Briefing Memorandum:

Mohammedia Port – Morocco

ICA Meeting:

Financing Transport for Growth in Africa

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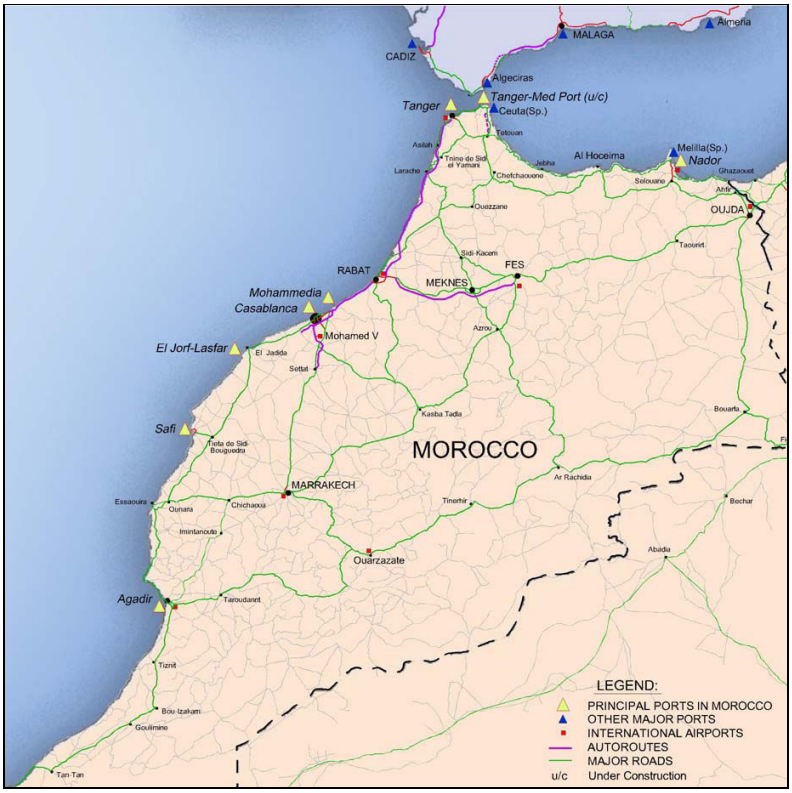
1. Summary

The proposed project is to bring into operation a new container terminal at Mohammedia Port.

Port of Casablanca, Morocco's largest container terminal, is currently near capacity and is considerably constrained by land shortages and lack of political support. The construction of the new major multi-purpose port facility, Tanger-Med Port, is nearing completion and was designed to become a transhipment and hub port for the Western Mediterranean. This will ease some of the pressure, but will not be able to completely replace Casablanca as a hub port for the country and the region due to constraints on the available road and rail networks at Tangier.

Mohammedia does not have adequate facilities to handle general cargo or containers and this memorandum focuses on the viability, both economic and financial, of a new container terminal at Mohammedia and the potential role of the private sector in its operation.

THE PRINCIPAL PORTS OF MOROCCO



As part of the MEDA (Euro Mediterranean Partners Project) Infrastructure Contract, Dar al-Handasah, in association with ARUP, RAND Europe and Comito & Associati ("the Consortium") carried out a pre-feasibility study in 2006 on the new container terminal at Mohammedia. The project is noted as a key element of the Moroccan National Ports strategy.

Mohammedia is the major crude oil import facility for Morocco and additional crude oil import terminals are needed to ensure the country's continued economic growth. Bringing in private-sector partners in the development of the facilities for the proposed third oil berth offers an opportunity for the Government of Morocco to share some of the costs of developing a general cargo or container facility at Mohammedia.

The case for developing a container terminal at Mohammedia is strong. Mohammedia would provide a more modern container port facility than the facilities at Casablanca, and Mohammedia Port has better land access and egress than Casablanca. The underlying need for increased capacity in container handling is supported by the trend of increasing world seaborne trade of between 5%-8% per year. Even though the new Tanger-Med Port could potentially reduce throughput to Casablanca, there is still an overall need for increased container handling capacity and increasing the container handling capacity of Casablanca is not a viable option.

