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# FEASIBILITY STUDY WITH MASTER PLAN

## Port Package V

# FINAL REPORT PORT OF DAVAO (Sasa Wharf)

## Volume 3: Project Evaluation

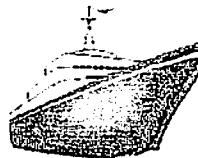
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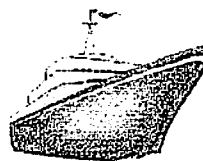
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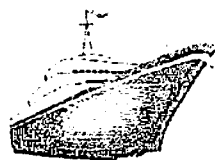
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# Chapter 15

## Concepts in Economic Evaluation

## Chapter 15

# CONCEPTS IN ECONOMIC EVALUATION

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### 15.1 VIEWPOINTS IN ECONOMIC EVALUATION

One of the ultimate objectives of a capitalistic economy is to optimize the allocation of its resources. The rationale behind the objective is that resources are scarce. These resources are limited in terms of quantity and quality. Once resources are committed for the use of particular project, the other projects that are competing for the use of the same resources are being sacrificed.

This is the reason why a Feasibility Study has to be undertaken prior to any investment or the utilization of resources. Such studies culminate in the economic evaluation of projects to determine whether or not the benefits to be derived in the investment of the resources will be more than the cost of the resources and which among the candidate projects will justify availment of the resources. If the benefits are more, it is a viable project/s hence the resources could be committed to these project/s otherwise the resources should not be used.

Economic evaluation of projects that utilize the resources is undertaken from two viewpoints. The first one is from the national viewpoint commonly called as an economic evaluation. The second is from the private viewpoint commonly called as a financial evaluation. The evaluation from the economic viewpoint will account all benefits and costs that will accrue to and/or will be incurred by all individuals and sectors of the economy irrespective whether they are directly or indirectly affected by the project. The reason is that the resources belong to the economy which competes for its use irrespective of the owners of such resources.

On the other hand, the evaluation from the private viewpoint will only account for the benefits and costs to gain and to be incurred by the project proponent or by the particular sector of the economy which will be affected by the project. The evaluation could either be the viewpoint of the private proponent of the cargo handling operator or both. Normally, financial evaluation is from the viewpoint of the proponents being the investors irrespective whether or not part of the investment is a loan or not.

Government or public projects, especially the service-oriented projects are evaluated and decided upon from the national viewpoint. Hence, these projects normally do not impose fees and if there are fees these are minimal. However, there are government projects where fees are imposed for use of the facilities and the implementing government agencies are entitled to some return of investment. Hence, economic evaluation from the private viewpoint of a government agency is also undertaken but still the results of the study based on the national viewpoint prevails in the decision as to whether the project will be implemented or not.

The proponents on the financial implications evaluate projects by private individuals or by the private sector and the decision to implement such projects by the proponents is purely based on results of the evaluation from the financial viewpoint. Even if a project is economically viable but not financially feasible, then private proponents will not invest on such projects. This is obvious since their objective is profit. Secondly, the private individual or sector has no indirect way that they could be paid for the services they will provide and render. The government on the other hand could impose taxes as indirect way of being paid for the services rendered or provided.

Normally, government provides incentives to private sectors for projects that exhibits positive economic effects but not financially feasible. Incentives are either in the form of tax holidays/exemptions, low interest rate loans, import restrictions and other schemes with purpose of lowering costs of production. The lowering of the costs will improve the financial situation of the projects to encourage private proponent to pursue the same.

In summary, there are two viewpoints from which to evaluate a proposed project, the national and private viewpoints both of which are used in this study.

## 15.2 CRITERIA IN ECONOMIC EVALUATION OF PROJECTS

A project is an investment proposal to use the resources now where the stream of benefits will occur in the future during the useful life of the project. The definition of a project indicates the difference in the timing of the investment or costs on one hand and the benefits on the other hand.

The most widely use criterion in the past especially by the private proponents to determine whether a project is to be implemented is what is called as the Payback Period Method. This method measures the number of years required to recover the investment. Where the yearly net benefits are the same in each year, the formula is as follows:

$$\text{Payback Period} = \frac{\text{Investment}}{\text{Yearly Net Benefits}} = \frac{I}{\text{YNB}}$$

If the yearly net benefits are not the same in each year, the payback period is that year when the accumulated yearly net is equal to the investment.

The above criterion has several setbacks. One of them is the difference in the timing of the investments and benefits that is not considered. And, if the future benefits have the same value as the time of investment, one would not agree to receive an amount five years from now of which he is entitled to the same amount today. A certain premium has to be added to the amount if one will receive the amount five years from now. Such premium is the value of the difference in time.

Another setback is there is no decision standards from which to compare the results. How many years are required for the projects to be feasible? The standard is dependent on the perception of each proponent.

Another setback is that the costs and the benefits after the payback period up to the end of the project's useful life are no longer considered. Yet, the period after the payback is in most cases longer than the payback period itself. As such a bigger portion of the costs and benefits is no longer being considered in the analysis, evaluation and the decision to implement the project.

The payback period method appears to be more of the criterion against risk than a measure to determine the viability of the project. It determines when the project can recover its investment. The lesser number of years to recover, the better the project is for the proponent. Anything after the period is profit and if something will happen to the project, at least the proponent has recovered his investment already.

The present widely use criterion especially for the evaluation of government or public projects is known as the Cost-Benefit Method. This criterion takes into account the difference in the timing between the stream of the costs and benefits. It means that the benefits and the costs shall be accounted for at the time they are made available or being incurred by the economy. It takes into consideration the entire useful life of the project.

To be able to take into consideration the time dimension, the future costs and benefits should be discounted to the present values on the same year. The discounted values of the costs and benefits which are on the same year can now be compared.

The Cost-Benefit Method provides three criteria of comparing the benefits and costs at their discounted values. They are the Net Present Value (NPV), the Benefit-Cost Ratio (B/C) and the Internal Rate of Return (IRR).

The NPV is the comparison by subtracting the discounted costs from the discounted benefits. The project is feasible if the difference is a positive value. The B/C is a comparison by dividing the discounted benefits with discounted costs. The project is feasible if the ratio is more than one. The IRR is the comparison where discount rate is to be determined when the discounted benefit is equal to the discounted cost. The project is feasible when the rate of return is more than the accepted discount rate.

The formulae and the decision criteria which are sometimes called the Go - No Go criteria are as follows:

Formula :  $NPV = \text{Discounted Benefits} - \text{Discounted Costs}$

Decision :  
 a. if NPV is equal to or greater than zero (0), the project is feasible. (GO)  
 b. if NPV is less than zero or negative, the project is not feasible, (NO GO)

Formula :  $B/C = \frac{\text{Discounted Benefits}}{\text{Discounted Costs}}$

Decision :  
 a. if B/C is equal to or greater than the discount rate, the project is feasible. (GO)  
 b. if IRR is less than one, the project is not feasible, (NO GO)

Formula :  $IRR = \text{Discounted Benefits} = \text{Discounted Costs}$

Decision :  
 a. if IRR is equal to or greater than the discount rate, the project is feasible. (GO)  
 b. if IRR is less than the discount rate, the project is not feasible, (NO GO)

There are three (3) decision points or areas that have to be addressed before the final project/s are to be determined for implementation:

- a) Is the project feasible?
- b) Which of the alternatives of the project is the most feasible?
- c) Under a budgetary constraint, which projects should be implemented?

The first decision point is the GO or NO GO decision. Projects are evaluated individually to determine whether a project is feasible irrespective of the decision on the other projects. The second decision point is to determine the alternative to be adopted to achieve the same purpose. These alternatives are either in the form of technology to use, project location or size and the timing in the implementation of the project.

The third decision point is beyond the scope of a feasibility study stage. The analysis is undertaken after a feasibility study has been completed for all projects and the comparison is among the feasible projects. This decision will be used only when there is shortage of funds or budgetary constraint in the implementation of all feasible projects. Therefore, not all the feasible projects can be implemented. The third decision point then is to determine which among the feasible projects will be implemented first. As such, this decision will not form part in the analysis of this study.

The above mentioned three (3) criteria of comparison have advantages and disadvantages as they relate to the decision points. In so far as the first decision point is concerned all the three criteria will give the same decision. This means that if the NPV is higher than zero which is feasible, then the B/C ratio will be higher than unity and the IRR will be higher than the standard discount rate. The decision then irrespective of the criterion to be used will be the same.

However, the problem with IRR is when the cash flow changes more than once over the project useful life from positive to negative value and then to positive value again. When this situation occurs, IRR will give more than one value or answer and if one of these values is less than accepted discount rate and the other is more, then the determination as to the feasibility of the project becomes the problem. One can not categorically state that the project is feasible or not.

On the second decision point, the Net Present Value and the B/C Ratio may or may not identify the same alternative to be adopted. If the output of the benefits in each alternative are the same but the costs are different then the NPV and B/C will identify the same alternative to be adopted and this is just an analysis called cost minimization. The alternative which will give the lowest cost is the alternative that will be adopted for implementation provided it is feasible. This situation is very common when the alternatives to be analyzed pertain to the different technologies to be adopted, for example, the types of cargo handling equipment.

However, if the benefits and costs are different in each of the alternatives, there is a tendency for NPV and the B/C to identify a different alternative to be adopted provided that both alternatives are feasible. There is a tendency for NPV to favor big alternative projects as it is expected that the net benefits will be higher when the project is big. On the other hand, B/C tends to favor small alternative projects in terms of investment costs.

The B/C Ratio and the IRR have the tendency to contradict the incremental or marginal analysis like in the case of analysis of the alternative number of berths. The first additional berth gives the highest value of the incremental benefit and as additional berths are provided, the incremental benefits will decrease. Since the incremental costs are the same, it follows that the highest value of the IRR and B/C ratio will be on the first additional berth.

The succeeding additional berths will result to a lower value of the B/C ratio and the IRR. If the values of the B/C ratio and IRR are used in the decision, then it will always point to an addition of only 1 berth every time that an evaluation is made to expand the port since the values are higher in the first increment of the expansion. On the other hand, the NPV will identify a different alternative. It may be more than one berth where the total net benefit is the highest and not the highest incremental net benefit as the B/C Ratio and IRR. The objective is to attain the highest net benefits for the economy hence NPV is the right criterion.

On the third decision point, it presupposes that the required total investment for all the feasible projects is more than the available funds. Hence, not all these projects could be implemented. So, it is the question of selection of several groups of projects out of the total feasible projects whose total investments add up to the available funds. Since each group has a total investment more or less equal to the other groups, then the decision is to choose that group which will give the highest benefits. It is just then the question of maximizing the benefits.

Net Present Value will attain this objective. By adding all the net discounted benefits of the projects in each group and that group which will show the highest total discounted value is the group that will achieve the objective and they are the projects to be adopted for implementation. Undertaking the same procedure by adding the values of the B/C ratios or IRR of the individual project does not necessarily achieve the objective. Hence, the B/C Ratio and the IRR should be used with caution when dealing with the third decision points.

### 15.3 CONCEPTS IN THE METHOD OF EVALUATION AND PRICING

#### 15.3.1 Method of Evaluation

The formulae as shown in Section 15.2 above involve the stream of benefits and costs for the project. What are these benefits and costs and how would they be identified and quantified? The specific details are explained and analyzed in Chapter 16 for the economic evaluation from the national viewpoint and in Chapter 17 for the private viewpoint.

This section defines the concept as basis for identification and quantification of the benefits and costs. The project introduces a change in the present setup hence it creates a different or new scenario. The two scenarios are called "with" and "without" the project case which is being used in project evaluation. This is the concept directly used in the identification and quantification of the benefits and the costs attributable to the project.

The "without" the project case is obviously the status quo. While this scenario does not involve additional investments, it may create the increase in other costs elsewhere like the transport costs in ports. On the other hand, the "with" the project scenario will involve additional investments but may result to the decrease or prevent the increase in other costs elsewhere within the economy.

The difference then between these two scenarios will identify the benefits and costs that will take place in the change of the scenario from "without" to "with" the project case. The different scenario in each case will naturally result to the different identification of the benefits and costs.

The other aspect to analyze pertaining to the method of the evaluation is the period of evaluation. Normally the useful life of the port physical facilities to be provided may reach 30 to 50 years. However, irrespective of the useful life of the facilities, the period of evaluation should be the same. This period is from 20 to 25 years.

The reason for this number of years as the period of analysis is the fact that the present value of the benefits and costs after this period is already very small and it will no longer alter the results of the evaluation or change the decision to be made. As such, the stream of costs and benefits shall be quantified only up to 25 years of the project operation.

Where the useful life of the facilities is more than 25 years their salvage value shall be quantified and to be included as benefits a year after the period of evaluation. On the other hand, if the useful life is less, there should be replacement of the facilities and the replacement of the facilities and the replacement cost should be included in the evaluation.

### 15.3.2 Pricing

The government imposes taxes, tariffs, quotas, subsidies and sets of foreign exchange rates, interest rates and minimum wage rates. These impositions distort the equilibrium prices of the goods and services. The resulting price to include these impositions is the market price. This market price is used in the quantification of the benefits and cost of the project from the financial viewpoint. The market price is the value that project proponent will gain or to lose irrespective of what ever happen to the rest of the economy.

Adjusting market prices by removing the causes of distortions will result to the real prices of the goods and services and this is what economist term as the shadow price. This price is the opportunity cost of the resources and should therefore be the price to be used in the quantification of the benefits and costs from the national viewpoint.

The opportunity cost should be used because it reflects the real value of the resources of the economy to be gained or to be lost by implementing the project. The difference between the market prices and the shadow prices is the value that is lost by one sector but to be gained by another sector within the same economy. Hence, the economy does not gain or loss out of the difference in the price as the real value of these resources has not changed by the impositions. It is called transfer payments within the economy.

The market price of the goods includes taxes. Such taxes do add to the financial value of the goods, but they do not add to the real economic value of the goods. As such, the duty and tax portion of the goods and/or services shall be removed to determine the price to be used in the economic evaluation from the national viewpoint.

The interest and exchange rates in the Philippines used to be imposed by law for the former and controlled by the executive branch of the government for the latter. The law governing the interest rates has been abolished and the government does not control the foreign exchange rate anymore and has allowed the same to float in the market so that the exchange rate is determine by the market forces.

