE	19,439,420	24,818,766	30,547,360	36,654,603	53,807,348	59,374,075	65,381,725	71,075,661	22,909,058	26,201,239	19,725,782
Investment Cashflow:											
Capital Expenditure											
Grants:											
Greek Government Grant											
EU Grant											
Equity Capital:											
Ordinary Equity Drawdown											
Subordinate Debt Drawdown											
Senior Debt Capital:											
EIB Loan Construction Amount											
Commercial Loan Construction Amount											
Total Debt											
Net Project Cash Flow.	19,439,420	24,818,766	30,547,360	36,654,603	53,807,348	59,374,075	65,381,725	71,075,661	22,909,058	26,201,239	19,725,782
Value of Cash Reserve	59,799,927										
Remaining for Sub Debt	6,608,866	24,818,766	30,547,360	36,654,603	53,807,348	59,374,075	65,381,725	71,075,661	22,909,058	26,201,239	19,725,782
Sub. Debt Required	2,351,394	1,175,697	1,175,697								
Cummulative Sub Debt	14,553,677	-	-								
Sub Debt Paid	6,608,866	15,729,374	1,175,697								
Remaining For Dividends	-	9,089,392	20,371,663	36,654,603	53,807,348	60,374,075	65,381,725	71,075,661	22,909,058	26,201,239	19,725,782
Equity & Sub Debt Cash Flow to Consortium	6,608,866	19,819,600	14,392,945	16,404,571	24,213,307	26,718,334	29,421,778	31,984,048	10,309,076	11,790,557	8,876,602
Equity Cash Flow to Consortium.	-	4,090,226	13,217,248	16,494,571	24,213,307	26,718,334	29,421,778	31,984,048	10,309,076	11,790,557	8,876,602

x1000 DRX

Appendix III-1-3

	2017	2018	2019	2020	2021	2022	2023	2024	2025
Cashflow From Operations:									
Operating Revenue	171,731,850	179,302,740	187,256,496	195,415,876	204,108,728	213,237,220	222,831,946	232,916,940	243,519,873
Operating Costs	(68,692,740)	(71,721,096)	(74,902,598)	(78,166,350)	(81,642,691)	(85,294,888)	(89,132,778)	(93,166,776)	(97,407,949)
Gross Operating Income	103,039,110	107,581,644	112,353,898	117,249,525	122,466,037	127,942,332	133,699,168	139,750,164	146,111,924
ADF Received									
Grants of Rights Fee (ADA Schedule 2)	(15,455,866)	(16,137,247)	(16,853,085)	(17,587,429)	(18,369,606)	(19,191,350)	(20,054,875)	(20,962,525)	(21,916,789)
EBITD	87,583,243	91,444,397	95,500,813	99,662,097	104,096,431	108,750,982	113,644,292	118,787,640	124,195,135
Tax Payable	(30,654,135)	(32,005,539)	(33,425,285)	(34,881,734)	(36,433,051)	(38,062,844)	(39,775,502)	(41,575,674)	(43,468,297)
Cash Available for Senior Debt Service	56,929,108	59,438,858	62,075,528	64,780,363	67,661,380	70,688,138	73,868,790	77,211,966	80,726,838
Interest Payment on Senior Debt	9,720,481	7,582,335	5,260,309	2,738,589					
Principal Payment	24,862,160	27,000,306	29,322,332	31,844,053					
Senior Debt Service	34,582,641	34,582,641	34,582,641	34,582,641					
CASH FROM OPERATIONS NET OF DEBT SERVICE	22,346,467	24,856,217	27,492,887	30,197,721	67,661,380	70,688,138	73,868,790	77,211,966	80,726,838
Investment Cashflow:									
Capital Expenditure									
Grants									
Greek Government Grant									
EU Grant									
Equity Capital:									
Ordinary Equity Drawdown									
Subordinate Debt Drawdown									
Senior Debt Capital									
EIB Loan Construction Amount									
Commercial Loan Construction Amount									
Total Debt									
Net Project Cash Flow	22,346,467	24,856,217	27,492,887	30,197,721	67,661,380	70,688,138	73,868,790	77,211,966	80,726,838
Value of Cash Reserve:									
Remaining for Sub Debt	22,346,467	24,856,217	27,492,887	30,197,721	67,661,380	70,688,138	73,868,790	77,211,966	80,726,838
Sub. Debt Required									
Cummulative Sub Debt									
Sub Debt Paid									
Remaining For Dividends	22,346,467	24,856,217	27,492,887	30,197,721	67,661,380	70,688,138	73,868,790	77,211,966	80,726,838
Equity & Sub. Debt Cash Flow to Consortium:	10,055,910	11,185,298	12,371,799	13,588,975	30,447,821	31,809,662	33,240,956	34,745,385	36,327,077
Equity Cash Flow to Consortium	10,055,910	11,185,298	12,371,799	13,588,975	30,447,821	31,809,662	33,240,956	34,745,385	36,327,077