Additional analysis on the timing of the development of the new container facility at Mohammedia Port needs to be undertaken. Actual container traffic, and the resulting revenues, at Mohammedia Port will be dependent on the capacity limitations at the container terminal at Casablanca, as traffic will be diverted to Mohammedia, which will in turn be affected by the opening of the new port of Tanger-Med.

The results of the financial evaluation demonstrate that the construction of the Mohammedia Container Terminal is financially viable. The results suggest that there is considerable potential for the private sector to undertake the investment in the proposed terminal if the government takes responsibility for and funds the construction of the breakwaters, dredging, and works outside of the terminal. A detailed feasibility study, which investigates the views of freight forwarders to clarify future traffic volumes and the impact of Tanger-Med port, would be essential to confirm the results of the financial analysis.

2. Economic Rationale

2.1 Moroccan Port Capacity Constraints

At present, 92% of container trade with Morocco passes through the existing Casablanca container terminal. Over the past 8 years, container tonnage trade has been increasing by some 11% per year. This is supported by the underlying trend of increasing world seaborne trade, with growth of 5%-8% per year. This growing volume of container traffic has raised concern that Casablanca container terminal is approaching capacity and there is no room for expansion at this terminal.

The pre-feasibility study made several predictions of container growth based on various scenarios. The scenario used for project evaluation assumes that container growth at Casablanca will remain initially at the existing level of 11% for one year, but then will gradually level off up to year 2015, settling at a rate of 6.7%. Working capacity of the Casablanca container facilities has been taken as 750,000 TEU per annum, which should be an attainable rate, given current norms in Europe for similarly-sized facilities. When this level is reached around 2011, Mohammedia will need to be starting operations.

The impact of the new Tanger-Med Port is taken into consideration in the economic analysis. The construction and implementation of Tanger-Med Port will divert some container traffic from Casablanca, independently of whether the Mohammedia container terminal is developed. It is assumed that 25% of all container traffic will use the Tanger-Med Port.

2.2 Economic Evaluation Results

For the economic analysis, the project evaluation period is twenty-five years, starting in the year 2009, when the first expenditure on the new container terminal at Mohammedia is likely to take place, and finishing in the year 2033. All costs used in the economic analysis are in Euros (in mid 2005 constant prices). The mid 2005 exchange rate between the Euro and the Moroccan Dirham is approximately €1 = MAD 11.

The Consortium calculated the EIRR and the ENPV for the proposed Mohammedia Container Terminal using a discount rate of 7%. It was assumed that factors affecting future demand for the container terminal after the year 2025 (including savings in ship waiting, container dwell time and inland road transportation costs) remain constant and do not vary from year to year after the year 2025. Prior to 2025, efficiencies will continue to be gained in port operations, and capacity continually increased, lowering container dwell time and resulting in savings in ship waiting.

A split of the total discounted benefits over the evaluation period is shown in the table below.

Benefits	Total discounted benefits (€ million)	% total discounted benefits
Ship waiting time savings	56.9	13.4%
Container dwell time savings	71.5	16.8%
Road trucking savings	297.5	69.9%
Total savings	425.9	100.0%

The majority of the economic benefits (almost 70%) are derived from savings in the inland transportation of container goods. The pre-feasibility study assumed that, if Casablanca Container Terminal becomes congested, containers will enter or leave the port through the new Tanger-Med Port. There will consequently be a large increase in road trucking costs if containers are transported from Tangers-Med Port rather than from Casablanca. As road trucking costs would be saved by using the proposed new container terminal at Mohammedia, savings can be reached by implementing the new facilities at Mohammedia.

2.2 Economic Rates of Return

Under the assumptions made for the economic analysis, the project achieved an EIRR of 14.1% and an Economic Net Present Value (ENPV) of €234.5 million. In economic terms, therefore, the project is viable. The main benefits were due to savings in ship waiting time (13.4% of total discounted benefits), container dwell time (16.8%) and road haulage costs (69.9%). Sensitivity testing revealed that potential variations in construction costs did not render the project non-viable in economic terms, while the possibility of bad weather, which would restrict the number of days when the port was open, again only had a marginal impact and also did not render the project non-viable in economic terms.