It is expected that the present existing foreign exchange and interest rates then reflect already the level of the scarcity of foreign exchange and capital. Hence, no adjustment shall be made on the indirect or direct foreign exchange costs of the goods and services to be used in the project.

The law that imposes the minimum wage rate has been abolished also and the government does not promulgate the minimum wage rate anymore. However, a tripartite council has been formed to determine and promulgate the minimum wage rates from time to time as required.

The unskilled laborers are the ones benefited by the setting of the minimum wage rate. Based on the unemployment and the underemployment conditions of the country, the minimum wage appears to be higher than the value of their output prior to their employment. The value of their output prior to employment is what the economy is going to lose as it is to be presumed that the laborer absorbed in the labor force will cease to undertake the activities prior to employment. The economy does not lose anything if the employee has no output prior to employment even if paid the minimum wage. Previous studies on the opportunity cost of labor show that the shadow price of unskilled labor is around 60% of the actual wage is by the National Economic and Development Authority (NEDA).

On the other hand, it appears that the skilled labor wage is below their opportunity cost. It appears that this case for skilled labor is to counter balance the opposite situation of the unskilled labor. The employers may have the tendency to lower the salary rate of skilled labor that what it should be to compensate for the higher salary of the unskilled labor as compared to their output.

Both skilled and unskilled labor will be used in the project during the construction and in the operation of the port and their shadow prices may balance at the end. Hence, again the market price on the average between the skilled and unskilled labor reflects their average opportunity cost. As such, no labor cost adjustments shall be made for those to be used in the proposed project.

The other aspect of pricing to analyze into is the effect of price inflation. The evaluation of the project will for a period of 25 years. It is likely that the prices in the future may be different from the prices in other years due to price changes. The changes in the prices in the future shall not be taken into consideration. The prices be fixed and shall be based on the prices prevailing at the time the study is being undertaken.

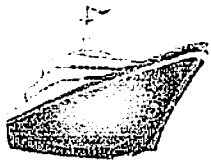
It is to be presumed that any changes in prices in the future will affect both costs and the benefits and as such will not alter the decision to be made based on the results of the evaluation. Secondly the sensitivity analysis is undertaken as part of the economic evaluation of the project which will assume some alterations in the costs or the benefits or both to determine the level of sensitivity of the project to such changes.

## 15.4 CONCEPT IN DISCOUNTING

The requirement of the Cost-Benefit Approach is for the costs and the benefits to be discounted to determine their present values. In theory, the social discount rate is equal to the sum of the difference between consumption and investment on one hand and the value of time on the other hand. These two parameters unfortunately can not be quantified mathematically and if based on value judgement the problem is that the value may differ from one person to another. The social discount rate should be determined by the NEDA so that all agencies of the government have a common discount rate to be used. If these agencies will use different discount rates, then there is no way to compare feasible projects.

Previous feasibility studies on ports and the other transport related studies used 15% as the discount rate. This rate has never changed in all the studies although other rates as 10%, 12% and 18% have been used together with 15%. However, the decision and the determination as to whether the project is feasible or not is still based at 15% discount rate. It seems that the other rates were used just to find out how the results of the evaluation with the different rates.

The National Economic and Development Authority implicitly promulgates 15% as the social discount rate to be compare. In view thereof 15% is used in this study as the discount rate in the evaluation of the project from the national viewpoint.



# Chapter 16

## *Economic Evaluation of the Proposed Project: National Viewpoint*

## Chapter 16

# ECONOMIC EVALUATION OF THE PROPOSED PROJECT NATIONAL VIEWPOINT

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### 16.1 SCENARIOS IN IDENTIFICATION OF COSTS AND BENEFITS

Chapter 15 presented the general concepts and the parameters in the economic evaluation of projects. This Chapter will present the different scenarios in the identification of the costs and benefits prior to the quantification of the same. Each of the scenarios will indicate the nature of the costs as well as the corresponding benefits that should be considered (depending on the scenario that will occur) which are presented below.

The economic evaluation of any proposed project from national the viewpoint is normally undertaken based on the analysis of the "with" and "without" the project basis. This proposed port project is no exception and shall be evaluated on this basis especially in the light that there are existing facilities at the Port of Davao presently handling cargo traffic.

The "without" the project case is a situation where there are no additional facilities to be provided at the port to handle traffic in excess of the capacity of the existing facilities. The "with" the project case is obviously the situation where additional facilities are to be provided or the existing port facilities are to be expanded.

There are three scenarios that would probably occur under the "without" the project case when the capacity of the existing facilities is reached. These are as follows:

1. The excess commodities over the capacity of the existing port facilities will no longer be produced for the reason that there are no additional port facilities to handle the same and the additional cost to use existing facilities or other modes of transportation is prohibitive that the cost of the commodities will increase to the extent that demand for such commodities will greatly decrease or too much to be shouldered by the firm if price is not increased.
2. The excess commodities over the capacity of the existing port facilities will continue to be produced but will be handled in another port or be handled by another mode of transportation. In effect, the traffic is diverted to another facility. This resorted to when the additional cost of continuing the use of the existing port facilities will be more than the additional cost in the use of other modes of transportation or other nearby ports.
3. The excess commodities over the capacity of the existing port facilities will continue to be produced and continue to be handled at the port. This is resorted to when the additional cost to continue using the existing facilities is still tolerable to warrant an acceptable profit margin or will only slightly increase the cost of the commodities that will not affect the level of demand and will still be lower than using the other alternative transport mode.

Each of the above scenario will define different sets of costs as well as different set of costs as well as different sets of benefits, if additional facilities are to be provided. Each requires different investment and yearly operating costs. Hence, being the case, there is the need to analyze and identify the scenario that would likely happen in the "without" the project case in order to adopt that scenario from which to identify and to quantify the costs and the corresponding benefits.

Under the first scenario mentioned above, it is obvious that there will be no investment or costs to the economy under the "without" the project case. However, the economy is deprived of the benefits in the production of the commodities and may result to the increase of the price due to short supply.

Under the "with" the project case of this first scenario, the additional port facilities are to be provided and goods then will continue to be produced. Hence, the costs will include not only the costs of the additional port facilities but all costs associated to the production, handling and transport of the commodities that otherwise would not have been reproduced. On the other hand, the benefits will be the satisfaction that the economy will get from the additional goods produced.

To account for all of these costs and these benefits is a very tedious undertaking. What is then normally identified and quantified is the net benefits in the production which is the difference between the costs and benefits. This net benefit is what is called value added of the commodities. The value added is the total of the income of the factors of production namely wages for labor, rents for land, interests for capital and profits for entrepreneurship. On the other, the costs include the investment for additional port facilities, investment for additional equipment and all additional port operating expenses to include additional manpower costs.

In the second scenario, there will be additional investment and operating costs at the port where the commodities will be diverted even if initially there is excess capacity that will not need immediate expansion of the port under "without" the project case. The investment costs are for the additional port facilities and equipment. There is additional land transport costs as the port of diversion is farther from the source and destination of the commodities than the original port where they are handled. While the build up of waiting time at the original port will not occur to affect the other traffic, but may create build up of waiting time at the port of diversion.

Under the "with" the project case of the second scenario, the investment cost will be the additional port facilities and equipment. Actually, the investment costs in the ports are the same in both the port of diversion and the original port. This means then that there will be no additional investment between the "with" and the "without" the project case. The benefits under the "with" the project case are the savings of the additional transport costs of the commodities when they are handled at the port of diversion.

In the third scenario, the "without" the project case shall not require additional port facilities to include additional berthing spaces. However, the volume of the commodities in excess of the port operational capacity will continue to use and be handled at the port. This means then that additional equipment and manpower shall be provided to handle the cargo traffic volume in excess of the capacity.

As in the second scenario, the "with" the project case shall require investment in additional port facilities, additional equipment and additional manpower. However, the incremental investment between the "with" and the "without" the project case is only the investment in the additional port facilities since in either case additional

equipment will be provided. Therefore this is the only investment to be accounted for in the evaluation of the "with" the project case.

On the other hand, with the provision of additional berthing facilities under the "with" the project case the waiting time will be reduced. There will be the savings in terms of stay time of vessels at the port, the benefits to be attained.

It is to be noted that the investment cost for the additional equipment and manpower cost in the second and third scenarios are not to be considered as additional costs under the "with" the project case inspite that they are provided because they are also provided in the "without" the project case. Hence, there is no incremental cost between the two cases.

Secondly, in the "without" the project case where the excess cargo traffic will be handled either at the other ports or at the same port, there are already benefits derived because of the provision of the additional equipment and manpower. The benefits are the difference between the additional transport costs and additional waiting time costs. If transport costs are higher than the latter the commodities will be handled at the same port. Under the "with" the project case where the additional berthing facilities are provided, the incremental benefits that could be derived are the reduction or savings in the waiting time costs.

If the costs of the additional equipment and manpower costs are to be included, then the benefits to be quantified will also include not only the reduction or savings in the waiting time costs but also the benefits to be derived by having the commodities available to the economy. However, these are not the costs and the benefits associated to the provision of the additional port facilities.

In short, the costs to be accounted for in the "with" the project case must correspond only to the additional benefits that can be derived or the additional benefits to be derived must also correspond to the additional costs to be incurred.

Of the three scenarios mentioned and discussed above for the "without" the project case, it is most likely that the third scenario will occur. The excess cargo traffic volume beyond the optimum capacity of the port will still be handled at the same port. It is very unlikely for the manufacturers to stop the manufacture of the commodities in excess of the capacity of the port. Diversion of the commodities to another port may happen but there is no nearby alternate port with a capacity to handle the excess volume.

Secondly, experience in other ports of the country shows that is for the vessels to continue calling at the same port to load/unload their cargo volume. If the waiting time becomes excessive, the vessels do not go to another port but impose demurrage.

The conditions for the "with" and "without" the project case of the third scenario from which to base the identification and the quantification of the costs and benefits are as shown and summarized below.

#### A. THE "WITHOUT" THE PROJECT CASE

1. Excess cargo traffic volume over the capacity of the port will continue to be handled at the port.
2. No additional berthing facilities and other port facilities are to be provided.

3. Additional equipment and manpower will be provided to be able to handle the additional volume.
4. Increasing waiting time of vessels is going to occur.

**B. THE "WITH" THE PROJECT CASE**

1. Additional berthing space and other port facilities will be provided.
2. Additional equipment and manpower will also be provided.
3. The same service time will occur as in the "without" case.
4. The waiting time will be reduced because the provision of more berthing spaces will allow more vessels at berth than waiting.

## **16.2 IDENTIFICATION AND QUANTIFICATION OF BENEFITS**

### **16.2.1 Identification of Benefits**

Section 16.1 identified the scenario that will most likely occur and identified the conditions of the "without" and the "with" the project case. From the set of conditions the benefits are the reduction in waiting time. The addition of berths in the proposed port project which is the "with" project case, there would be higher available berthing time of vessels thus the berth occupancy rate will go down and ultimately lowers the waiting time.

The reduction is in effect the savings in waiting time costs at port. While the vessels obviously will benefit from the reduction of waiting time in port the cargo and passenger traffic will likewise be benefited.

It is a benefit to vessels because they will have lower turn around time in port. In turn, it will increase the number of round trips that the vessels can make thus could handle more cargo volume per year. With the increasing cargo volume in the future, the procurement of more vessels will be postponed and naturally the investment for more vessels can be delayed.

The reduction of the waiting time in port will also shorten the travel time of the other port traffic which are the cargo volume and passengers. The benefits associated with faster travel time for the cargo traffic is the savings in inventory costs. They are in the form of smaller volume per order and also smaller warehousing costs and insurance. The benefits associated with faster travel time for passengers are the time value. The reduction in waiting time per ship call is 4.8 hours by 2004 and 32 hours by 2010 which are time savings of the cargo volume and passengers. While the 4.8 hours to be saved is quite small, the 32 hours savings in time is already significant.

As such, the benefits that could be attained by the proposed port project will be the savings in the waiting time cost of the vessels, cargo volume and passengers at the port from the national viewpoint. The gross productivity is the same with and without the project as such the service time is the same in either case. As such, there is no savings or benefits in terms of the service time.

### 16.2.2 Quantification of Benefits for Vessel Traffic

It is obvious that benefits in the reduction of waiting time will only start when the proposed port project will start its operation by 2004. The waiting time of the 7 and 9 berths will be increasing after 2004 but the increase is more with the 7 berths. It means then that the difference in the waiting time is increasing hence the reduction in the waiting time with the port project will be increasing in the future.

It would appear then that the benefits will approach infinity because the reduction in the waiting time is increasing with time. However, the basic assumption is that expansion of the port facilities shall be undertaken when the capacity of the port is reached. Hence it is to be expected that there will be phases of development in the provision of port facilities.

As such the benefits will start to accrue when the particular expansion is provided. It will increase in the future until the capacity is reached and thereafter the value of benefits will remain the same up to the study period. As determined in Chapter 10, the capacity of the proposed port project will be reached by 2010. Reduction in the waiting time after the capacity has been reached as the result of the next expansion should be attributed to the next expansion of the port.

On the other hand, the quantification of the benefits shall be between the existing number of berths which is seven berths and the optimum number of berths as determined in Chapter 10 at 9 berths.

The volume of cargo traffic by 2004 is 3,072,000 metric tons and increases to the capacity of the nine berths at 4,324,000 metric tons by 2010. The gross productivity increases from 69.28 metric tons per hour by 2004 to 78.16 metric tons per hour by 2010. The service time is equal to the quotient of the cargo volume handled and the gross productivity. Hence, the service time of vessels will be 44,342 hours by 2004 and 55,322 hours by 2010.

$$\text{Service Time} = \frac{\text{Cargo Traffic Handled}}{\text{Gross Productivity}}$$

**Table 16-1**  
**SERVICE TIME OF VESSELS**

YEAR	CARGO VOLUME (mt)	GROSS PRODUCTIVITY (mt/hr)	SERVICE TIME (hr)
2004	3,072,000	69.28	44,342
2005	3,280,000	70.65	46,426
2006	3,491,000	71.78	48,635
2007	3,715,000	73.16	50,779
2008	3,950,000	74.95	52,702
2009	4,202,000	76.55	54,892
2010	4,324,000	78.16	55,322
2028	4,324,000	78.16	55,322

The gross berth time for the seven berths is 61,320 hours per year while that of the nine berths is 78,840 hours per year. Dividing the service time by the gross berth time will result to the berth occupancy rate. The berth occupancy rate for the 7 berths then is 72.31% by 2004 and will be increasing to 90.22% by 2010. The berth occupancy rate of the 9 berths is 56.24% by 2004 and will be increasing to 70.19% by 2010.

$$\text{Berth Occupancy} = \frac{\text{Service Time}}{\text{Gross Berth Time}}$$

The waiting time to service time (WT/ST) ratio based on the UNCTAAD Queuing Theory Matrix for the seven berths is 0.1377 and 0.7776 from 2004 to 2010. The ratio of the nine berths is 0.0225 and 0.0717 for the same years.