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Appendix III-2-1

Alternate 1 Capital Investment:

PROJECT Name	Aggregate	YEAR				
		1996	1997	1998	1999	2000
Indirect costs (40%)	208,130,000	81,191,298	13,451,208	27,036,302	44,783,996	41,667,196
Terminal Building	84,712,455	7,624,121	18,636,740	28,802,235	29,649,359	
Satellite	19,887,539	1,789,879	4,375,259	6,761,763	6,960,639	
Police Building	3,642,699			692,113	2,950,586	
Building & Ground Maint.	7,072,771		4,809,484	2,263,287		
Mobile Equipment WS	2,674,504		2,112,858	561,646		
IKA Clinic	4,356,217			2,657,292	1,524,676	174,249
Ramp Service	2,741,413		740,182	2,001,231		
Sewage Plant	8,264,436				7,768,570	495,866
Air Mail	2,365,877			1,040,986	1,324,891	
Control Tower	24,277,608	2,184,985	5,341,074	8,254,387	8,497,163	
Fire/Rescue Station	4,581,539			2,703,108	1,740,985	137,446
Misc. Roadways	5,489,239	93,317	1,756,556	1,838,895	1,619,326	181,145
Employee Parking (S)	981,815				225,817	755,998
Passenger Parking	733,500				168,705	564,795
Earthworks	69,992,766	2,099,783	14,698,481	29,396,962	23,797,540	
Aircraft Bridge	5,902,791				5,194,456	708,335
Airfield Light Sys & P S	9,258,169		2,776,851	5,090,893	1,388,425	
Home Base:	59,128,375		591,264	15,964,121	36,658,353	5,912,638
Total:	524,189,713	94,983,382	69,289,956	135,065,221	174,253,487	50,597,667

x1000 DRX

Appendix III-3-1

Sources and Uses During Construction:

	1996	1997	1998	1999	2000	
Sources						
Airport Development Fund	65,685,241	6,656,708	10,730,980	11,257,844	20,648,499	16,391,212
Greek State Grant	44,286,062	11,071,555	11,071,555	11,071,555	11,071,555	
EU Grant	73,810,103	18,452,486	18,452,486	18,452,486	18,452,486	
Ordinary Equity	39,857,535	19,928,768		19,928,768		
Subordinate Debt	13,285,899	6,642,949		6,642,949		
EIB Loan	303,210,895	30,321,090	30,321,090	66,706,397	121,284,358	54,577,961
Commercial Loan	95,455,282	9,545,528	9,545,528	21,000,162	38,182,113	17,181,951
Total Sources	635,591,016	102,619,083	80,121,638	155,060,160	209,639,011	88,151,124
Uses						
Capital Expenditure	524,189,713	94,983,382	69,289,956	135,065,221	174,253,487	50,597,667
Operating Losses	37,311,945	4,242,490	4,830,857	7,314,649	10,860,704	10,063,246
Interest During Construction	74,089,358	3,393,211	6,000,824	12,680,291	24,524,820	27,490,212
Total Uses	635,591,016	102,619,083	80,121,638	155,060,160	209,639,011	88,151,124

x1000 DRX

Appendix III-4-2

Debt Analysis:

	2002	2003	2004	2005	2006	2007
Drawdown:						
EIB						
Commercial Bank						
EIB Loan:						
Principal	303,210,895	303,210,895	294,704,391	285,466,327	275,433,790	264,538,454
Interest Payment	26,076,137	26,076,137	26,076,137	25,344,578	24,550,104	23,687,306
Principal Payment			8,506,504	9,238,064	10,032,537	10,895,336
Total Debt Service on EIB Loan	26,076,137	26,076,137	34,582,641	34,582,641	34,582,641	34,582,641
Commercial Loans:						
Princinpal	84,849,139	74,242,997	63,636,855	53,030,712	42,424,570	31,818,427
Interest Payment	6,983,084	6,110,199	5,237,313	4,364,428	3,491,542	2,618,657
Principal Payment	10,606,142	10,606,142	10,606,142	10,606,142	10,606,142	10,606,142
Total Debt Service on Comm. Loan	17,589,227	16,716,341	15,843,456	14,970,570	14,097,685	13,224,799
TOTAL INTEREST EXPENSE:	33,059,221	32,186,336	31,313,450	29,709,005	28,041,646	26,305,962
TOTAL PRINCIPAL PAYMENT:	10,606,142	10,606,142	19,112,647	19,844,206	20,638,680	21,501,478
TOTAL DEBT SERVICE:	43,665,364	42,792,478	50,426,097	49,553,211	48,680,326	47,807,440