Sensitivity tests indicate that the implementation of Tanger-Med Port will have some significance for the economic viability of the Mohammedia Container Terminal. With high growth traffic, the project always achieves economic viability. With medium traffic growth, the project also always achieves economic viability, although where 35% of traffic diverts to Tanger-Med the project is only marginally positive (€3.5 million). With low traffic growth and 35% of traffic diverted to the Tanger-Med port, the project does not achieve a positive ENPV from a macroeconomic perspective (as distinct from the financial perspective discussed in Section 4).

Variations in the level of construction costs (+30% and -30%) do not significantly affect the project's economic viability.

Ignoring the potential benefits for road trucking gained from avoiding to re-route containers via Tanger-Med Port when Casablanca Container Terminal becomes congested, economic evaluation produces a negative ENPV (€-50.4 million). Container diversion to the Mohammedia port is, however, likely to provide significant time-savings benefits for the truck transport sector by avoiding the major population centres around Casablanca and Rabat.

The impact of bad weather, delaying ships' access to the port, had a marginal impact on the economic viability of the project. On the basis of a year of 365 days, bad weather for approximately 20 days (10 storms @ 2 days duration) would only increase ship waiting times and container dwell times for less than 5.5% of ships.

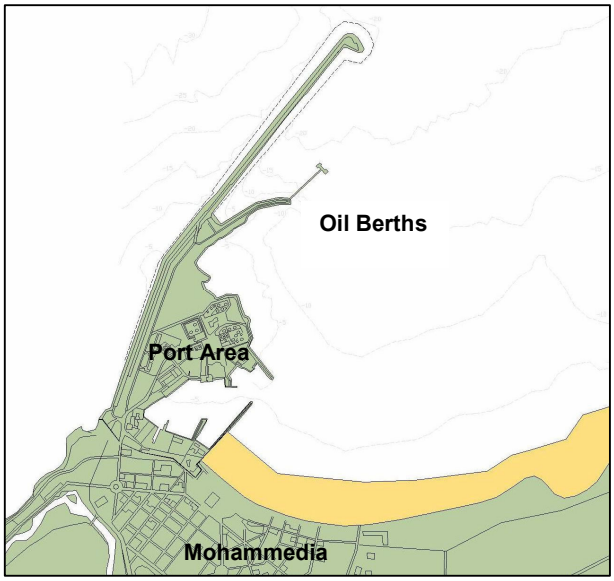
3. The Project

3.1 Description

The current Port of Mohammedia is located approximately 23km northeast of Casablanca on the Atlantic coast of Morocco. The port facilities are protected by a 2.8 km long main breakwater with concrete armour units of up to 100 tons as primary protection. There are two secondary breakwaters 396m and 168m long. The protected area of the port extends to some 750ha, and there are 7.5ha of land areas, with 60,000m^3 of product storage, including 21,000m^3 of chemical products, and 12,000m^3 of bulk liquid storage.

As stated above, the Port of Mohammedia is the principal import facility for crude oil and also handles other hydrocarbon cargoes. In 2004, some 6.2 million tons of hydrocarbons were imported in addition to 1.4 million tons of gas, acids and refined liquid products. In that same year, some 1.4 million tons of refined hydrocarbon products were exported.

MOHAMMEDIA PORT – EXISTING LAYOUT



The Moroccan port authorities have estimated that, in order to relieve congestion, Mohammedia's container port would need to be operational by 2011. Capital investments would need to start around years 2008/2009. This scenario would provide a short "wait and see" period, when the effects of the enhancements at the Tanger-Med port could be actively monitored for a couple of years (2007-2008) before committing to major investments at Mohammedia. A more detailed feasibility study would include an analysis of the 2007-2008 period.