**Table 16-2**  
**BERTH OCCUPANCY RATE AND WT/ST RATIO**

YEAR	BERTH OCCUPANCY		WT/ST RATIO	
	B-7	B-9	B-7	B-9
2004	72.31	56.24	0.1377	0.0225
2005	75.71	58.89	0.1842	0.0278
2006	79.31	61.69	0.2562	0.0334
2007	82.81	64.41	0.3768	0.0388
2008	85.95	66.85	0.5170	0.0511
2009	89.52	69.62	0.7312	0.0677
2010	90.22	70.19	0.7776	0.0717
2028	90.22	70.19	0.7776	0.0717

The waiting time is the product of the service time and WT/ST ratio. The waiting time then for the seven berths is 6,106 hours by 2004 and will be increasing to 43,018 hours by 2010. The waiting time for the nine berths is 988 hours by 2004 and will also be increasing to 3,967 hours by 2010.

$$\text{Waiting Time} = \text{Service Time} \times \text{WT/ST ratio}$$

The reduction of waiting time by providing the two additional berths is 5,108 hours by 2004 and increases to 24,554 hours by 2008 and further increase to 39,051 hours by 2010.

**Table 16-3**  
**WAITING TIME OF VESSELS**  
(in hour)

YEAR	WAITING TIME		REDUCTION IN WT.
	B-7	B-9	
2004	6,106	998	5,108
2005	8,552	1,291	7,261
2006	12,460	1,624	10,836
2007	19,134	1,970	17,164
2008	27,247	2,693	24,554
2009	40,137	3,716	36,421
2010	43,018	3,967	39,051
2028	43,018	3,967-	39,051

As determined in Chapter 10, the ship-in port cost of vessels that will be calling at the Port of Sasa, Davao at the design cargo traffic year is P6,800 per hour which is already an economic value. The savings in the ship-in port cost of vessels then in the reduction of waiting time is P34.734 million by 2004 ( $P6,800 \times 5,108$ ). These savings will increase to P166.967 million by 2008 and to P265.547 million by 2010.

Table 16-4  
VALUE IN SAVINGS IN SHIP-IN PORT COST

YEAR	REDUCTION in WT. (hr)	VALUE (in million)
2004	5,108	34.734
2005	7,261	49.375
2006	10,836	73.685
2007	17,164	116.715
2008	24,554	166.967
2009	36,421	247.663
2010	39,051	265.547
2028	39,051	264.547

### 16.2.3 Quantification of Benefits for Passenger Traffic

As discussed earlier, the benefits to be derived by passengers are related to the reduction of the waiting time also. The passengers will loss their opportunity to perform an economic activity when vessels are waiting to berth and if the waiting time is reduced due to the addition of the number of berths, the opportunity loss is the savings or benefits.

However, vessels carrying big volume of passengers are allowed to berth immediately just to unload passengers only in order that the passengers will not be subject to waiting for berth. This means then that there is no opportunity loss hence there is nothing to be saved and therefore there are no benefits. The berth occupancy rate by year 2004 is already more than 70% and will reach 90% by year 2010. At these occupancy rates the berths are most of the time occupied so that most of the time vessels have to de berth to give way to vessels with passenger load. So while there is no opportunity loss for labor of the passengers there will be another type of cost to be incurred. This is the cost for de berthing/ berthing and the additional time in the port of the vessel that will de berth. It is also possible that passengers will be unloaded at anchorage and to be transported to the port but this means additional transport cost for the passengers.

Whatever operating option to be followed, there is still loss or cost to be incurred either in the form of opportunity loss of labor or additional time in port or an additional transport cost. The quantification of the savings in the reduction of the loss or cost is based on the opportunity loss of labor. It is to be understood that if the other options are followed the savings in cost in the reduction of the additional time in port or the additional transport cost will approximate the reduction in the opportunity loss of labor.

The affected passengers are only the disembarking or incoming passengers since the waiting time is on the incoming vessels. There is the delay in their disembark. The embarking or the outgoing passengers are expected to adjust the time in going tot he port is expected departure time of the vessels will be delayed due to the waiting time hence no opportunity loss of labor on their part.

The incoming passengers are not all expected to be gainfully employed. As a matter of fact during peak periods, most of the passengers are students going back to their families. It does not mean however that the students have no activities to be foregone due to the waiting time. While the students are not employed or undertaking regular work, they maybe helping in the chores which have economic value. However, the value is too small that it will not be included anymore. It is expected that 50% of the incoming passengers have a significant value of labor.

The other parameter to analyze is the economic value of their labor. It is expected that the vessel passengers of airlines as they can not afford the higher fare of airlines. Hence, their wage rate would be very low and it is estimated to be around the minimum rate at around P200 per day. As used in some reports like the feasibility of the Manila Grain Terminal, the shadow wage rate (SWR) is 70%. Hence, the shadow wage then is P140 per day.

The reduction in the waiting time will range from 5,108 hours by year 2004 to 39,051 hours by year 2010. Average delay of incoming passengers is equal to average waiting time per vessel. The number of ship calls by year 2004 is 1,064 vessels and increases to 1,185 vessels by year 2010. The average waiting time then is 4.80 hours by year 2004 and will increase to 32.95 hours by year 2010.

Table 16-5  
AVERAGE WAITING TIME PER VESSEL

YEAR	REDUCTION (hr)	SHIPCALLS	AVERAGE REDUCTION IN WEIGHT	
			HOURS (hr/SC)	DAYS (days/SC)
2004	5,108	1,064	4.80	0.20
2005	7,261	1,092	6.65	0.28
2006	10,836	1,116	9.71	0.40
2007	17,164	1,143	15.02	0.63
2008	24,554	1,172	20.95	0.87
2009	36,421	1,195	30.48	1.27
2010	39,051	1,185	32.95	1.37
2028	39,051	1,185	32.95	1.37

With the shadow wage of P140 per day, the savings in the opportunity loss of labor in view of the reduction of waiting time is P28 per passenger ( $P140 \times 0.20$ ) by year 2004 and this will increase to P121.20 per passengers by year 2008 and increases further to P191.80 per passenger by year 2010.

There will be 129,900 incoming passengers by year 2004. It will increase to 174,000 passengers by year 2010. As analyzed above, only 50% of the incoming passengers have significant value of labor. The total savings then by year 2004 is P1.819 million and will increase to P16.687 million by year 2010.

**Table 16-6**  
**SAVINGS IN OPPORTUNITY COST OF LABOR**

YEAR	VOLUME OF PASSENGER	SAVINGS PER PASSENGER	TOTAL SAVINGS (MILLION)
2004	64,950	P28.00	P1.819
2005	68,200	39.20	2.673
2006	71,600	56.00	4.010
2007	75,150	88.20	6.628
2008	78,950	121.80	9.616
2009	82,900	177.80	14.740
2010	87,000	191.80	16.687
2028	87,000	191.80	16.687

#### 16.2.4 Quantification of Benefits for Cargo Traffic

As discussed and analyzed above the benefit to be derived by the cargo traffic is on the form of savings in inventory cost of the commodities in the inventory cost of the commodities. Inventory costs are in the form of tied investment to the commodities in the inventory and investment in warehousing to store the inventory. If there are delays in the arrival of commodities, it may require a bigger volume of inventory thus increasing the tied investment.

While the additional investment is not wasted because it will still be used but its opportunity cost is lost because it is tied as additional inventory instead of being used elsewhere in the economy. The opportunity cost of the investment or capital is equal to the social discount rate hence, it is 15% per annum of the value of the additional inventory.

The reduction in waiting time per vessel as determined above is in effect the additional delay in the arrival of the cargo traffic without the project. The delay will range from 0.20 day by 2004 to 1.37 days by 2010. However, the delay in the arrival of the cargo traffic for a maximum of 1.37 days would hardly trigger the increase in the inventory level of goods. Normally there is a minimum inventory level being maintained to take care of any delay in the arrival of commodities and it is expected that the minimum level could absorb more than 1.37 days delay.

In summary, there will be no increase in the inventory level hence there is nothing to be saved, as such, there will be no benefits to be derived by the cargo traffic volume in the reduction of the waiting time at the port.

#### 16.2.5 Summary of Benefits

The benefits then which could be derived by the provision of additional port facilities are the savings in the reduction of the waiting time of the vessel and passenger traffic. The aggregate value is P36.553 million by 2004 and will increase to P282.234 million by 2010.

**Table 16-7**  
**SUMMARY OF BENEFITS**  
(in million)

YEAR	BENEFITS		TOTAL
	BY VESSELS	BY PASSENGERS	
2004	34.734	1.819	36.553
2005	49.375	2.673	52.048
2006	73.685	4.010	77.695
2007	116.715	6.628	123.343
2008	166.967	9.616	176.583
2009	247.663	14.74	262.403
2010	265.547	16.687	282.234
2028	265.547	16.687	282.234

### 16.3 IDENTIFICATION AND QUANTIFICATION OF ECONOMIC COSTS

#### 16.3.1 Identification of Economic Costs

There are several investments to be made and yearly operating costs to be incurred in the development and operations of the port. However, as analyzed in Section 16.1 of this Chapter, there are investment costs that will occur in both the "with" and the "without" the project case. These are the investment cost for additional equipment and the provision of additional manpower in order that the cargo traffic will continue to use the port even beyond its optimum capacity. It is the reason why only the savings in the reduction of the waiting time are identified as the benefits for the "with" the project case.

As such, the incremental investment then that will occur for the "with" the project case as compared to the "without" the project case is the investment in the expansion of the port facilities to reduce the waiting time. It follows then that the yearly operating costs are those related to the provision of the port facilities like the repair and maintenance of the same and salaries and benefits of the additional personnel of the Facility Maintenance Division.

#### 16.3.2 Quantification of the Economic Costs

In line with the general concepts discussed in Chapter 15, the tax portion of the investment and operating costs have to be excluded since they do not represent any additional economic value to the goods and they are only transfer payments. The tax being imposed by the government on the goods and services is the Value Added Tax or VAT which is 10% of the value of the goods. The VAT works in the manner that irrespective of how many times the goods are transferred or being traded, the amount of the VAT remains at 10% based on the last value. If the cost or price includes already the VAT as in the case of the investment cost for the port facilities, the amount of the VAT is equal to one over 11 (1/11) of the cost or price. The net amount after deducting the VAT is the economic costs which are the costs to be considered in the evaluation of the port project from the national viewpoint.

The investment cost includes also direct and indirect foreign exchange costs like the imported steel sheet piles and most of the local supplies which depend on imported raw materials.

However, as explained in Chapter 15, there are no more shadow price for foreign exchange. Hence, the investment cost shall no longer be adjusted of any shadow price. The same is true for the shadow price of labor.

The total investment cost is quantified in Chapter 14 for the port expansion project to include the redevelopment costs of the existing port. The total investment costs is P371.000 million for the expansion. This costs would have been lower if the capacity of the existing land side facilities is more or less of the same capacity of the existing berth. They are the close storages like the shed and CFS which if there adequate will reduce the building costs by P30.000 million. The summary of the investment costs as shown in Chapter 14 is as follows.

**Table 16-8**  
**SUMMARY OF INVESTMENT COSTS OF EXPANSION PORT PROJECT**  
(in million)

ITEMS	AMOUNT
1. General Expenses	P 7.000
2. Wharf Structures	161.766
3. Reclamation	60.000
4. Runways	9.770
5. Paving Blocks	25.449
6. Asphalt Pavement	20.552
7. Concrete Pavement	3.390
8. Buildings	64.710
9. Utilities/Others	18.314
<b>TOTAL</b>	<b>P 370.951</b>
	<b>Say P 371.000</b>

In view of the proposed redevelopment of the existing port, the estimated cost is P164.00 million as shown in Chapter 14 also. This includes the demolition of the existing offices and sheds and construction of their replacement based on the proposed port layout. This is however, not considered as an investment costs related to the attainment of the benefits or brought about by the benefits in the reduction of the waiting time.

Even without the redevelopment of the existing port, facilities remain the same as determined under Section 16.2. Secondly, the redevelopment of the existing port can be undertake not necessarily at the same time as the expansion project.

Hence the investment to consider related to the attainment of the benefits is only the costs related to the port expansion project which is P371.000 million. This amount however has to be reduced to its economic value by deducting the VAT and the economic investment cost then is P337.273 million.

Based on the implementation schedule as discussed in Chapter 14 also, the construction of the expansion project will take three years. The construction will start by 2001 and to be completed by the end of 2003. The value of the works to be completed by 2001 is 30.05 of total amount which is P101.182 million. By the end of 2002, the total additional value of the works to be completed is 40% of total amount which is P134.909 million and the remaining 30% or P101.182 million will be completed by 2003. However there will expropriation of some properties along the highway and it is estimated that the value of the foregone resources is P26.000 million which is to be incurred in the first year. Hence, the total cost only 2001 is P127.182 (P101.182 + P26.000).

The yearly repair and maintenance costs are determined also in Chapter 14 at P4.750 million. After deducting the VAT, the economic costs are P4.318 million per year. The maintenance personnel for the facilities as shown in Chapter 12 will cost P2.236 million but this is for the entire port. The cost of the expansion port project is estimated to be P0.500 million by proportion (2/9 berths). Hence the total maintenance and repair cost is P4.818 million.

Table 16-9  
TOTAL YEARLY COSTS  
(in million)

YEAR	INVESTMENT	REPAIR AND MAINTENANCE
2001	P127.182	
2002	134.909	
2003	101.182	
2004		P4.818
2005		P4.818
2006		P4.818
2007		P4.818
2008		P4.818
2009		P4.818
2010		P4.818
2028		P4.818

#### 16.4 ECONOMIC EVALUATION

The bulk of the costs occur during the construction stage of the project from 2001 to 2003 while the benefits occur after 2003 when the project is already operating and the highest of the yearly benefits occur from 2010 to 2028.