x1000 DRX

Appendix III-4-3

Debt Analysis:

	2008	2009	2010	2011	2012	2013
Drawdown:						
EIB Commercial Bank						
EIB Loan:						
Principal	252,706,120	239,856,205	225,901,197	210,746,059	194,287,578	176,413,668
Interest Payment	22,750,307	21,732,726	20,627,634	19,427,503	18,124,161	16,708,732
Principal Payment	11,832,334	12,849,915	13,955,008	15,155,138	16,458,480	17,873,910
Total Debt Service on EIB Loan	34,582,641	34,582,641	34,582,641	34,582,641	34,582,641	34,582,641
Commercial Loans:						
Principnal	21,212,285	10,606,142				
Interest Payment	1,745,771	872,886				
Principal Payment	10,606,142	10,606,142				
Total Debt Service on Comm. Loan	12,351,913	11,479,028				
TOTAL INTEREST EXPENSE:	24,496,078	22,605,612	20,627,634	19,427,503	18,124,161	16,708,732
TOTAL PRINCIPAL PAYMENT:	22,438,477	23,456,058	13,955,008	15,155,138	16,458,480	17,873,910
TOTAL DEBT SERVICE:	46,934,555	46,061,669	34,582,641	34,582,641	34,582,641	34,582,641

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Appendix III-4-4
Debt Analysis:

	2014	2015	2016	2017	2018	2019	2020
Drawdown:							
EIB Commercial Bank							
EIB Loan:							
Principal	157,002,602	135,922,185	113,028,851	88,166,691	61,166,385	31,844,053	0
Interest Payment	15,171,575	13,502,224	11,689,308	9,720,481	7,582,335	5,260,309	2,738,589
Principal Payment	19,411,066	21,080,418	22,893,334	24,862,160	27,000,306	29,322,332	31,844,053
Total Debt Service on EIB Loan	34,582,641	34,582,641	34,582,641	34,582,641	34,582,641	34,582,641	34,582,641
Commercial Loans:							
Principal							
Interest Payment							
Principal Payment							
Total Debt Service on Comm. Loan							
TOTAL INTEREST EXPENSE:	15,171,575	13,502,224	11,689,308	9,720,481	7,582,335	5,260,309	2,738,589
TOTAL PRINCIPAL PAYMENT:	19,411,066	21,080,418	22,893,334	24,862,160	27,000,306	29,322,332	31,844,053
TOTAL DEBT SERVICE:	34,582,641	34,582,641	34,582,641	34,582,641	34,582,641	34,582,641	34,582,641