The project was appraised from the viewpoint of a potential concessionaire. The government would be responsible for financing the breakwaters, dredging and reclamation, and additional works outside of the port. The concessionaire would be responsible for financing the berths, surfacing and equipment. It will have to be determined how the costs of the container terminal will be divided between the concessionaire and the government. There are plans for a Phase 2 development, once the container terminal at Mohammedia nears capacity.

3.2 Risk Factors & Mitigation Measures

According to the pre-feasibility study, there are three main constraints, or risks, associated with the proposed container terminal at Mohammedia, notably potential restrictions caused by wave action, issues with land access and vehicle parking capacity, and the impact of the new Tanger-Med port on future container traffic volumes at Mohammedia. These are not considered significant obstacles and can be mitigated. In addition, sensitivity analysis on the impact of the new Tanger-Med port indicated that diversion to this port has minimal impact on the overall economics of the Mohammedia Port.

3.3 Environmental and Social Impact

Environmental issues were reviewed and check-listed. Given that there were no available impact studies or baseline surveys done during previous port development on which to gauge any need for supplementary investigation, in order to satisfy international funding agencies in this respect, a full Environmental Impact Assessment ("EIA") would be required during the detailed feasibility stage.

In addition, the results of this brief environmental assessment suggested that the most important adverse impacts would occur in two areas:

- Habitat damage and possible impacts on biota from marine environments and reclamation works.
- Possible changes in patterns of sediment transport and settlement along the coastline.

The pre-feasibility study also highlighted traffic-related impacts onshore. The Consortium stated that socio-economic studies may also be required to assess the potential impact of the development of the port at Mohammedia as opposed to Casablanca on employment and economic development.

4. Feasibility Analysis

4.1 Private Sector Participation

For the financial evaluation, the pre-feasibility study appraised the proposed container terminal from the perspective of the organization receiving revenues from shippers, i.e. the concessionaire. The Government of Morocco Port Authority (ANP) has indicated that the concessionaire would be responsible for investing in the surfacing, berths and equipment. In turn, the Government would be responsible for financing the breakwaters, dredging and reclamation, as well as additional works outside of the port. ANP would also levy a fee on the concessionaire.

4.2 Construction Costs

The pre-feasibility study updated the construction costs to be used in the economic and financial analysis, including the costs of handling equipment and land-based infrastructure. A summary of all investment costs are as follows:

Item	€ million	MAD million
Breakwaters	75.8	833.8
Dredging and reclamation	15.7	172.7
Surfacing	13.4	147.4
Berths	22.2	244.2
Contingencies @ 20%	25.4	279.4
Sub-total construction costs	***152.5***	***1,677.5***
Equipment, building & system costs	67.1	738.1
Additional costs outside port area	4.8	52.8
Grand Total	**224.4**	**2,468.4**

The cost of Phase 2 of the Mohammedia container terminal, anticipated to be implemented by 2020, was estimated at €162 million (MAD 1,782 million) and is included in the financial evaluation presented here.

4.3 Container Traffic

For purposes of comparison and to develop a base line for the analysis of the proposed Mohammedia container terminal, the Consortium used container traffic statistics at Casablanca. The Consortium received data on the number of empty and loaded containers entering the port of Casablanca during the period 2001-2003. This data is summarized in the table below.

SUMMARY OF LOADED/UNLOADED CONTAINERS CASABLANCA PORT (2001-2003)

Container Type	2001	2002	2003
20' full	93,273	97,563	99,305
20' empty	54,526	56,647	60,869
Total 20'	147,799	154,210	160,174
40' full	63,209	74,435	88,691
40' empty	36,093	45,333	55,291
Total 40'	99,302	119,768	143,982
Nr boxes	247,101	273,978	304,156
Total TEU	346,403	393,746	448,138

Source: ODEP

Similar data was not available from the Port Authority for 2004 so port traffic was calculated by the Consortium based on the number of vessels calling at Casablanca, which was 425 dedicated container ships with a further 206 combined "Roll on-Roll off"/ "Lift on-Lift off" ("RoRo/LoLo") vessels. The latter are assumed to carry 40% LoLo and are therefore equivalent to a further 85 container vessels for a total of 510 ships.

