

ATTIKO METRO (ATHENS METRO BASE PROJECT), ATTIKI, GREECE

OVERVIEW

LOCATION: ATTIKI REGION, GREECE

SCOPE: INTRA-URBAN

TRANSPORT MODE: METRO

PRINCIPAL CONSTRUCTION: TUNNEL

NEW LINK: YES

PRINCIPAL OBJECTIVES

MODERNISE TRANSPORT NETWORK

TRAVEL TIME SAVINGS

REDUCED POLLUTION

ALTERNATIVE TO CAR TRAVEL

CONGESTION RELIEF

URBAN REGENERATION

ECONOMIC DEVELOPMENT

PRINCIPAL STAKEHOLDERS

CLIENT/PROJECT MANAGER:

ATTIKO METRO SA

DESIGN/CONSTRUCTION:

OLYMPIAKO METRO

PROJECT CONSULTANT:

BECHTEL INTERNATIONAL

FUNDER: EUROPEAN UNION/EIB

PLANNING AND IMPLEMENTATION

PLANNING START DATE: 03/1985

CONSTRUCTION START DATE: 11/1992

OPERATION START DATE:

01/2000; 11/2000; 04/2003

MONTHS IN PLANNING: 92

MONTHS IN CONSTRUCTION:

86; 96; 125

PROJECT COMPLETED: 28; 38; 65

MONTHS BEHIND SCHEDULE

COSTS (IN 2010 USD)

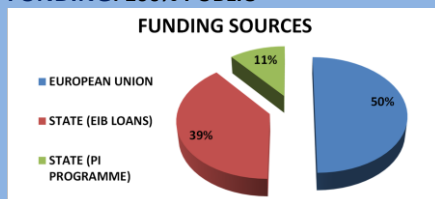
PREDICTED COST: 3.10BN

ACTUAL COST: 4.61BN

PROJECT COMPLETED:

49% OVER BUDGET

FUNDING: 100% PUBLIC



INFRASTRUCTURE QUANTITIES:

LENGTH: 17.6KM

COST PER KM (2010 USD): 0.26BN



INTRODUCTION

The Athens Metro Base Project is a 17.6km underground rapid transit network in metropolitan Athens. Its two lines serve 20 stations and opened in three stages in 2000 and 2003.

The two lines connect at Syntagma station, and three other stations provide connections to the pre-existing metropolitan railway line.

The Metro network has since been extended five times and is now 51km long with 32 stations. Four further extensions are in progress.

BACKGROUND

The main objective of the project was to modernise the transport network in Athens, providing an alternative to car travel and so reducing congestion, pollution and travel times. It was also intended to act as a catalyst for urban renewal in the vicinity of the stations, and to increase employment opportunities.

At the time of planning the project, although proposals for an underground system had been studied on several occasions, the city's public transport network consisted of one rail line and bus, trolley bus and tram routes. Wilbur Smith & Associates' 1963/4 Smith Study had proved influential, but the *coup d'etat* by a military junta in 1967 impeded progress. In 1971 however, the government invited Smith to submit a new proposal. Feasibility and preparatory studies by a Greek-French consortium, SOFRETU, followed. The project was approved by government in 1978 and included in the general strategic principles of the 1979 Athens Regulatory Plan.

During this time, high levels of car ownership were making urban public transport services unprofitable and causing traffic congestion. More detailed technical studies were began, under the supervision of Athens-Piraeus Electric Railways (ISAP), but a change in government in 1981 led to the suspension of the project until its adoption as a conscious policy in the new Regulatory Plan of 1985.

International protests led to some route modifications to avoid important archaeological sites, and plans to extend the line to Kerameikos were abandoned as a result. The location of stations was, in many cases, influenced by public consultation.