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Appendix IV-1-1

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Cashflow From Operations:										
Operating Revenue						87,396,916	102,529,185	111,791,432	121,974,697	133,170,647
Operating Costs	(4,242,490)	(4,830,857)	(7,314,649)	(10,860,704)	(10,063,246)	(50,222,172)	(58,671,705)	(63,642,234)	(69,073,612)	(75,009,361)
Gross Operating Income	(4,242,490)	(4,830,857)	(7,314,649)	(10,860,704)	(10,063,246)	37,174,744	43,857,480	48,149,199	52,901,085	58,161,287
ADF Received	10,411,857	11,065,109	13,806,523	16,870,851	13,012,690	12,424,456	12,880,454	13,298,838	13,730,291	14,175,208
Grants of R ghts Fee (ADA Schedule 2)						(320)	(320)	(320)	(320)	(320)
EBITD	6,169,367	6,234,252	6,491,875	6,010,147	2,949,444	49,598,880	56,737,614	61,447,716	66,631,056	72,336,175
Tax Payable										
Cash Available for Senior Debt Service	6,169,367	6,234,252	6,491,875	6,010,147	2,949,444	49,598,880	56,737,614	61,447,716	66,631,056	72,336,175
Interest Payment on Senior Debt	3,043,860	6,735,831	13,834,869	22,778,241	27,713,134	33,820,665	32,950,647	32,080,628	31,210,609	29,611,434
Principal Payment	-	-	-	-	-	10,571,309	10,571,309	10,571,309	19,049,876	19,779,033
Senior Debt Service	3,043,860	6,735,831	13,834,869	22,778,241	27,713,134	44,391,975	43,521,956	42,651,937	50,260,486	49,390,467
CASH FROM OPERATIONS NET OF DEBT SERVICE	3,125,507	(501,580)	(7,342,994)	(16,768,094)	(24,763,690)	5,206,905	13,215,658	18,795,779	16,370,571	22,945,708
Investment Cashflow:										
Capital Expenditure	(94,983,382)	(80,678,853)	(144,118,410)	(139,910,142)	(62,654,820)					
Grants:										
Greek Government Grant	11,071,555	11,071,555	11,071,555	11,071,555						
EU Grant	18,452,486	18,452,486	18,452,486	18,452,486						
Equity Capital:										
Ordinary Equity Drawdown	19,928,768		19,928,768							
Subordinate Debt Drawdown	6,642,949		6,642,949							
Senior Debt Capital:										
EIB Loan Construction Amount	27,199,357	39,287,960	72,531,619	96,708,825	66,487,317					
Commercial Loan Construction Amount	8,562,761	12,368,432	22,834,028	30,445,371	20,931,192					
Total Debt	35,762,118	51,656,392	95,365,647	127,154,196	87,418,509					
Net Project Cash Flow:	0	(0)	(0)	(0)	-	5,206,905	13,215,658	18,795,779	16,370,571	22,945,708
Value of Cash Reserve:						5,206,905	18,422,563	37,218,342	53,588,912	59,603,529
Remaining for Sub Debt								-	-	16,931,091
Sub. Debt Required		1,175,697	1,175,697	2,351,394	2,351,394	2,351,394	2,351,394	2,351,394	2,351,394	2,351,394
Cummulative Sub. Debt		1,175,697	2,351,394	4,702,787	7,054,181	9,405,575	11,756,968	14,108,362	16,459,755	1,880,058
Sub Debt Paid								-	-	16,931,091
Remaining For Dividends									-	-
Equity & Sub Debt Cash Flow to Consortium:	(26,671,717)	-	(26,671,717)	-	-	-	-	-	-	18,031,091
Equity Cash Flow to Consortium:	(19,928,768)	-	(19,928,768)	-	-	-	-	-	-	-

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Consortium Debt&Equity Irr: 15.57%
 Consortium Equity Irr: 16.68%

Assumptions

Those concerning traffic and individual projects are seen in Appendix II.

15% of Total Debt is required to be in reserve fund.

Subordinate debt is for 10 years at 12%.