To compare the costs and benefits, there is the need to bring the stream of costs and benefits to their present value based on the same year. Their present value is determined by the use of the social discount rate which is 15.005 as defined in Chapter 15. The construction of the project starts by 2001 hence the present value should be brought to 2001.

It is obvious that when the present value (PV) of benefits is higher than the present value of costs, the proposed project is feasible hence should be pursued. The table below shows the present value of the costs not only at 15% but also at different discount rates.

The present value of the costs at 15% is P337.556 million. The present value is P312.152 million at 25% discount rate, P307.352 million at 27% rate and P304.817 million at 28%.

**Table 16-10**  
**Present Value Of Costs**  
(in million)

YEAR	AMOUNT	PRESENT VALUE				
		15%	23%	25%	27%	28%
2001	P127.182	P127.182	P127.182	P127.182	P127.182	P127.182
2002	134.909	117.312	109.682	107.927	106.402	105.398
2003	101.182	76.508	66.879	64.756	62.734	61.757
2004	4.818	3.168	2.589	2.467	2.351	2.297
2005	4.818	2.755	2.105	1.973	1.852	1.795
2006	4.818	2.395	1.711	1.579	1.458	1.402
2007	4.818	2.083	1.391	1.263	1.148	1.095
2008	4.818	1.811	1.131	1.010	0.904	0.856
2009	4.818	1.575	0.920	0.808	0.712	0.669
2010	4.818	1.370	0.748	0.647	0.561	0.522
2011	4.818	8.393	3.173	2.540	2.048	1.844
TOTAL		P337.556	P317.511	P312.152	P307.352	P304.817

The evaluation of the port project is to be undertaken for 25 years of operation but the useful life of the port facilities is more than 25 years. Hence the port facilities have still value at the end of the evaluation period. There is a need then to account for such value. The value is called salvage value of the facilities which should be included as part of the benefits and to be accounted for by 2029.

This value is considered part of the benefits since there is still the facilities which will continue to handle the future cargo traffic volume even beyond the evaluation period hence will continue to attain benefits. Such benefits after the evaluation period is assumed to be equal to the salvage value and the amount of the salvage value is P191.0 million. The economic value is P172.64 million after deducting the VAT.

**Table 16-11**  
**SALVAGE VALUE OF PORT FACILITIES**  
(value in million)

ITEMS	VALUE	% OF VALUE	AMOUNT
1. Non-depreciable	P 43.828	100.00	P 43.828
2. Wharf Structures	157.484	50.00	78.742
3. RDF/Used Tires	2.722	50.00	1.361
4. Bollards/Bitts	1.560	50.00	0.780
5. Bulkhead	37.650	50.00	18.825
6. Runways	7.572	50.00	3.786
7. Paving Blocks	19.571	50.00	9.786
8. Asphalt Pavement	17.559	25.00	4.390
9. Concrete Pavement	2.881	50.00	1.441
10. Building	64.710	37.00	24.266
11. Tank/Lighting	6.714	50.00	3.367
12. Landscape	1.700	25.00	0.425
TOTAL			P190.997
Say			P191.000

The present value of the benefits at the discount rate of 15% is P873.244 million. The value is P365.894 million at the rate of 25%, P315.705 million at 27% and P294.012 million at 28%.

**Table 16-12**  
**PRESENT VALUE OF BENEFITS**  
(in million)

YEAR	AMOUNT	PRESENT VALUE				
		15%	23%	25%	27%	28%
2001	P 0.000	P 0.000	P 0.000	P 0.000	P 0.000	P 0.000
2002	0.000	0.000	0.000	0.000	0.000	0.000
2003	0.000	0.000	0.000	0.000	0.000	0.000
2004	36.553	24.034	19.643	18.715	17.845	17.430
2005	52.048	29.759	22.740	21.319	20.007	19.369
2006	77.695	38.328	27.597	25.459	23.517	22.612
2007	123.343	53.325	35.619	32.334	29.396	28.045
2008	176.583	66.384	41.459	37.032	33.138	31.367
2009	262.403	85.780	50.087	44.024	38.774	36.416
2010	282.234	80.228	43.799	37.881	32.838	30.600
2011	282.234	491.638	185.844	148.794	119.975	108.000
2028						
2029	173.640	3.468	0.528	0.336	0.125	0.173
<b>TOTAL</b>		<b>P873.244</b>	<b>P427.316</b>	<b>P365.894</b>	<b>P315.705</b>	<b>P294.012</b>

The Net Present Value (NPV) of the proposed port project at the Port of Davao is a positive value of P535.688 million at 15% social discount rate. The Benefit-Cost (B/C) ratio is 2.59 at the same rate. The Internal Rate of Return (IRR) is 27.445. At the discount rate of 27%, the discounted benefits are still higher than the discounted costs of P8.353 million. On the other hand, at the discount rate of 28%, the discounted benefits are already lower than the discounted costs by P10.805 million. Hence, the IRR is between 27% and 28%.

$$\text{NPV} = \text{P873.244} - \text{P337.556} = \text{P535.688 million}$$

$$\text{B/C} = \frac{\text{P873.244}}{\text{P337.556}} = 2.59$$

	B	C	NPV
27%	P315.705	P307.352	+ P 8.353
28%	294.012	304.817	- P10.805

$$\text{IRR} = 27\% + \frac{\text{P8.353}}{\text{P8.353} + \text{P10.805}} = 27.44\%$$

Based on the results of the above evaluation of the proposed port project at the Port of Davao, the project is feasible at 15% social discount rate.

## 16.5 SENSITIVITY ANALYSIS

Sensitivity analysis is an evaluation of the project to find out how sensitive the port project is where there are changes in either the costs and/or benefits. The changes that shall be examined in either case must be those that will affect the feasibility of the project. It is obvious then that changes should be an improvement of the benefits or the decrease in the costs which in either case enhances the project since the project is already feasible.

The scenarios then that should be examined are as follows:

1. The investment cost will increase by 20%. This maybe due to an increase of some items like the increase in the length of the piles or additional items.
2. Decrease in the benefits by 20%. This maybe caused by the decrease in the cargo traffic volume or a lower growth rate.
3. A combination of the above.

### 16.5.1 Increase in the Investment Costs

The investment costs will increase from P371.000 million to P445.200 million. The economic value of this amount after deducting the VAT is P404.727 million. The same schedule of implementation is followed. The first year value of the accomplishment is P121.418 million and to include the cost of expropriation at P26.000 million, the total costs during the first year is P147.418 million, the second year at P161.891 million and the third year at P121.418 million.

The increase in the investment cost will also increase repair and maintenance cost. It will increase from P6.100 million to P7.320 million per year and to include the manpower costs at P0.500 million, the total repair and maintenance costs is P7.820 million per year starting 2004 up to the end of the study period.

The present value of the costs at the discount rate of 15.00% is P407.775 million. The present value of the costs at 23% is P375.529 million and P369.130 million at 25% rate.

Table 16-13  
PRESENT VALUE OF INCREASED COSTS

YEAR	AMOUNT	PRESENT VALUE			
		15%	20%	23%	25%
2001	P 147.418	P 147.418	P 147.418	P147.418	P 147.418
2002	161.891	140.775	134.909	131.619	129.513
2003	121.418	91.809	84.318	80.255	77.708
2004	5.682	27.773	19.522	16.237	14.491
2028					
TOTAL		P 407.775	P 386.167	P 375.529	P 369.130

As determined in the previous Section, the present value of the benefits is P873.244 million at 15% discount rate and it is P427.316 million at 23% and it is P365.894 million at 25% rate.

The Net Present Value is still positive at P465.469 million. The Benefit-Cost Ratio is 2.14 and Internal Rate of Return is 24.88%.

$$\text{NPV} = \text{P } 873.244 - \text{P } 407.775 = \text{P } 465.469 \text{ million}$$

$$\text{B/C} = \frac{\text{P } 873.244}{\text{P } 407.775} = 2.14$$

	<b>B</b>	<b>C</b>	<b>NPV</b>
23%	P 427.316	P 375.529	+ P 51.787
25%	P 365.894	369.130	- P 3.236
		P 51.787	

$$\text{IRR} = 23\% + \frac{\text{P } 51.787}{\text{P } 51.787 + \text{P } 3.236} \times 2 = 24.88\%$$

### 16.5.2 Decrease in Benefits

The benefits will decrease by 20%. The value of benefits by 2004 which is P36.553 million will decrease to P29.242 million and the value by 2010 which is P282.234 million will decrease to P225.787 million. However, the salvage value at P173.640 million will remain the same.

The present value of the benefits at the reduced amount will be P703.347 million at 15% social discount rate. It is P342.545 million at 23% and P293.152 million at 25%.

Table 16-14  
PRESENT VALUE OF DECREASED BENEFITS  
(in million)

YEAR	AMOUNT	PRESENT VALUE			
		15%	20%	23%	25%
2004	29.242	19.227	16.922	15.714	14.972
2005	41.638	23.807	20.080	18.192	17.055
2006	62.156	30.903	24.979	22.078	20.367
2007	98.674	42.660	33.046	28.495	25.867
2008	141.266	53.107	39.425	33.167	29.626
2009	209.922	68.624	48.821	40.070	35.219
2010	225.787	64.183	43.759	35.039	30.305
2011	225.787	393.310	210.577	148.675	119.035
2028					
2029	173.640	3.468	1.053	0.528	0.336
TOTAL		699.289	438.662	341.958	292.782

As determined in the previous section, the present value of the costs is P337.556 million at 15% discount rate and it is P317.511 million at 23% and P312.152 million at 25%.

The Net Present Value is P361.733 million at 15.00% discount rate. The Benefit-Cost Ratio is 2.07 and the Internal Rate of Return is 24.125. It is to be noted that the discounted value of the benefits at 23% rate is still higher but is already lower at 25% rate.

$$\text{NPV} = \text{P } 699.289 - \text{P } 337.556 = \text{P } 361.733 \text{ million}$$

$$\text{B/C} = \frac{\text{P } 699.289}{\text{P } 337.556} = 2.07$$

	B	C	NPV
23%	P 341.958	P 317.511	+ P 24.447
25%	P 292.782	P 312.152	- P 19.370

$$\text{IRR} = 23\% + \frac{\text{P } 24.447}{\text{P } 24.447 + \text{P } 19.370} \times 2 = 24.12\%$$

### 16.5.3 Combination of the Above Two Scenarios

The third situation is the combination of the increase in the investment costs and at the same time a decrease in benefits. The increase in costs is 20% and the decrease in benefits is also at 20%.

The present value of the benefits is P699.289 million at 15% discount rate and on the other hand, the present value of the costs is P407.775 million at the same rate. Hence, the Net Present Value is P291.514 million. The Benefit-Cost Ratio is 1.71. The present value of the benefits at 20% is still higher than the present value of the costs but already lower at 25% rate. Hence, the internal Rate Return is between the two rates at 21.63%.

$$\text{NPV} = \text{P } 699.289 - \text{P } 407.775 = \text{P } 291.514 \text{ million}$$

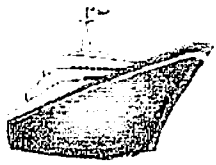
$$\text{B/C} = \frac{\text{P } 699.289}{\text{P } 407.775} = 1.71$$

	B	C	NPV
20%	P 438.662	P 386.167	+ P 52.495
23%	P 341.958	P 375.529	- P 33.571

$$\text{IRR} = 20\% + \frac{\text{P } 52.495}{\text{P } 52.495 + \text{P } 33.571} \times 3 = 21.83\%$$

In conclusion, the proposed port project at the Port of Sasa, Davao is feasible even if the costs will increase by 20% and at the same time the benefits will decrease by 20%. Even if the benefits will decrease by 60%, it will still be equal to the present value of the costs at 15% discount rate.

Hence, the proposed port project is therefore recommended for implementation as soon as possible including redevelopment of the existing port.



# Chapter

# 17

## *Economic Evaluation of the Proposed Project: Private Viewpoint*

## Chapter 17

# ECONOMIC EVALUATION OF THE PROPOSED PROJECT PRIVATE VIEWPOINT

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### 17.1 SCENARIOS FOR EVALUATION

#### 17.1.1 Private Viewpoints for Evaluation

The economic evaluation from the private viewpoint is what is commonly called the financial evaluation. As started above, the private viewpoint could be from the users or any user of the facilities and/or services or the one which provides the facilities and/or services.

There are projects whose output is tradeable. An example of this non-tradeable good is an irrigation project where the output is water needed to irrigate the farms. In such cases the private viewpoint to be evaluated is normally the users of the output of the project rather than the one who provides the irrigation project. However, it is not from the private viewpoint of a particular farmer but the entire beneficiaries of the irrigation project.

The output of the proposed port project are port facilities and services hence, they are tradeable goods/services. The private viewpoint then to be evaluated is the one that will provide the facilities. A port provides also also services hence the other viewpoint to evaluate is that one that will provide the port services. Even if the provider of the services and facilities were the same entity, it would be better to separate the financial evaluation in order to analyze whether each is viable and not one to subsidize the other. Secondly, each has its own separate revenue and each has its own separate costs and investment. Each revenue should be analyzed if it could justify the costs and investment.

The private viewpoint then shall be undertaken from 2 aspects one for the provision of port facilities and the other in the provision of port services. As analyzed in Chapter 12, the port facilities shall be provided by the Authority and port services shall be provided by the private firm. The private viewpoints then shall be from that of the Authority and that of the private firm.

#### 17.1.2 Port Pricing

The revenue that will accrue to the proponents is in the form of rates and charges which the proponents will impose on the users of the facilities and services. The set of rates and charges comprised the port tariff. The tariff speaks of the pricing strategy being adopted.

There are two concepts being adopted in port pricing strategy. One is the marginal port pricing port concept. The tariff that will evolve out of this concept will result to the situation where the port users or direct users would pay less than what it would cost to provide the port facilities and services.