Dividing the total number of estimated TEUs (492,000) by this number of ships, yields an average exchange of 965 TEUs per vessel per visit. This estimated average loading/unloading per ship was used to derive traffic projections for the port for 2004. Revenue estimations on TEUs can be calculated using current growth trends for the Port of Casablanca and worldwide port traffic.

4.4 Revenues

Actual tariff charges for Moroccan ports were obtained from the ODEP for the pre-feasibility study. The average tariff charges for loaded and unloaded containers are:

- 20' container : DH 1,800 (€163.63)
- 40' container : DH 2,200 (€200)

Using the Port of Casablanca as the base line, information was obtained from the Moroccan ports authorities that indicated the average weighted tariff per TEU was €179.50. This number is high for the region. Port reforms were implemented at the end of 2006[1] and tariffs were decreased by approximately 30%.

For their financial analysis the Consortium considered average tariffs per TEU of both €179.50 and €120.

4.5 Operating Costs

The Consortium found that the estimated operating costs per container at Casablanca container port are €9.26 (DH101) and Mohammedia will have similar operating costs. The pre-feasibility study further estimated that the number of people needed for the proposed Mohammedia Container Terminal was 220 when handling 400,000 TEUs per year. Thereafter, it is assumed that staffing would increase in proportion to the number of TEUs handled. Similarly, energy costs, which are based on costs at the Casablanca Container Terminal, are assumed to increase in line with increases in the number of TEUs. Annual maintenance costs are assumed at 2% of investment costs.

In addition to the above, the pre-feasibility study took into consideration the potential operating costs of a private sector concessionaire. These other potential costs for the concessionaire include marketing, insurance and administration. The pre-feasibility study conservatively estimated that these costs would be of the order of 15% of total operating costs for the period 2012-2019, decreasing thereafter to 5%.

The pre-feasibility study also makes the assumption that a concessionaire would make a payment/rental to the government in order to operate the concession. This would reimburse the government for the investment made in the initial years (approx €80 million) for the construction of the breakwater, dredging and reclamation, as well as additional costs outside of the port area. The rental payment used in the financial analysis is €20 per TEU.

[1] From http://www.mtpnet.gov.ma/MET_New/Fr

4.6 Financial Returns

The following assumptions were used in the financial analysis:

- All infrastructure and equipment is depreciated over 10 yrs. This includes Phase 2 and equipment renewal in yrs 2026 and 2027
- Inflation rate at 2%
- Corporate tax at 35%
- Ships charges at 10% of TEU tariff

The Financial Internal Rate of Return (FIRR) and the Financial Net Present Value (FNPV) are shown below for two tariff rates.

Average Tariff Rate (€ per TEU)	Financial Internal Rate of Return (%)	Financial Net Present Value, € mln	Financial Net Present Value, DH mln
179.50	28.4%	604.4	6,654.3
120	19.5%	293.3	3,226.5

NPV calculated at a discount rate of 8%

The pre-feasibility study examined the impact of leverage on the possible rate of return. The results, based on a debt:equity ratio of 80:20, with an interest rate of 7% and capital repayment over 6 years, are shown below.

Average Tariff Rate (€ per TEU)	Rate of Return (%)	Net Present Value, € mln	Net Present Value, DH mln
120	24.9%	298.1	3,278.6

4.7 Sensitivity Tests

The Consortium carried out sensitivity tests around the base case tariff rate of €120 per TEU, as follows:

- Varying levels of traffic
- +/- 30% construction and equipment costs
- 20% reduction in tariffs

The FNPVs for each of the sensitivity tests carried out are shown below.