Proforma was built as in the Base Case; Not all sheets appear in this appendix

Appendix IV-1-2

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Cashflow From Operations:										
Operating Revenue	143,851,404	155,455,789	168,064,016	181,763,324	197,891,618	213,014,999	229,433,303	245,002,937	259,346,472	274,643,936
Operating Costs	(80,624,100)	(86,692,827)	(93,253,051)	(100,345,445)	(108,528,873)	(116,386,423)	(124,875,904)	(132,816,720)	(140,010,876)	(147,650,238)
Gross Operating Income	63,227,304	68,762,961	74,810,965	81,417,879	89,362,746	96,628,576	104,557,399	112,186,217	119,335,596	126,993,698
ADF Received	14,594,190	15,025,223	15,468,661	15,924,867	16,394,219	16,747,418	17,114,541	17,495,007		
Grants of R ghts Fee (ADA Schedule 2)	(295,224)	(295,224)	(295,224)	(295,224)	(295,224)	(295,224)	(295,224)	(295,224)	(295,224)	(295,224)
EBITD	77,526,270	83,492,960	89,984,401	97,047,522	105,461,740	113,080,767	121,376,715	129,386,000	119,040,372	126,698,473
Tax Payable									(41,664,130)	(44,344,466)
Cash Available for Senior Debt Service	77,526,270	83,492,960	89,984,401	97,047,522	105,461,740	113,080,767	121,376,715	129,386,000	77,376,242	82,354,008
Interest Payment on Senior Debt	27,949,551	28,219,567	24,415,627	22,531,370	20,559,887	19,383,698	18,064,637	16,653,856	15,121,748	13,457,879
Principal Payment	20,570,897	21,430,862	22,364,783	23,379,022	13,909,176	15,105,365	16,404,427	17,815,207	19,347,315	21,011,184
Senior Debt Service	48,520,448	47,650,429	46,780,410	45,910,392	34,469,064	34,469,064	34,469,064	34,469,064	34,469,064	34,469,064
CASH FROM OPERATIONS NET OF DEBT SERVICE	29,005,822	35,842,531	43,203,991	51,137,130	70,992,677	78,611,704	88,907,652	94,916,936	42,907,178	47,884,944
Investment Cashflow:										
Capital Expenditure										
Grants:										
Greek Government Grant										
EU Grant										
Equity Capital:										
Ordinary Equity Drawdown										
Subordinate Debt Drawdown										
Senior Debt Capital:										
EIB Loan Construction Amount										
Commercial Loan Construction Amount										
Total Debt:										
Net Project Cash Flow.	29,005,822	35,842,531	43,203,991	51,137,130	70,992,677	78,611,704	88,907,652	94,916,936	42,907,178	47,884,944
Value of Cash Reserve	59,603,529									
Remaining for Sub Debt	29,005,822	35,842,531	43,203,991	51,137,130	70,992,677	78,611,704	88,907,652	94,916,936	42,907,178	47,884,944
Sub. Debt Required	2,351,394	1,175,697	1,175,697							
Cummulative Sub Debt	-	-	-							
Sub Debt Paid	4,231,452	1,175,697	1,175,697							
Remaining For Dividends	24,774,370	34,666,834	42,028,294	51,137,130	70,992,677	78,611,704	88,907,652	94,916,936	42,907,178	47,884,944
Equity & Sub Debt Cash Flow to Consortium:	15,379,918	16,775,772	20,088,429	23,011,709	31,946,705	35,375,267	39,108,443	42,712,621	19,308,230	21,548,225
Equity Cash Flow to Consortium	11,148,467	15,600,075	18,912,732	23,011,709	31,946,705	35,375,267	39,108,443	42,712,621	19,308,230	21,548,225

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Appendix IV-1-3

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Cashflow From Operations:										
Operating Revenue	288,766,529	303,728,250	317,738,823	332,469,461	346,337,908	361,904,973	378,252,324	395,421,292	413,455,348	432,400,469
Operating Costs	(154,516,084)	(161,759,949)	(168,641,371)	(175,853,366)	(182,741,672)	(190,367,754)	(198,352,349)	(206,713,634)	(215,470,706)	(224,643,729)
Gross Operating Income	134,250,445	141,968,302	149,097,452	156,616,095	163,596,236	171,537,219	179,899,975	188,707,658	197,984,643	207,756,741
ADF Received										
Grants of Rights Fee (ADA Schedule 2)	(20,137,567)	(21,295,245)	(22,364,618)	(23,482,414)	(24,539,435)	(25,730,583)	(26,984,896)	(28,306,149)	(29,697,696)	(31,163,511)
EBITD	114,112,878	120,673,056	126,732,834	133,123,681	139,056,800	145,806,636	152,914,979	160,401,509	168,286,946	176,593,230
Tax Payable	(39,939,507)	(42,235,570)	(44,356,492)	(46,593,288)	(48,669,880)	(51,032,323)	(53,520,243)	(56,140,528)	(58,900,431)	(61,807,630)
Cash Available for Senior Debt Service	74,173,371	78,437,487	82,376,342	86,530,392	90,386,920	94,774,313	99,394,736	104,260,981	109,386,515	114,785,599
Interest Payment on Senior Debt	11,850,917	9,688,557	7,557,433	5,243,033	2,729,594					
Principal Payment	22,818,146	24,780,507	26,911,630	29,226,031	31,739,469					
Senior Debt Service	34,469,064	34,469,064	34,469,064	34,469,064	34,469,064					
CASH FROM OPERATIONS NET OF DEBT SERVICE	39,704,307	43,968,423	47,907,278	52,061,329	55,917,856	94,774,313	99,394,736	104,260,981	109,386,515	114,785,599
Investment Cashflow:										
Capital Expenditure										
<u>Grants</u>										
Greek Government Grant										
EU Grant										
<u>Equity Capital</u>										
Ordinary Equity Drawdown										
Subordinate Debt Drawdown										
<u>Senior Debt Capital</u>										
EIB Loan Construction Amount										
Commercial Loan Construction Amount										
Total Debt										
Net Project Cash Flow:	39,704,307	43,968,423	47,907,278	52,061,329	55,917,856	94,774,313	99,394,736	104,260,981	109,386,515	114,785,599
Value of Cash Reserve:										
Remaining for Sub Debt	39,704,307	43,968,423	47,907,278	52,061,329	55,917,856	94,774,313	99,394,736	104,260,981	109,386,515	114,785,599
Sub. Debt Required										
Cummulative Sub Debt										
Sub Debt Paid										
Remaining For Dividends	39,704,307	43,968,423	47,907,278	52,061,329	55,917,856	94,774,313	99,394,736	104,260,981	109,386,515	114,785,599
Equity & Sub Debt Cash Flow to Consortium:	17,868,938	19,785,790	21,558,275	23,427,598	25,163,035	42,648,441	44,727,831	46,917,441	49,223,932	51,653,520
Equity Cash Flow to Consortium:	17,868,938	19,785,790	21,558,275	23,427,598	25,163,035	42,648,441	44,727,831	46,917,441	49,223,932	51,653,520