The proponents of this concept rationalized that the benefits in ports extend in diverse and diffuse manner into the port's hinterland. It means that the direct users are not the only ones benefited by the provision of the port services and the port facilities but also other sectors of the economy. Hence, the latter shall also share in the costs for the provision of such facilities/services. Therefore, the direct users of the port are in effect being subsidized by the other sectors of the economy.

This concept can hardly be applied when the proponent of the port facilities and services is a private firm. The private firm can not force indirect users to share in the cost. As such, this concept could be applicable where the proponent is the government where the indirect users shall pay through the taxes imposed by the government.

This concept adheres to the principle that all those directly and indirectly benefited by the project should share in the burden for the recovery of the cost for the provision of such project. The problem however, is the appropriate allocation the sharing of the cost among the direct beneficiaries on one hand and indirect beneficiaries on the other hand.

At this pricing concept, the financial evaluation of the project is no longer necessary and becomes irrelevant. It is obvious that the project is not financially viable. Hence, projects are implemented solely on their economic feasibility from the national viewpoint. However, in order that projects under this concept of pricing shall continue to provide additional facilities and to provide efficient services, the government shall extend financial subsidy or provide some facilities.

The other pricing strategy is full cost port pricing concept. The tariff that will evolve out of this concept will result to a situation where the direct port users will shoulder and pay all the cost required to provide the port facilities and services. The proponents of this concept advocate that the pricing policy to be adopted shall be able to rationalize the proper usage of the port facilities and services to encourage the efficient use of the resources. Subsidized price tends to appear to the clients that the facilities and services are cheap hence would tend to abuse the use of such facilities.

Under the full cost port pricing, the port users will tend to pay more if the facilities and services are to be used in an inefficient manner. Hence, their tendency to use the port facilities efficiently in order to pay less. The proponents of this concept also maintain that under a subsidized pricing strategy, the same strategy will eventually be the cause of the downfall of the project. Since revenue is not adequate, the owner of the port project would find it hard to maintain and provide an efficient port services.

Thus, there is the need that the total cost of providing the goods and services must be fully recovered from the pricing system to be adopted. This will ensure that there is enough funds to maintain present facilities, enough funds to sustain an efficient operating system and enough funds to continue in the provision of facilities and equipment that may be needed in the future.

The proposed port project will be evaluated using full cost port the full cost port pricing subject to the present rates and charges at the port. If the revenue to be derived based on the present rates and charges will not justify the costs and investment to be made, the revised rates and charges will be determined to justify the project.

**17.2 PRESENT RATES AND CHARGES**

The financial evaluation of the proposed project shall start by using the rates and the charges under the present tariff. The tariff is composed of two charges. One is Port Charges which is imposed by the Authority and approved by the Office of the President. Together with their share from the income of the cargo handling operator, they form the revenue of the PPA from port operations and this revenue is suppose to recover their investment in the provision of port facilities.

The other is Cargo Handling Charges which is approved by the PPA. They are imposed by the cargo handling operator and serve as their revenue from undertaking the port services. The port operator provides equipment and manpower and incurs operating expenses and investment in equipment.

The Port Charges are implemented nationwide which means that the same rates are imposed in all the ports. Cargo Handling Charges on the other hand are implemented per port hence the charges at the Port of Davao is different from the charges of another port.

**Table 17-1**  
**PRESENT RATES AND CHARGES AT PORT OF DAVAO**

CHARGING ITEMS	CHARGING BASE	CHARGING RATE		
		DOM	IMP	EXP
<b>A. PORT CHARGES</b>				
1. VESSELS				
a. Berthing Fee	GRT-Days	P 0.301	P 1.560	
b. Port Due	GRT		3.240	
2. CARGOES				
a. Wharfage Fee				
BB/LCL	MT	P 3.150	P 36.65	P 18.35
FCL Containers				
10'	Box	P 21.050	-	-
20'	Box	P 42.100	P 519.35	P 259.70
40'	Box	P 63.150	P 779.05	P 391.05
Empty				
b. Storage Fee				
BB/LCL	MT/Day	P 5.650	P 7.50	P 3.75
Containers				
10'	Box/day	P 63.450		
20'	Box/day	P 180.500	P 240.65	P 60.15
40'	Box/day	P 360.950	P 481.30	P 120.30
<b>B. CARGO HANDLING RATES</b>				
1. GEN. CARGO/LCL				
a. Arrastre	RT	P 64.860		P 37.99
b. Stevedoring	RT	P 15.660		P 59.66
c. Strip/stuff	RT	P 21.620		

CHARGING ITEMS	CHARGING BASE	CHARGING RATE		
		DOM	IMP	EXP
2. CONTAINERS				
a. Arrastre				-
10'	Box	P 293.30		P 620.15
20'	Box	P 586.65		P 1,143.45
40'	Box	P 1,173.30		-
b. Stevedoring				-
10'	Box	P 106.65		P 367.30
20'	Box	P 177.85		P 734.50
40'	Box	P 21.620		
3. CONTAINERS (Empty)				
a. Arrastre				-
10'	Box	P 88.05		P 397.55
20'	Box	P 234.50		P 662.70
40'	Box	P 469.50		-
b. Stevedoring				-
10'	Box	P 106.65		P 367.30
20'	Box	P 77.85		P 734.50
40'	Box	P 77.85		
4. CONTAINERS (LCL)				
20'	Box			P 933.10
40'	Box			P 2 123.80

The rates for Port Charges are taken from the PPA Memorandum Circular No. 07-94 as published in the PPA Trends in the second Quarter of 1994. The increase in the rates was approved by the Office of the President into two phases of implementation and the last phase became effective in April 3, 1995. Since then there were no approved increases on Port Charges. The Cargo Handling Charges on the other hand of the Port of Davao are taken from a copy of the PPA Board Ex-Com Resolution No. 98-560 which approved the charges.

Berthing Fee and Port Dues for foreign ships are denominated in US dollar. In the above table of rates, these rates have been converted to Philippine currency using the exchange rate of P40 to one (1) US dollar. The arrastre and stevedoring rates for non-containerized cargo traffic are the average of the palletized and non-palletized rates at 25% to 75% of the rates, respectively. The anchorage rates in the Port Charges are equal to 50% of the above rates.

The charging base of non-containerized cargo volume under the Cargo Handling Charges is in Revenue Ton however, the traffic is in metric ton. There is a need to reconcile the charging base and the volume of traffic. A revenue ton is based both on the weight and volume density.

If the weight of one cubic meter is equal to or more than one metric ton, then a revenue ton is equal to the weight of the cargo in metric ton. These are the high density cargoes. If the weight of one cubic meter is less than one metric ton the revenue tons is equal to one cubic meter. These are the low density cargoes. The problem then of the charging base on revenue ton is on the low density cargoes where the weight is not the basis but the volume. What is the volume of the low density cargoes out of the total cargo traffic and what is their density of each commodity. An estimate of the average density of the non-containerized cargo

traffic volume based on the types of commodities is 0.80. This means that one cubic meter weighs 0.80 metric tons and conversely. One metric ton is equivalent to 1.25 revenue ton (1.0/0.80).

The handling rates then for the non-containerized and the LCL cargo traffic should be adjusted by multiplying the rates by 1.25 to convert the charging base from revenue ton to metric ton. They are as follows.

CHARGING RATES	CHARGING BASE	CHARGING RATES	
		DOMESTIC	FOREIGN
1. Arrastre	MT	P 81.075	P 47.488
2. Stevedoring	MT	19.575	74.575
TOTAL RATE PER		P 100.65	P 122.063
3. Strip/Stuff	MT	P 27.000	—

### 17.3 TRAFFIC VOLUME FOR DETERMINATION OF REVENUE

There is the need to desegregate the traffic as projected in Chapter 7 in accordance with the charging based of the rates. The non-containerized cargo volume and the domestic LCL cargo volume are in metric tons and that the import and the export should be separate as the rates are different under the Port Charges. The containers shall be all in boxes desegregated by length and again into import and desegregated also into FCL, LCL and empties.

Table 17-2  
DOMESTIC TRAFFIC

YEAR	LOADED			EMPTY		
	IN	OUT	TOTAL	IN	OUT	TOTAL
<b>A. TOTAL CONTAINERS</b>						
2004	66,845	57,145	123,990	11,200	20,900	32,100
2005	71,890	61,905	133,795	11,855	21,840	33,695
2006	77,300	67,140	144,440	12,560	22,720	35,280
2007	83,150	72,830	155,980	13,300	23,620	36,920
2008	88,230	79,045	167,275	13,895	23,080	36,975
2009	94,125	84,735	178,860	14,590	23,980	38,570
2010	97,550	88,150	185,700	14,890	24,290	39,180
2028	97,550	88,150	185,700	14,890	24,290	39,180
<b>B. 40-FOOT CONTAINERS</b>						
2004	6,020	5,145	11,165	1,005	1,880	2,885
2005	6,830	5,880	12,710	1,125	2,075	3,200
2006	7,730	6,710	14,440	1,255	2,275	3,530
2007	8,730	7,650	16,380	1,400	2,480	3,880
2008	9,710	8,700	18,410	1,525	2,535	4,060
2009	10,820	9,740	20,560	1,680	2,760	4,440
2010	11,710	10,580	22,290	1,785	2,915	4,700
2028	11,710	10,580	22,290	1,785	2,915	4,700

YEAR	LOADED			EMPTY		
	IN	OUT	TOTAL	IN	OUT	TOTAL
C. 20-FOOT CONTAINERS						
2004	55,650	47,570	103,220	9,320	17,400	26,720
2005	60,750	52,310	113,060	10,015	18,455	28,470
2006	66,285	57,570	123,855	10,770	19,485	30,255
2007	72,340	63,360	135,700	11,570	20,550	32,120
2008	77,860	69,760	147,620	12,265	20,365	32,635
2009	83,300	74,990	158,290	12,915	21,225	34,140
2010	85,740	77,570	163,410	13,105	21,375	34,480
2028	85,840	77,570	163,410	13,105	21,375	34,480
D. 10-FOOT CONTAINERS						
2004	5,180	4,430	9,610	870	1,620	2,490
2005	4,310	3,715	8,025	715	1,310	2,025
2006	3,290	2,850	6,140	530	970	1,500
2007	2,080	1,820	3,900	330	590	920
2008	660	590	1,250	105	175	280
2009	0	0	0	0	0	0
2010	0	0	0	0	0	0
2028	0	0	0	0	0	0
E. DETAILS OF LOADED CONTAINERS						
YEAR	FCL			LCL		
	10-FOOT	20-FOOT	40-FOOT	20-FOOT	40-FOOT	
2004	9,610	93,320	10,095	9,900	1,070	
2005	8,025	102,420	11,515	10,640	1,195	
2006	6,140	112,425	13,105	11,430	1,335	
2007	3,900	123,410	14,895	12,290	1,485	
2008	1,250	134,500	16,775	13,120	1,635	
2009	0	144,340	18,745	13,950	1,815	
2010	0	149,010	20,325	14,400	1,965	
2028	0	149,010	20,325	14,400	1,965	
F. NON-CONTAINERIZED AND LCL CARGO TRAFFIC (nt)						
	NON-CONT.	LCL	TOTAL			
2004	339,000	174,000	513,000			
2005	350,000	187,000	537,000			
2006	361,000	201,000	562,000			
2007	372,000	216,000	588,000			
2008	382,000	232,000	614,000			
2009	392,000	249,000	641,000			
2010	392,000	258,000	650,000			
2028	392,000	258,000	650,000			

Table 17-3  
FOREIGN CARGO

YEAR	LOADED			EMPTY		
	IN	OUT	TOTAL	IN	OUT	TOTAL
<b>A. TOTAL CONTAINERS</b>						
2004	980	17,350	27,330	10,495	3,125	13,620
2005	11,230	18,990	30,220	11,130	3,370	14,500
2006	12,365	20,150	32,515	11,315	3,530	14,845
2007	13,500	21,425	34,925	11,620	3,695	15,315
2008	14,745	22,430	37,175	11,495	3,810	15,305
2009	16,050	23,540	39,590	11,430	3,940	15,370
2010	16,905	23,805	40,710	10,825	3,925	14,750
2028	16,905	23,805	40,710	10,825	3,925	14,750
<b>B. 40-FOOT CONTAINERS</b>						
2004	6,985	12,140	19,125	7,345	2,190	9,535
2005	7,860	13,290	21,150	7,790	2,360	10,150
2006	8,655	14,100	22,755	7,920	2,475	10,395
2007	9,450	15,000	24,450	8,135	2,585	10,720
2008	10,320	15,700	26,020	8,050	2,670	10,720
2009	11,230	16,480	27,710	8,005	2,755	10,760
2010	11,830	16,660	28,490	7,580	2,750	10,330
2028	11,830	16,660	28,490	7,580	2,750	10,330
<b>C. 20-FOOT CONTAINERS</b>						
2004	2,995	5,210	8,205	3,150	935	4,085
2005	3,370	5,700	9,070	3,340	1,010	4,350
2006	3,710	6,050	9,760	3,395	1,055	4,450
2007	4,050	6,430	10,480	3,485	1,105	4,590
2008	4,420	6,730	11,150	3,450	1,140	4,590
2009	4,820	7,060	11,880	3,425	1,185	4,610
2010	5,070	7,140	12,210	3,250	1,180	4,430
2028	5,070	7,140	12,210	3,250	1,180	4,430
<b>E. NON-CONTAINERIZED CARGO VOLUME(mt)</b>						
YEAR	IN		OUT		TOTAL	
2004	216,000		49,000		265,000	
2005	214,000		49,000		263,000	
2006	217,000		47,000		264,000	
2007	220,000		45,000		268,000	
2008	221,000		47,000		272,000	
2009	223,000		49,000		275,000	
2010	213,000		49,000		262,000	
2028	213,000		49,000		262,000	

Table 17-4  
VESSELS

YEAR	LOAD/VESSEL	GROSS PROD.	S.T./VESSEL		TOTAL GRT	GRT- DAYS
	(mt)	(mt/h)	Hours	Days	(in million)	
A. DOMESTIC						
2004	2,640	71.54	36.90	2	5.738	11.476
2005	2,750	72.53	37.92	2	5.990	11.980
2006	2,880	73.46	39.21	2	6.240	12.480
2007	3,010	74.71	40.29	2	6.517	13.034
2008	3,150	76.51	41.17	2	6.804	13.608
2009	3,300	78.09	42.26	2	7.100	14.200
2010	3,450	79.67	43.30	2	7.190	14.380
2028	3,450	79.67	43.30	2	7.190	14.380
B. FOREIGN						
2004	4,010	63.30	63.35	3	1.582	4.746
2005	4,140	65.55	63.16	3	1.647	4.941
2006	4,210	67.09	62.75	3	1.722	5.166
2007	4,280	68.76	62.25	3	1.796	5.388
2008	4,350	70.42	61.77	3	1.870	5.610
2009	4,440	71.98	61.68	3	1.946	5.830
2010	4,520	73.63	61.39	3	1.953	5.859
2028	4,520	73.63	61.39	3	1.953	5.859

Table 17-5  
PASSENGER TRAFFIC

YEAR	IN	OUT	TOTAL
2004	129,900	110,600	240,500
2005	136,400	116,100	252,500
2006	143,200	122,000	265,200
2007	150,300	128,100	278,400
2008	157,900	134,500	292,400
2009	157,900	134,500	292,400
2010	157,900	134,500	292,400
2028	157,900	134,500	292,400

#### 17.4 REVENUE FROM CARGO HANDLING CHARGES

The main source of revenue for the port operator is from the handling of the cargo traffic volume. The other sources are from the handling of the passengers, the rental of spaces at the passenger terminal building and from the parking fee.