Sensitivity Test	FIRR (%)	FNPV (€ million)	FNPV (DH mln)
Base Case (Scenario 1 – 25% diversion to Tanger-Med Port) with high growth (one year) then tail-off with high growth levels over remaining evaluation period	**19.5%**	**293.3**	**3,226.5**
High growth for 1 year then tail-off with:			
Medium growth, 25% of all traffic diverted to Tanger-Med	15.6%	171.4	1,885.5
High growth, 35% of traffic diverted to Tanger-Med	17.4%	229.1	2,520.3
Medium growth, 35% all of traffic diverted to Tanger-Med	14.2%	124.4	1,368.0
High growth for 5 years then tail-off with:			
High growth, 25% of traffic diverted to Tanger-Med	23.4%	392.4	4,316.6
Low growth, 35% of traffic diverted to Tanger- Med	12.6%	79.3	872.8
Other sensitivities (with Base Case traffic)			
+ 30% construction and equipment costs	15.4%	224.0	2,464.2
- 30% construction and equipment costs	25.6%	360.5	3,695.0

Sensitivity testing revealed that even with medium traffic growth and a 35% diversion to the Tanger-Med port, the project was still feasible in financial terms.

4.8 Conclusions

The results of the financial evaluation demonstrate that the construction of the Mohammedia Container Terminal is financially feasible, on the basis of the assumptions used in the evaluation. The impact of changes in the construction costs had little effect on the financial feasibility of the project.

The results above would suggest that, pending the results of future traffic studies, there is considerable potential for the private sector to undertake the investment in the proposed terminal if the government takes responsibility for and funds the construction of the breakwaters, dredging and works outside of the terminal.

5. Development Status

5.1 Prior Studies

Planning and engineering studies for Mohammedia Port have been ongoing for many years. The studies and reports 'Etude pour l'Elaboration d'un Plan Masse du Port de Mohammedia – Rapports des Missions 1, 2, 3, 4, 5.1 & 5.2A' by the consortium Sogreah/Tectone/LPEE/CID, dated between May 2003 and August 2004, had been preceded by a number of studies and reports on the proposed port expansion at Mohammedia by Sogreah and others between 1981 and 2002.

Among other things, these studies indicated that, based on the prior report 'Perspectives de développement des trafics conteneurs et ro-ro des ports du Maroc' from November 2000 and 'Etude de réactualisation du Plan Directeur Portuaire National (PDPN)', together with the express wishes of the Government, the following facilities would be required to meet the needs of container traffic up to the year 2015 - the primary objective of the development (see Rapport de la Mission 1 and Rapport des Missions 5.1 et 5.2A):

- Two berths providing around 600m of quay in the first phase of development, meeting the needs of container traffic up to 2007-2008
- Further berths providing around 1100m of quay in the second phase of development, meeting the needs of container traffic up to 2015
- A backup area adequate in extent (at least 300,000m2) for the operation of the forecast traffic, allowing a throughput of about 1,100,000 TEU/year, with appropriate container handling equipment including RTGs.

The secondary objective of the development was stated to be to provide a third berth for hydrocarbon traffic for tankers of 7,000 to 150,000 DWT.

The Consortium has studied alternative Master Plans for the development of the port. These considered two variants of extension to the existing main breakwater:

- An extension of 600m on the line of the existing breakwater
- An extension of 500m on an alignment of 50° clockwise from the present alignment

5.2 Required Studies

The pre-feasibility study states that, at this stage of design development, there has been no planning work completed on the superstructure, or on equipment requirements to provide and operate the proposed Phase 1 container terminal. The selection of equipment and systems will have to be made as a result of a more detailed study carried out by the eventual operator or consultant.

A detailed feasibility study, which investigates the views of freight forwarders in order to clarify future traffic volumes and the impact of Tanger-Med port, would also be essential to confirm the results of the financial analysis.

6. Next Steps

Based on the findings and recommendations of the pre-feasibility study, this project should be analyzed further in a detailed feasibility study. The project proved itself financially viable with the potential for successful private sector participation. The Consortium suggests that some of the areas that should be addressed in more detail include the diversionary effect of the Tanger-Med port via interviews with all possible stakeholders, particularly shipping companies and freight forwarders who are influential in routing decisions, and the need to conduct relevant environmental impact assessments.