x1000 DRX

Appendix IV-2-1

Alternate 2 Capital Investments:

PROJECT Name	Aggregate	YEAR				
		1996	1997	1998	1999	2000
Indirect costs (40%)	208,130,000	81,191,298	13,451,208	27,036,302	44,783,996	41,667,196
Terminal Building	84,712,455	7,624,121	18,636,740	28,802,235	29,649,359	
Satellite	19,887,539	1,789,879	4,375,259	6,761,763	6,960,639	
Police Building	3,642,699			692,113	2,950,586	
Building & Ground Maint.	7,072,771		4,809,484	2,263,287		
Mobile Equipment WS	2,674,504		2,112,858	561,646		
IKA Clinic	4,356,217			2,657,292	1,524,676	174,249
Ramp Service						
Building	2,741,413		740,182	2,001,231		
Equipment	17,135,000					17,135,000
Cargo Facility	6,632,450		66,325	2,387,682	3,913,146	265,298
Air Mall	2,365,877			1,040,986	1,324,891	
Veterinary Building	480,000		110,400	369,600		
Forwarders Building	681,600		231,744	449,856		
Control Tower	24,277,608	2,184,985	5,341,074	8,254,387	8,497,163	
Fire/Rescue Station	4,581,539			2,703,108	1,740,985	137,446
Runways	14,780,779			5,173,273	7,833,813	1,773,693
Taxiways/Aprons	40,995,835		14,348,542	21,727,793	4,919,500	
Misc. Roadways	5,489,239	93,317	1,756,556	1,838,895	1,819,328	181,145
Employee Parking (S)	981,815				225,817	755,998
Passenger Parking	733,500				168,705	564,795
Earthworks	69,992,766	2,099,783	14,698,481	29,396,962	23,797,540	
Total:	522,345,606	94,963,382	80,678,853	144,118,410	139,910,142	62,654,820

x1000 DRX

Appendix IV-3-1

Sources and Uses During Construction:

	1996	1997	1998	1999	2000	
Sources						
Airport Development Fund	65,167,027	10,411,857	11,065,109	13,806,523	16,870,851	13,012,690
Greek State Grant	44,286,062	11,071,555	11,071,555	11,071,555	11,071,555	
EU Grant	73,810,103	18,452,486	18,452,486	18,452,486	18,452,486	
Ordinary Equity	39,857,535	19,928,768		19,928,768		
Subordinate Debt	13,285,899	6,642,949		6,642,949		
EIB Loan	302,215,078	27,199,357	39,287,960	72,531,619	96,708,825	66,487,317
Commercial Loan	95,141,784	8,562,761	12,368,432	22,834,028	30,445,371	20,931,192
Total Sources	633,763,486	102,269,732	92,245,542	165,267,928	173,549,087	100,431,199
Uses						
Capital Expenditure	522,345,606	94,983,382	80,678,853	144,118,410	139,910,142	62,654,820
Operating Losses	37,311,945	4,242,490	4,830,857	7,314,649	10,860,704	10,063,246
Interest During Construction	74,105,935	3,043,860	6,735,831	13,834,869	22,778,241	27,713,134
Total Uses	633,763,486	102,269,732	92,245,542	165,267,928	173,549,087	100,431,199

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Appendix IV-4-2

Debt Analysis:

	2002	2003	2004	2005	2006	2007
Drawdown:						
EIB						
Commercial Bank						
EIB Loan:						
Principal	302,215,078	302,215,078	293,736,511	284,528,787	274,529,199	263,669,646
Interest Payment	25,990,497	25,990,497	25,990,497	25,261,340	24,469,476	23,609,511
Principal Payment			8,478,567	9,207,724	9,999,588	10,859,553
Total Debt Service on EIB Loan	25,990,497	25,990,497	34,469,064	34,469,064	34,469,064	34,469,064
Commercial Loans:						
Principal	84,570,474	73,999,165	63,427,856	52,856,546	42,285,237	31,713,928
Interest Payment	6,960,150	6,090,131	5,220,113	4,350,094	3,480,075	2,610,056
Principal Payment	10,571,309	10,571,309	10,571,309	10,571,309	10,571,309	10,571,309
Total Debt Service on Comm. Loan	17,531,459	16,661,441	15,791,422	14,921,403	14,051,384	13,181,366
TOTAL INTEREST EXPENSE:	32,950,647	32,080,628	31,210,609	29,611,434	27,949,551	26,219,567
TOTAL PRINCIPAL PAYMENT:	10,571,309	10,571,309	19,049,876	19,779,033	20,570,897	21,430,862
TOTAL DEBT SERVICE:	43,521,956	42,651,937	50,260,486	49,390,467	48,520,448	47,650,429

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Appendix IV-4-3

Debt Analysis:

	2008	2009	2010	2011	2012	2013
Drawdown:						
EIB						
Commercial Bank						
EIB Loan:						
Principal	251,876,172	239,068,459	225,159,283	210,053,918	193,649,491	175,834,283
Interest Payment	22,675,590	21,661,351	20,559,887	19,363,698	18,064,637	16,653,856
Principal Payment	11,793,474	12,807,713	13,909,176	15,105,365	16,404,427	17,815,207
Total Debt Service on EIB Loan	34,469,064	34,469,064	34,469,064	34,469,064	34,469,064	34,469,064
Commercial Loans:						
Principal	21,142,619	10,571,309				
Interest Payment	1,740,038	870,019				
Principal Payment	10,571,309	10,571,309				
Total Debt Service on Comm. Loan	12,311,347	11,441,328				
TOTAL INTEREST EXPENSE:	24,415,627	22,531,370	20,559,887	19,363,698	18,064,637	16,653,856
TOTAL PRINCIPAL PAYMENT:	22,364,783	23,379,022	13,909,176	15,105,365	16,404,427	17,815,207
TOTAL DEBT SERVICE:	46,780,410	45,910,392	34,469,064	34,469,064	34,469,064	34,469,064

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Appendix IV-4-4
Debt Analysis:

	2014	2015	2016	2017	2018	2019	2020
Drawdown:							
EIB							
Commercial Bank							
EIB Loan:							
Principal	156,486,968	135,475,784	112,657,637	87,877,130	60,965,500	31,739,469	0
Interest Payment	15,121,748	13,457,879	11,650,917	9,688,557	7,557,433	5,243,033	2,729,594
Principal Payment	19,347,315	21,011,184	22,818,146	24,780,507	26,911,630	29,226,031	31,739,469
Total Debt Service on EIB Loan	34,469,064	34,469,064	34,469,064	34,469,064	34,469,064	34,469,064	34,469,064
Commercial Loans:							
Principal							
Interest Payment							
Principal Payment							
Total Debt Service on Comm. Loan							
TOTAL INTEREST EXPENSE:	15,121,748	13,457,879	11,650,917	9,688,557	7,557,433	5,243,033	2,729,594
TOTAL PRINCIPAL PAYMENT:	19,347,315	21,011,184	22,818,146	24,780,507	26,911,630	29,226,031	31,739,469
TOTAL DEBT SERVICE:	34,469,064	34,469,064	34,469,064	34,469,064	34,469,064	34,469,064	34,469,064