The other possible sources are from watering and bunkering of vessels however, these are not included since they may not be regular sources of revenue because the vessels may get their supply of water and fuel in other ports of call. Secondly, the investment required for these services including manpower requirement and cost of the goods to be sold are not included hence any revenue from these services should not be included. Thirdly, these services actually involve the resale of goods which are the water and diesel hence should be analyzed as a separate revenue center to determine the resale price.

In addition, the revenue from the handling of cargo volume at the anchorage should not be included also. Again the reason is that the fact that corresponding investment and operating costs in the handling of such cargo traffic are not included also. Secondly, there is the question whether or not the cargo traffic at the anchorage are really traffic for the Port of Davao. The big volume handled at the anchorage is the refined petroleum which is really cargo traffic of the private ports of the oil companies but because they are handled at the anchorage, then the volume will not be handled by the operator of the private port but by the operator of the nearby government port. As such, the traffic handled at the anchorage forms part of the statistics of the government port.

The specific revenue from the handling of cargo traffic are as follows, except for the stripping and stuffing of the LCL boxes, both the rates for arrastre and stevedoring applies:

- └ Handling of the non-containerized volume
- └ Stripping and stuffing of LCL containers
- └ Handling of FCL containers and
- └ Handling of empty containers

#### 17.4.1 Revenue from the Handling of Domestic Traffic

The revenue for the handling of the non-containerized and LCL Cargo traffic cargo traffic will be P51.633 million by 2004 and increases P65.423 million by 2010. The revenue from stripping and stuffing will be P4.698 million by 2004 and will increase to P6.966 million by 2010. The revenue from the handling of FCL containers will be P88.827 million by 2004 and increases to P141.380 million by 2010. The revenue from the handling of empty containers will be P13.529 million by 2004 and will increase to P17.261 million by 2010. The total revenue from the handling of domestic cargo traffic is P158.529 million and increases to P231.030 million by 2010 up to 2028.

**Table 17-6**  
**REVENUE FROM HANDLING DOMESTIC**  
**NON-CONTAINERIZED AND LCL CARGO**  
(in million pesos)

YEAR	VOLUME (mt)	ARR/STEV (P 100.65)	VOLUME (mt)	STRIP/STUFF (P 27.00)
2004	513,000	P 51.633	174,000	P4.698
2005	537,000	54.049	187,000	5.049
2006	562,000	56.565	201,000	5.427
2007	588,000	59.182	216,000	5.832
2008	614,000	61.799	232,000	6.264
2009	641,000	64.517	249,000	6.733
2010	650,000	65.423	258,000	6.966
2028	650,000	65.423	258,000	6.966

**Table 17-7**  
**REVENUE FROM HANDLING DOMESTIC FCL CONTAINERS**  
(in million pesos)

YEAR	10'	ARR/ STEV	20'	ARR/ STEV	40'	ARR/ STEV	TOTAL ARR/STEV
2004	9,610	P 3.844	93,320	P 71.343	10,095	P13.640	P 88.827
2005	8,025	3.210	102,420	78.300	11,515	15.558	97.068
2006	6,140	2.456	112,425	85.949	13,105	17.707	106.112
2007	3,900	1.560	123,410	94.347	14,895	20.125	116.032
2008	1,250	0.500	134,500	102.825	16,775	22.666	125.991
2009	0	0.000	144,340	110.348	18,745	25.327	135.675
2010	0	0.000	149,010	113.918	20,325	27.462	141.380
2028	0	0.000	149,010	113.918	20,325	27.462	141.380

**Table 17-8**  
**REVENUE FROM HANDLING DOMESTIC EMPTY CONTAINERS**  
(in million pesos)

YEA R	10'	ARR/ STEV	20'	ARR/ STEV	40'	ARR/ STEV	TOTAL ARR/STEV
2004	2,490	P 0.845	26,720	P 11.018	2,855	P 1.868	P 13.371
2005	2,025	0.394	28,470	11.740	3,200	2.072	14.206
2006	1,500	0.292	30,255	12.476	3,530	2.285	15.053
2007	920	0.179	32,120	13.245	3,880	2.512	15.936
2008	280	0.055	32,630	13.455	4,060	2.628	16.138
2009	0	0.000	34,140	14.078	4,440	2.874	16.952
2010	0	0.000	34,480	14.218	4,700	3.043	17.261
2028	0	0.000	34,480	14.218	4,700	3.043	17.261

**Table 17-9**  
**SUMMARY OF REVENUE FROM HANDLING DOMESTIC CARGO**  
(in million)

YEAR	NC/LCL	S/S	FCL	EMPTY	TOTAL
2004	P51.633	4.698	88.827	13.371	158.529
2005	54.049	5.049	97.068	14.206	170.372
2006	56.656	5.427	106.112	15.053	183.157
2007	59.182	5.832	116.032	15.936	196.982
2008	61.799	6.264	125.991	16.138	210.192
2009	64.517	6.723	135.675	16.952	223.867
2010	65.423	6.966	141.380	17.261	231.030
2028	64.423	6.966	141.380	17.261	231.030

**17.4.2 Revenue from Handling Foreign Traffic**

The revenue from the handling of non-containerized foreign will be P32.330 million by 2004 and will increase to P31.96 million by 2010. The revenue from the handling of FCL boxes will be P44.018 million by 2004 and will increase to P65.56 million by 2010. The revenue from the handling of the empty containers will be P16.038 million by 2004 and will increase to P7.38 million by 2010. The total revenue from handling of the foreign cargo traffic will be P92.386 million by 2004 and will increase to P114.902 million by 2010 up to 2028.

**Table 17-10**  
**REVENUE FROM HANDLING OF FOREIGN NON-CONTAINERIZED CARGO**  
(in million pesos)

YEAR	VOLUME (mt)	ARR/STEV (P 122/mt)
2004	265,000	P 32.330
2005	263,000	32.086
2006	264,000	32.208
2007	268,000	32.696
2008	272,000	33.184
2009	275,000	33.550
2010	262,000	31.964
2028	262,000	31.964

**Table 17-11**  
**REVENUE FROM HANDLING FOREIGN FCL CONTAINERS**  
(in million pesos)

YEAR	20'	ARR/STEV (987.45/mt)	40'	ARR/STEV (P1,877.95/mt)	TOTAL
2004	8,205	P 8.102	19,125	P35.916	P 44.018
2005	9,070	8.956	21,150	39.719	48.675
2006	9,760	9.638	22,755	42.733	52.371
2007	10,480	10.348	24,450	45.916	56.264
2008	11,150	11.010	26,020	48.864	59.874
2009	11,880	11.731	27,710	52.038	63.769
2010	12,210	12.057	28,490	53.503	65.560
2028	12,210	12.057	28,490	53.503	65.560

**Table 17-12**  
**REVENUE FROM HANDLING OF FOREIGN EMPTY CONTAINERS**  
(in million pesos)

YEAR	20'	ARR/STEV (P 664.85/mt)	40'	ARR/STEV (P1,397.20/mt)	TOTAL
2004	4,085	P 2.716	9,535	P13.322	P 16.038
2005	4,350	2.892	10,150	14.182	17.074
2006	4,450	2.959	10,395	14.524	17.483
2007	4,590	3.052	10,720	14.978	18.030
2008	4,590	3.052	10,720	14.978	18.030
2009	4,610	3.065	10,760	15.034	18.099
2010	4,430	2.945	10,330	14.433	17.378
2028	4,430	2.945	10,330	14.433	17.378

**Table 17-13**  
**SUMMARY OF REVENUE FROM HANDLING OF FOREIGN CARGO**  
**(in million pesos)**

YEAR	NC	FCL	EMPTY	TOTAL
2004	P 32.330	P 44.018	P 16.038	P 92.386
2005	32.086	48.675	17.074	97.835
2006	32.208	52.371	17.483	102.062
2007	32.696	56.264	18.030	106.990
2008	33.184	59.874	18.030	111.088
2009	33.500	63.769	18.099	115.368
2010	31.964	65.560	17.378	114.902
2028	31.964	65.560	17.378	114.902

#### 17.4.3 Revenue from Other Sources

Another source of revenue for the operator is the passenger terminal fee from departing passengers. However, there is a need to derive the fee to be charged each passenger. There are two sources of costs from which to base the fee and they are operating costs and the investment for the passenger terminal building. The operating costs are to be shouldered by the operator and the investment by the PPA.

Chapter 12 shows the personnel costs for those that will be needed at the passenger terminal. They are part of the unit for the statistics and the terminal. The personnel cost of this unit is P1.200 million per year to include the benefits but only 1/3 or P0.400 million shall be for the terminal as the work at the terminal is not continuous per day and not in all days of the year. The guards and janitors to be assigned are shown in Chapter 12. The details of the operating costs are as follows to include a profit level of around 15%.

**Table 17-14**  
**OPERATING COSTS AT THE PASSENGER TERMINAL**

ITEMS	AMOUNT
1. Manpower	P 400,000
2. Guards	192,000
3. Janitors	168,000
4. Supplies	24,000
5. Power	36,000
6. R/M	125,000
TOTAL	P 945,000
Mark-up	145,000
GRAND TOTAL	P 1,090,000

The other income from the terminal are parking fee and rental of space. There are available 60 square meters for rental at the terminal and at P200 per month per square meter, the income is P144,000 a year. There are available 50 parking lots and it is expected that they will be all occupied. The number of departures per day on the average is 3 vessels and for 240 days. The income is P180,000 a year at P5 per vehicle for the total income of P324,000 a year.

The difference of P766,000 (P1,900,000 - 324,000) should be recovered from the passenger fee. The present value of this amount for 25 years at 15% discount rate is P4.95 million (P766,000 x 6.464149). The departing passengers then have to pay P5.75 in order that the present value of the fee is also at P4.95 million.

Table 17-15  
PRESENT VALUE OF FEE TO RECOVER OPERATING COSTS

YEAR	VOLUME	FEE P 5.75/PAX	PV AT 15%
2004	110,600	P 635,950	P 553,000
2005	116,100	667,580	504,790
2006	122,000	701,570	461,250
2007	128,100	773,380	421,140
2008	134,500	773,380	384,500
2009	141,200	811,900	351,010
2010	148,300	852,720	2,285,000
2028	-	-	-

If the total fee will be P10 per departing passenger, the difference of P4.25 (P10 - P5.75) will be used for the recovery of the investment in the building at P9 million. The resulting discount rate is around 6% which is the IRR for the building investment.

Table 17-16  
PRESENT VALUE OF FEE TO RECOVER BUILDING INVESTMENT

YEAR	VOLUME	FEE P 4.25/PAX	PV AT 6.00%
2004	110,600	P470,050	P 443,440
2005	116,100	493,430	439,150
2006	122,000	518,200	435,340
2007	128,100	544,430	431,240
2008	134,500	571,630	427,150
2009	141,200	600,100	423,050
2010	148,300	630,280	6,384,040
2028			
TOTAL			P8,983,410

If the fee will be P12.50, then P6.75 (P12.50 - P5.75) will be for the recovery of the building investment resulting to an IRR of 10%. However, if PPA will require an IRR of 15% the fee is P15.90 per Passenger of which P10.15 is for the recovery of investment of the building.

The most likely fee is P10 per departing passenger. The fee at the Port of Cebu operated by the owner of a fast craft vessels is P10 however, it is to be expected that the IRR is much higher because a big portion of the operating cost is recovered from the rental of space. To attain the same IRR for the passenger terminal building at the Port of Davao will mean higher fee because the rental of space is not big enough to lower the fee. The space for rent could not be increased because the volume of passenger is not big enough to warrant a bigger area for rent. However, passenger fee on the other hand has a social dimension that to charge more than P 10.00 will already draw some adverse comments from the public.

In conclusion the recommended fee is P10 of which P4.25 per passenger will be the share of PPA and the P5.75 will be the share of the operator to include the rental of space and parking fee. It follows that this income of the operator is no longer subject to the share of PPA to the gross income of the operator as PPA has a share of the fee already.

As mentioned earlier under this section, the revenue of the operator from other services if any will not be included in the quantification of the revenue for the operator nor of the PPA for the reasons stated earlier. However, if the operator will provide such services, the share of PPA shall be defined separately from the share of the revenue for cargo handling.

#### 17.4.4 Summary of Revenue of Operator

The total revenue of the operator from the handling of cargo and passenger volume at the port is P251.875 million by 2004 and will increase to P322.377 million by 2008 and further increases to P347.109 million by 2010 up to 2028. Revenue from passenger fee and rental of space is net of the share of PPA from the fee.

Table 17-17  
SUMMARY OF REVENUE OF OPERATOR  
(in million)

YEAR	DOMESTIC	TRAFFIC FOREIGN	PASSENGER	TOTAL
2004	P158.529	P 92.386	P 0.960	P251.875
2005	170.372	97.835	0.992	269.199
2006	183.157	102.062	1.026	286.245
2007	196.982	106.990	1.061	305.033
2008	210.192	111.088	1.097	322.377
2009	223.867	115.368	1.136	340.371
2010	231.030	114.902	1.177	347.109
2028	231.030	114.902	1.177	347.109

#### 17.5 REVENUE FROM PORT CHARGES

The main sources of revenue from port charges which accrue to PPA are the berthing fee, wharfage and share in the income of the operator in the cargo and passenger handling. There may be additional share from the income of the operator like from the revenue in the handling of the cargo at the anchorage or from the provision of other services. However, they are not included as there are no investment or if any such investment is not included. The revenue to be accounted for should be related only to the investment to be provided in order that the evaluation of the project will not be distorted.