TIMELINE

CONCEPTION: 1963: SMITH STUDY PROPOSES TWO-LINE NETWORK
DELAY: 1967-1974: GREECE RULED BY MILITARY JUNTA
CONCEPTION: 1971: GOVERNMENT INVITES NEW SMITH PROPOSAL
CONCEPTION: 1974: NEW SMITH PROPOSAL ALSO RECOMMENDS TWO-LINE NETWORK
INCEPTION: 1977/78: GOVERNMENT ORDERS FEASIBILITY STUDY OF SMITH PROPOSAL & PRELIMINARY STUDY, APPROVES PROJECT
INCEPTION: 1979: PROJECT INCLUDED IN ATHENS REGULATORY PLAN
DELAY: 1981: NEW GOVERNMENT SUSPENDS PROJECT
INCEPTION: 1985 (MAR): PROJECT ADOPTED IN NEW ATHENS REGULATORY PLAN
INCEPTION: 1987: CONSTRUCTION CONTRACT TENDERED
INCEPTION: 1988: THREE COMPANIES SHORTLISTED AND SUBMIT TENDERS
INCEPTION: 1991: ATTIKO METRO SET UP, CONTRACT AGREED WITH OLYMPIC METRO
CONSTRUCTION: 1992 (NOV): CONSTRUCTION BEGINS
CONSTRUCTION: 1993: TUNNEL BORING MACHINES DELIVERED
CONTROVERSY: 1994: ATTIKO METRO/OLYMPIC METRO CONTRACT RENEGOTIATED TO RESOLVE DELAYS
ACCIDENT: 1994: TUNNEL COLLAPSE CAUSED BY USE OF UNSUITABLE MACHINERY
CONSTRUCTION: 1996: CONSTRUCTION BECOMES VISIBLE WITH ARRIVAL OF TBM2 AT SYNTAGMA SQUARE
CONCEPTION: 1997: GOVERNMENT DEMANDS ROUTE CHANGE TO AVOID KERAMEIKOS CEMETERY
DELIVERY: 2000 (JAN): PARTIAL OPENING (14 STATIONS)
DELIVERY: 2000 (NOV): PARTIAL OPENING (FIVE STATIONS)
DELIVERY: 2003 (APR): PARTIAL OPENING (MONASTIRAKI STATION)

Urban renewal initiatives, increased land values and demand for property development have also occurred around stations.

CHARACTERISTICS

Attiko Metro SA, a government-owned company, was set up in 1991 to act as client and project manager, although Bechtel International also provided some project management services in a consultancy role. The government also signed a lump sum construction contract with Olympic Metro (a consortium of 23 Greek, French and German firms), for EUR 0.83bn (USD 3.10bn at 2010 prices)ⁱ, with a delivery date of September 1997. Construction began in 1992 but, due to client-contractor conflicts and contractual vagueness, the contract was renegotiated in 1994, with additional fundingⁱⁱ and a new delivery date of October 1998.

The final project cost was EUR 2.76bn (2003 prices) (equivalent to USD 4.61bn at 2010 prices) including construction costs (EUR 2.1bn), VAT, tax, loan interests and disbursements. The impact of archaeological investigations was partly responsible for cost overruns, in one case requiring a redesign of the route to avoid the Kerameikos cemetery.

Various combinations of tunnelling techniques were used in the construction, including Tunnel Boring Machines, Open Face Shield, NATM and Cut & Cover. Attiko Metro is also developing bus transfer stations and park-and-ride facilities at Metro stations, with the aim of linking the network to remoter areas and discouraging cars from entering the city centre.

TIMELINE ISSUES

Delays were evident soon after the start of construction and were attributed to relations between Attiko Metro and Olympic Metro and differing interpretations of contracts. Extensive archaeological investigations also contributed to delays.

FUNDING

Construction costs were funded by the European Union Community Support Framework (50%) and the Greek State, through its Public Investment Programme (11%) and loans from the European Investment Bank (39%). Attiko Metro SA is responsible for repaying the loans, although they are guaranteed by the State.

ⁱ Costs have been converted to USD at 2010 prices, using historic inflation rates and current exchange rates, to allow comparison between projects.

ⁱⁱ The increase in funding is balanced out by inflation when converting to current prices.