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References

Bibliography

1. Ashford, Norman, Stanton, H. P. Martin, and Moore, Clifton A. Airport Operations. London: Bookraft Ltd., 1991.
2. Ashford, Norman and Wright, Paul H. Airport Engineering. 3rd ed. New York: John Wiley & Sons, Inc., 1992.
3. Brealey, Richard A. and Myers, Stuart C. Principles of Corporate Finance. 5th ed. New York: McGraw Hill, 1996.
4. Carter, E. Eugene. Portfolio Aspects of Corporate Capital Budgeting. Lexington: D.C. Heath and Company, 1974.
5. Fleischer, Gerald A. Capital Allocation Theory: The Study of Investment Decisions. New York: Appleton-Century-Crofts, 1969.
6. Giannakopoulos, Dimitris. MIT SM Thesis: Creating Infrastructure for Europe's Unification: Financing and Management of Construction Projects in the European Union. Cambridge: Massachusetts Institute of Technology, 1995.
7. Goldman, Harvey and Mokuvos, Sandra. The Privatization Book. New York: Arthur Young, 1984.
8. Gordon, Christopher. 1.472 Innovative Contract Strategies in the Public and Private Sectors (Reader). Cambridge: MIT, 1997.
9. The Group of Personal Representatives of the Heads of State or Government, Report: Trans-European networks. Luxembourg: Office for Official Publications of the European Commission, 1995
10. Hendrickson, Chris and Au, Tung. Project Management for Construction. Englewood Cliffs: Prentice-Hall, 1989.
11. Howard, George P. Airport Economic Planning. Cambridge: Massachusetts Institute of Technology, 1974.
12. Hudson, Maurice G. Airport Technology International. London: The Sterling Publishing Group, 1989.
13. Juan, Ellis J. Airport Infrastructure: The Emerging Role of the Private Sector. Washington, D.C.: The World Bank, 1995.

14. Miller, John B. 1.441 Public Infrastructure Development Systems (Reader). Cambridge: MIT, 1997.
15. Smith, Donald I., Odegard, John D., Shea, William. Airport Planning and Management. Belmont: Wadsworth Publishing Company, 1984.
16. Wacht, R. A New Approach to Capital Budgeting. 2nd ed. Atlanta: Georgia State University, 1987.
17. Wiley, John R. Airport Administration. Eno Foundation for Transportation, Inc, 1981.

Periodicals

1. "Athens airport link finalised." Privatization International. April 1, 1996
2. "Athens International Airport." Infrastructure Finance. September 9, 1996: p. 87
3. "Athens: New Athens Airport." Europe. October 1995 n350.: pp. 36-27
4. "The Biggest Infrastructure Project in Europe." To Vima. July 28, 1996.
5. "Bulldozers on Attiki Odos." To Vima. June 8, 1997.
6. "Construction" Express Special Supplement. March 1997
7. "Corner Stone for a New Expansion" Ependitis: Annual Supplement. March 23, 1997.
8. "Design-Build & Co.: A Brave New World." Civil Engineering. June 1997: pp. 58-61
9. "The Eleven Months of Spata." To Vima. May 25, 1997
10. "EC clears Athens Spata finance." Airports International. July 1996: p 2
11. "EU roadblock on Greek infrastructure plans: Brussels is holding back funding until Athens can convince it that money will be spent wisely." Financial Times (London). October 11, 1994: p. 2
12. "Greece's first BOT project takes off." Privatisation International. September 1995 n84: p. 5

13. "Greece undertakes 75 major projects for infrastructure and development." Business America. May 17, 1993 v 114 n10: p. 17
14. "Green Light for Athens Spata." Airports International. April 1995: p. 2
15. "How we Secured the Loan for Spata" To Vima. September 29, 1996
16. "Move Valued at 118 Billion" Ta Nea. August 6, 1997.
17. "Olympic at Spata" Naftemboriki. August 6, 1997.
18. "Project Finance" Euromoney. The 1996 Guide to Greek Financial Markets Supplement. September 1996. p. 20-23
19. "World Trade News: Hochtief set for Athens take-off." Financial Times (London). August 1, 1995: p. 4
20. Szyliowicz, Joseph S. and Goetz, Andrew R. "Getting Realistic about megaproject planning: The case of the new Denver International Airport." Policy Sciences. November 1995 v28n4: pp. 347-367
21. "Spata International Airport: The Construction Commences. Will be Operational in 2001." Technical Review of Greece. July 8, 1996. p. 28-32
22. "Stagnant Prices at Spata." To Vima. November 13, 1996.
23. "Rushing Now the Projects." To Vima. September 8, 1996
24. "This Time the Projects Will Happen." To Vima. September 8, 1996
25. "These are the New Projects for 1997." To Vima. December 22, 1996
26. "Wanted 1.5 Billion for Projects." To Vima. February 23, 1997
27. "Who is Working at Spata." To Vima. January 26, 1997.

Athens International Airport Documents

1. Request For Proposals, The New Athens International Airport at Spata. December 23, 1991
2. New Athens International Airport Master Plan, June 30, 1995
3. Airport Development Agreement, July 31, 1995

4. Athens International Airport Public Relations Pamphlet, 1996

Olympic Airways Documents

1. Study for the Relocation to the New International Airport, April 1997