The sources of the revenue from port charges are as follows:

- ▲ Berthing fee from ship owners
- ▲ Wharfage fee from cargo owners
- ▲ Passenger fee from departing passengers
- ▲ Share of the income from operator -

**17.5.1 Revenue from Domestic Traffic**

The revenue from wharfage fee of non-containerized and LCL cargo traffic is P1.616 million by year 2004 and will increase to P 2.035 million by year 2010. The volume of the cargo traffic is 513,000 metric tons by 2004 and 646,000 metric tons by year 2010. The fee is P3.15 per metric tons.

**Table 17-18**  
**REVENUE FROM WHARFAGE FEE OF NON-CONT/LCL VOLUME**  
(amount in million)

YEAR	VOLUME	WHARFAGE P 3.15/mt
2004	513,000	P1.616
2005	537,000	1.692
2006	562,000	1.770
2007	588,000	1.852
2008	614,000	1.934
2009	641,000	2.019
2010	646,000	2.035
2028	646,000	2.035

The revenue from the wharfage fee of FCL domestic container is P4.768 million by 2004 and increases to P7.557 million by 2010. The volume of 10-foot containers will decrease from 9,610 boxes by year 2004 to year zero by 2009 at the rate of P21.05 a box while the volume of 20-foot containers will increase from 93,320 boxes by 2004 to 149,010 boxes by 2001 and the 40-foot containers will increase from 10,095 boxes by year 2004 to 20,325 boxes by year 2010.

**Table 17-19**  
**REVENUE FROM WHARFAGE OF FCL CONTAINERS**  
(fee in million)

YEAR	10' FEE (P21.05)		20' FEE (P42.10)		40' FEE (P63.15)	
2004	9,610	P 0.202	93,320	P3.929	10,095	P0.637
2005	8,025	0.169	102,420	4.312	11,515	0.727
2006	6,140	0.129	112,425	4.733	13,105	0.828
2007	3,900	0.082	123,410	5.196	14,895	0.941
2008	1,250	0.026	134,500	5.662	16,775	1.059
2009	0	0.000	144,340	6.077	18,745	1.184
2010	0	0.000	149,010	6.273	20,325	1.284
2028	0	0.000	149,010	6.273	20,325	1.284

The revenue from berthing fee of domestic vessels is P3.454 million by 2004 and will increase to P4.329 million by 2010. There will be 11.476 million GRT-days to 14.381 million GRT-days for the same period and the rate is P0.301 per GRT-day.

**Table 17-20**  
**REVENUE FROM BERTHING FEE OF DOMESTIC VESSELS**  
(in million)

YEAR	GRT-DAYS	FEE
2004	11.476	P 3.454
2005	11.980	3.606
2006	12.481	3.757
2007	13.034	3.923
2008	13.609	4.096
2009	14.201	4.275
2010	14.381	4.329
2028	14.381	4.329

The total revenue from domestic traffic is P9.838 million by 2004 and will increase to P13.934 million by year 2010. Volume of cargo traffic is P2.303 million by 2004 and P3.310 million by year 21010. This means that the PPA is earning only P4.20 per metric tons of domestic cargo traffic.

**Table 17-21**  
**SUMMARY OF REVENUE FROM DOMESTIC TRAFFIC**  
(in million)

YEAR	WHARFAGE FEE (NC)	WHARFAGE FEE (NC)	BERTHING FEE	TOTAL
2004	P1.616	P 4.768	P 3.454	P 9.838
2005	1.692	5.208	3.606	10.506
2006	1.770	5.690	3.757	11.217
2007	1.852	6.219	3.923	11.994
2008	1.934	6.747	4.096	12.777
2009	2.019	7.261	4.275	13.555
2010	2.035	7.557	4.329	13.934
2028	2.035	7.557	4.329	13.934

#### 17.5.2 Revenue from Foreign Cargo Traffic

The revenue from wharfage fee for non-containerized foreign cargo traffic is P8.815 million by year 2004 and will increase to P9.072 million by 2009 but will decrease to P8.705 million by year 2010. The revenue is separate between export and import since the rates are different.

**Table 17-22**  
**REVENUE FROM WHARFAGE FEE OF FOREIGN NON-CONT. TRAFFIC**  
(in million)

YEAR	VOL (IN)	FEE (P36.65)	VOL (OUT)	FEE (P18.36)	TOTAL
2004	216,000	P 7.916	49,000	P 0.899	P 8.815
2005	214,000	7.843	49,000	0.899	8.742
2006	217,000	7.953	47,000	0.862	8.815
2007	220,000	8.063	45,000	0.826	8.889
2008	221,000	8.100	47,000	0.862	8.962
2009	223,000	8.173	49,000	0.899	9.072
2010	213,000	7.806	49,000	0.899	8.705
2028	213,000	7.806	49,000	0.899	8.705

The revenue from the wharfage fee for FCL boxes is P13.097 million by year 2004 and will be increasing to P20.218 million by 2010. The revenue for the inward and outward containers is shown separately because of the difference in rates.

**Table 17-23**  
**REVENUE FROM WHARFAGE OF FOREIGN FCL BOXES**  
(fee in million)

YEAR	20'	FEE	40'	FEE	TOTAL FEE
<b>A. INWARD</b>					
2004	2,995	P 1.555	6,985	P 5.442	0
2005	3,370	1.750	7,860	6.123	0
2006	3,710	1.927	8,655	6.743	0
2007	4,050	2.103	9,450	7.362	0
2008	4,420	2.296	10,320	8.040	0
2009	4,820	2.503	11,230	8.749	0
2010	5,070	2.633	11,830	9.216	0
2028	5,070	2.633	11,830	9.126	0
<b>B. OUTWARD</b>					
2004	5,210	P 1.353	12,140	P 4.747	P13.097
2005	5,700	1.480	13,290	5.197	14.550
2006	6,050	1.571	14,100	5.514	15.755
2007	6,430	1.670	15,000	5.866	17.001
2008	6,730	1.748	15,700	6.139	18.223
2009	7,060	1.833	16,480	6.445	19.530
2010	7,140	1.854	16,660	6.515	20.218
2028	7,140	1.854	16,660	6.515	20.218

There are two (2) sources of revenue from the foreign vessels and they are the port dues and berthing fee. The former is based on the GRT and the latter is based on GRT-days. The income from the port dues is P5.126 million based on 1.582 million GRT by 2004 and increases to P 6.328 million on 1.95 million GRT by year 2010.

The income from the berthing fee of foreign vessels is P7.40 million by 2004 and will increase to P9.14 million by 2010. There will be 4.746 GRT-days for the same period. The total revenue from foreign vessels is P12.530 million by year 2004 and P15.468 million by year 2010.

**Table 17-24**  
**REVENUE FROM FOREIGN VESSELS**  
(in million)

YEAR	GRT	PORT DUE (P 3.24)	GRT-DAYS	BERTHING (P 1.56)	TOTAL
2004	1.582	P 5.126	4.746	P 7.404	P12.530
2005	1.647	5.336	4.941	7.708	13.044
2006	1.722	5.579	5.166	8.059	13.638
2007	1.796	5.819	5.388	8.405	14.224
2008	1.870	6.059	5.610	8.752	14.811
2009	1.946	6.305	5.838	9.107	15.412
2010	1.953	6.328	5.859	9.140	15.468
2028	1.953	6.328	5.859	9.140	15.468

The total revenue from port charges for the foreign traffic is P34.442 million by 2004 and increases to P44.391 million by 2010. This revenue is about P44 per metric ton.

**Table 17-25**  
**SUMMARY OF REVENUE FROM FOREIGN TRAFFIC**  
(in million)

YEAR	WHARFAGE FEE (NC)	WHARFAGE FEE (CONT)	VESSELS	TOTAL
2004	P 8.815	P 13.097	P 12.530	P 34.442
2005	8.742	14.550	13.044	36.336
2006	8.815	15.775	13.638	38.208
2007	8.889	17.001	14.224	40.114
2008	8.962	18.223	14.811	41.996
2009	9.072	19.530	15.412	44.014
2010	8.705	20.218	15.468	44.391
2028	8.705	20.218	15.468	44.391

### 17.5.3 Other Sources of PPA Revenue

The other source of revenue for PPA is from the share of the income of the operator which is at the present at 12% each of their cargo handling gross income. The share of the PPA is based on different methods at the present. Some are based on the percentage of the income, some are based on the fixed amount with escalation and some are on combination of fixed amount and percentage basis.

However, the Authority is planning to have the uniform basis of the share of PPA and it seems that the Authority is going back to the original method by percentage. The proposal is a share of 10% for domestic traffic income and 20% foreign traffic income. According to PPA, it appears that this will be approved within this year and to be implemented when a new cargo handling contract is signed. Since the two contracts of the operators will be based on 10% for domestic and 20% foreign traffic.

**Table 17-26**  
**SHARE OF PPA FROM THE INCOME OF THE OPERATOR**  
(in million)

YEAR	DOMESTIC INCOME	FOREIGN INCOME	TOTAL SHARE CH INCOME	PASSENGER FEE
2004	P 15.853	P 18.477	P 34.330	P 0.470
2005	17.037	19.567	36.604	0.493
2006	18.316	20.412	38.728	0.518
2007	19.698	21.398	41.096	0.544
2008	21.019	22.218	43.237	0.572
2009	22.387	23.074	45.461	0.600
2010	23.103	22.980	46.083	0.630
2028	23.103	22.980	46.083	0.630

## 17.6 QUANTIFICATION OF COSTS

The first items to analyze here is the investment on the port facilities. The investment costs as determined in Chapter 14 pertains only to the additional port facilities to be provided under the proposed port project. However, the determination of revenue is for the entire traffic volume including the volume to be handled by the existing port. Hence, the costs of investment to be considered is not only for the additional port facilities to be provided but for the entire port.

One approach in the determination of the total investment is to determine the sound value of the existing port and add the same to the investment for the additional facilities. Sound value is equal to replacement value less depreciation. The problem with using the sound value is that its remaining life is much shorter than the new investment. Secondly, when the replacement of the existing facilities takes place, then the value is again different. Hence, it is more appropriate to use the replacement value.

The port facilities then to be provided will be based on the facilities determined and shown in Section 10.4.7, Chapter 10 as they are based on the capacity of the total port including the proposed additional facilities. The investment cost is P1,286,000 million based on the same unit prices as used in the determination of the investment cost for the additional port facilities. The details are shown in Annex 17-1.

Table 17-28  
SUMMARY OF THE TOTAL INVESTMENT COST  
(in million)

ITEMS	AMOUNT
1. General Expenses	P 20.000
2. Wharf Structures	661.636
3. Reclamation	234.400
4. Runways	26.098
5. Paving Blocks	85.246
6. Asphalt Pavement	66.961
7. Buildings	146.240
8. Utilities/Others	45.450
TOTAL	P 1,286.031 say P 1,286.000

### 17.6.1 Costs for the Operator

The investment costs of the operator will comprise the costs for the investment in the acquisition of equipment and office furnitures, the equipment and the vehicles. The investment in equipment is determined and shown in Chapter 11. Initial investment is P367.000 million and additional investment in the amount of P250.700 million spread over the period of 21 years from 2005 to 2025. It is expected that 80% of the initial investment or P300.000 million will be made by 2003 and the rest at P67.000 million by year 2004.

The investment for the office furnitures, equipment and the vehicles is determined and shown in Chapter 12. Investment cost is P10.000 million of which P2.500 million will occur by 2003 and the rest at 7.500 million will occur by 2004. The replacement cost is P4.000 million which occurs every 5 years.

The total investment cost by the operator is P643.70 million of which the initial investment cost is P377.00 million.

**Table 17-29**  
**INVESTMENT BY THE OPERATOR**  
(in million)

YEAR	EQUIPMENT	OFFICE	TOTAL
2003	300.00	2.50	302.50
2004	67.00	7.50	74.50
2005	50.70		50.70
2006	2.90		2.90
2007	50.70		50.70
2008	3.60		3.60
2009	50.80	4.00	54.80
2010	0.30		0.30
2011	0.00		0.00
2012	16.80		16.80
2013	0.40		0.40
2014	0.40	4.00	4.40
2015	0.40		0.40
2016	48.30		48.30
2017	0.80		0.80
2018	2.50		2.50
2019	0.00	4.00	4.00
2020	19.30		19.30
2021	0.40		0.40
2022	0.40		0.40
2023	0.40		0.40
2024	0.80	4.00	4.80
2025	0.80		0.80

The operating expenses per year include the personal costs, repair and maintenance for the equipment and port facilities, equipment fuel and overhead expenses. The determination of these expenses are shown in Chapters 11 and 12. The repair and maintenance for the port facilities is 1.25% of the total investment cost which is the same percentage as the proposed port project. The amount is P16.5 million ( $1,286 \times 0.128$ ) but the initial amount by 2004 is only 60% or P9.90 million and will increase to the full amount by 2010. The operating expenses is P113.293 million by 2004 and will be increasing to P129.108 million.

**Table 17-30**  
**TOTAL OPERATING EXPENSES**  
(in million)

YEAR	PERSONNEL COST	REPAIR/ MAINTENANCE COST		FUEL COST	OVERHEAD	TOTAL
		EQUIP.	FACILITY			
2004	P 73.589	P 4.040	P 9.900	P 5.764	20.00	113.293
2005	74.187	4.461	10.725	6.083	20.00	115.456
2006	75.142	4.571	11.550	6.402	20.00	117.671
2007	77.615	4.998	12.375	6.738	20.00	121.726
2008	78.701	5.135	13.200	7.055	20.00	124.091
2009	79.556	5.567	14.850	7.400	20.00	127.373
2010	79.556	5.571	16.500	7.481	20.00	129.108
2028	79.556	5.571	16.500	7.481	20.00	129.108

There is the need to determine the income tax of the operator which is 32.% of the net income. Aside from the operating expenses, the share of PPA and the depreciation are included as costs. The depreciation as shown also in Chapters 11 and 12 is P18.900 million by year 2004 and will increase to P25.720 million by year 2010. The share in the income of operator from cargo handling is shown above in this Chapter.

**Table 17-31**  
**INCOME TAX OF OPERATOR**  
(in million)

YEAR	REVENUE	EXPENSES		SHARE	NET INCOME	INCOME TAX
		OPERATING	DEPRECIATION			
2004	P251.845	P 113.293	P 18.90	P34.330	P85.352	P27.313
2005	269.199	115.456	20.96	36.604	96.179	30.777
2006	286.245	117.671	21.22	38.728	108.626	34.760
2007	305.033	121.726	23.08	41.096	119.131	38.122
2008	322.377	124.091	24.30	43.237	130.749	41.840
2009	340.371	127.373	25.70	45.461	141.837	45.356
2010	347.109	129.108	25.72	46.083	146.198	46.783
2028	347.109	129.108	25.72	46.083	146.198	46.783

The costs per year to be considered in the evaluation of the project exclude the depreciation. They consist of operating expenses, the share of the Authority from the revenue of the operator and the income tax. These will amount to P174.936 million by year 2004 and will be increasing to P221.974 million by 2010. The depreciation is excluded since the investment costs will be included the evaluation of the port project to prevent double counting of costs.

**Table 17-32**  
**SUMMARY OF YEARLY COSTS OF OPERATOR**  
(in million)

YEAR	OPERATING EXPENSES	SHARE	INCOME TAX	TOTAL
2004	P 113.393	P 34.330	P 27.313	P174.936
2005	115.456	36.604	30.777	182.837
2006	117.671	38.728	34.760	191.159
2007	121.726	41.096	38.122	200.944
2008	124.091	43.237	41.840	209.168
2009	127.373	45.461	45.356	218.190
2010	129.108	46.083	46.783	221.974
2028	129.108	46.083	46.783	221.974

The total costs then to the operator are P302.500 million by 2003 which part of the initial investment. Thereafter, the yearly costs will be more of the operating costs. The amount is around P220.000 million per year up to year 2028.

**Table 17-33**  
**TOTAL COSTS TO THE OPERATOR**

YEAR	INVESTMENT COSTS	OPERATING COSTS	TOTAL COSTS
2003	P 302.50	P 0.000	P 302.500
2004	74.50	174.936	257.337
2005	50.70	182.837	233.537
2006	2.90	191.159	194.059
2007	50.70	200.944	251.644
2008	3.60	209.168	212.768
2009	54.80	218.190	272.990
2010	0.30	221.974	222.274
2011	0.00	221.974	221.974
2012	16.80	221.974	238.774
2013	0.40	221.974	222.374
2014	4.40	221.974	226.374
2015	0.40	221.974	222.374
2016	48.30	221.974	270.374
2017	0.80	221.974	222.774
2018	2.50	221.974	224.474
2019	4.00	221.974	225.974
2020	19.30	221.974	241.274
2021	0.40	221.974	222.374
2022	0.40	221.974	222.374
2023	0.40	221.974	222.374
2024	4.80	221.974	226.774
2025	0.80	221.974	222.774
2026	0.00	221.974	221.974
2027	0.00	221.974	221.974
2028	0.00	221.974	221.974

### 17.6.2 Costs to PPA

The costs to the Authority involve the total investment cost of the port facilities and share in the overhead costs of the head office, PDO-South Mindanao, PMO-Davao and the operating costs of the Port of Davao.

The investment cost is P1,286.000 million where the details are shown in Table 17-28 of this Chapter. In addition, the construction supervision should be included which is 5% of the amount or P64.000 million, a total of P1,350.00 million.

The port project will be implemented in three years and the value of the first year work accomplishment is 30% of the investment cost or P405 million. The value of the work accomplishment on the second year will have a value of 40% or P540.000 million while the last year work accomplishment will have a value of 30% or P405 million.

Based on the financial report of PPA, the personnel services cost of Head Office is P142.711 million and the maintenance and other operating expenses (MODE) is P679.113 million for 1998. However, the R/M of port and not the head office and included already as expense for the port project. The same is true for the interest or loan and amortization of deferred charges since these are related to the investment

of the port facilities or port expansion. The true MODE of head office then is only P383.855 million (P 679.113 - P 295.258%). The total operating expenses of Head Office is P526.566 million.

The share of the operating costs of the head office should be based on proportion of the cargo traffic handled at the port and total cargo traffic handled in all the PPA ports. There were 1.900 million metric tons handled at the port and 59.210 million metric tons in all the PPA ports in 1998. The share then of the Port of Davao is P16.900 million.

$$\text{Share} = \frac{1.900}{59.210} \times \text{P } 526.566 = \text{P } 16.900 \text{ million}$$

The operating expenses of PDO-South Mindanao is P15.87 million in 1998. The share of PMO-Davao is expected to be 50% than the average share per PMO. The amount is P4.76 million and the share of the Port of Davao is 80% or P3.800 million.

$$\text{Share} = \frac{\text{P } 15.87}{5} \times 1.50 \times 0.80 = \text{P } 3.80 \text{ million.}$$

The operating expenses of PMO-Davao in 1998 is P30.59 million which exclude the repair and maintenance and depreciation of port facilities. The management and operations of the port will be undertaken by a private firm as presented in Chapter 12 hence, the operating expenses will decrease. There will be a reduction in manpower and administrative expenses. The estimate is that the personnel costs will decrease by 50% while the administrative costs will decrease by 70%. The reduced personnel costs then is P12.24 million where P2.24 million will be directly for the port.

ITEMS	PRESENT	REDUCED	PMO	PORT
1. Personal Costs	P 24.47	P 12.24	P 10.00	P 2.24
2. Admin. Exp.	6.12	1.86	1.80	0.06
TOTAL	P 30.59	P 14.10	P 11.80	P 2.30

The share of the port of the reduced PMO expenses is 80% or 9.4 million (P11.80 x 80). The port shoulders all the P2.30 million. The total operating expenses of the port to included share in the overhead is P32.40 million per year.

ITEMS	AMOUNT
1. Share of Overhead Costs	
a. Head Office	P 16.90 million
b. PDO-SM	3.80 million
c. PMO-Davao	
TOTAL SHARE	P 30.10 million
2. Oper. Exp. Of the Port	P 2.30 million
TOTAL OPER. COSTS	P 32.40 million

Table 17-34  
SUMMARY OF PPA COSTS  
(in million)

YEAR	INVESTMENT COSTS	OPERATING COSTS	TOTAL COSTS
2001	P 405.000	P 0.000	P 405.000
2002	540.000	0.000	540.000
2003	405.000	0.000	405.000
2004		32.400	32.400
2005		32.400	32.400
2006		32.400	32.400
2028		32.400	32.400

PPA is not exempted from payment of income tax, however, its Charter (PD 857) allows PPA to deduct investments in port development, hence, PPA ends up with negative net income for purposes of said tax. As such, no income tax is paid by PPA.

## 17.7 EVALUATION OF THE PROJECT

### 17.7.1 The Port Operator

While a big portion of the investment of the operator occur a year prior to the start of the operation, about 42% of the investment occurs between 2005 and 2025. There is the need to determine the present value of the stream of revenues and costs so as to compare the same to find out whether the port project from the viewpoint of the operator is feasible. It is obvious that when the present value (PV) of the revenue is higher than the present value of the cost, the portion of the project to be undertaken by the operator is feasible.

The present values of the revenues and costs are determined using the discount rate of 18%. This rate is used since 18% reflects the minimum rate of return that investors from the private sector would like to have for their investments. The base or zero year used to determine the present values of the revenues and costs is 2003 because it is the start of the investment.

The present values of the costs is P1,579.722 million at 18% discount rate. Other rates are used and the present value at 22% is P1,359.505 million and present value at 23% is P1,315.395 million.

**Table 17-35**  
**PRESENT VALUE OF COSTS**  
(in million)

YEAR	AMOUNT	PRESENT VALUE		
		18.00%	22.00%	23.00%
2003	P 302.500	P 302.500	P 302.500	P 302.500
2004	257.337	218.082	210.932	209.217
2005	233.537	167.723	156.905	154.364
2006	194.059	118.110	106.870	104.284
2007	251.644	129.795	113.592	109.943
2008	212.768	93.003	78.724	75.575
2009	272.990	101.124	82.792	78.834
2010	222.274	69.777	55.255	52.186
2011	221.974	59.054	45.230	42.370
2012	238.774	53.833	39.879	37.055
2013	222.374	42.469	30.429	28.044
2014	226.374	36.654	25.402	23.221
2015	222.374	30.500	20.444	18.537
2016	270.271	31.430	20.376	18.325
2017	222.774	21.964	13.767	12.280
2018	224.474	18.747	11.370	10.060
2019	225.974	15.994	9.382	8.233
2020	241.274	14.472	8.211	7.147
2021	222.374	11.298	6.200	5.353
2022	222.374	9.575	5.082	4.352
2023	222.374	8.114	4.166	3.538
2024	226.774	7.016	3.484	2.935
2025	222.774	5.841	2.805	2.344
2026	221.974	4.932	2.291	1.899
2027	221.974	4.180	1.878	1.544
2028	221.974	3.542	1.539	1.255
TOTAL PV		P 1,579.722	P 1,359.505	P 1,315.395

The gross revenue will increase from P251.875 million by 2004 to P347.109 million by 2010. The salvage value is P24.300 million for the cargo handling equipment and office equipment and furnitures and the vehicles. The present value at 18% rate is P1,689.228 million. The present value at 23% is P1,301.004 million.

**Table 17-36**  
**PRESENT VALUE OF REVENUE**  
(in million)

YEAR	AMOUNT	PRESENT VALUE		
		18.00%	22.00%	23.00%
2003	0.000	0.000	0.000	0.000
2004	P 251.875	P 213.453	P 206.455	P 204.776
2005	269.199	193.334	180.685	177.936
2006	286.245	174.218	157.637	153.823
2007	305.033	157.333	137.692	133.268
2008	322.377	140.914	119.279	114.509
2009	340.109	126.084	103.227	98.293
2010		683.563	467.562	427.287
2028	24.300			
2029		0.329	0.138	0.112
TOTAL		P 1,579.722	P 1,372.855	P 1,310.004

The project from the viewpoint of the operator is feasible at 18% rate. The Net Present Value is P109.506 million and Benefit-Cost Ratio is 1.07. The IRR is 22.71%.

$$NPV = P 1,689.228 = P 1,579.722 = P 109.506 \text{ million}$$

$$B/C = \frac{P 1,689.228}{P 1,579.722} = 1.07$$

$$22\% \quad \begin{array}{cc} B & C \\ P 1,372.855 & P 1,359.505 \end{array} \quad \begin{array}{c} NPV \\ + P 13.350 \end{array}$$

$$IRR = 22\% + \frac{P 13,350}{P 13,350 + P 5.391} = 22.71\%$$

### 17.7.2 The Authority

The investment for port facilities by PPA will take at least 3 years before revenue start to accrue as against only 1 year of the operator. Secondly, only 58% of the investment of the operator occurs before the operations start and the rest occurs when there is already revenue. The investment of PPA occurs all before start of revenue. The base or zero year to determine the present value of revenues and costs is 2001 as the investment start in this year.

Table 17-37  
PRESENT VALUE OF COSTS  
(in million)

YEAR	AMOUNT	PRESENT VALUE			
		3.00%	5.00%	10.00%	12.00%
2001	P 405.000	P 405.000	P 405.000	P 405.000	P 405.000
2002	540.000	524.272	514.286	490.909	482.143
2003	405.000	381.751	367.747	334.711	322.864
2004	32.400	531.799	414.189	243.055	202.581
2028					
TOTAL		P1,842.822	P1,701.222	P1,473.675	P1,412.588

The present value of revenue is P1,949.669 million at 3% discount rate. It is P1,450.017 million at 5% rate and P780.610 million at 10% rate.

**Table 17-38**  
**PRESENT VALUE OF COSTS**  
(in million)

YEAR	AMOUNT	PRESENT VALUE			
		3.00%	5.00%	10.00%	12.00%
2001	P 0.000	P 0.000	P 0.000	P 0.000	P 0.000
2002	0.000	0.000	0.000	0.000	0.000
2003	0.000	0.000	0.000	0.000	0.000
2004	79.080	72.369	68.312	59.414	56.288
2025	83.939	74.579	69.057	57.331	53.345
2006	88.671	76.488	69.476	55.058	50.314
2007	93.748	78.512	69.956	52.918	47.496
2008	98.010	79.691	69.654	50.295	44.335
2009	103.630	81.806	70.141	48.344	41.854
2010	105.025	80.493	67.700	44.541	37.873
2011	105.025	1,107.060	791.386	365.298	274.567
2028					
2029	683.000	298.524	174.229	47.361	28.597
TOTAL		P1,949.522	P1,449.911	P 780.560	P 634.669

The Net Present Value at 10% discount rate is negative at P693.115 million. The Benefit-Cost ratio at 10% is 0.53. The Internal Rate of Return is only 3.60%.

$$\text{NPV} = \text{P } 780.560 - \text{P } 1,473.675 = \text{P } 6.93.115$$

$$\text{B/C} = \frac{\text{P } 780.560}{\text{P } 1,473.675} = 0.53$$

	B	C	NPV
3.00%	P 1,949.522	P 1,842.822	+ P 106.700
5.00%	1,449.911	1,701.222	- P 251.311

$$\text{IRR} = 3.00\% + \frac{\text{P } 106.700}{\text{P } 106.700 + \text{P } 251.311} \times 2 = 3.60\%$$

## 17.8 FINDINGS AND RECOMMENDATIONS

The management and operations of the port as part of the port project is feasible with the present level of charging rates and at 18% discount rate. It is feasible inspite that the repair and maintenance of the port facilities is included as part of the responsibility of the private operator and the share of PPA will increase. The IRR is 22.71%. It is then recommended that cargo handling rates be maintained at their present level.

The same however, could not be said on the part of the one who provides the port facilities. The provision of facilities as part of the port project will have an IRR of only 3.60%, a very low return on investment. There is a need to increase the charging rates under the port charges.

There are 2 approaches in the determination of the increase one by annualized method and the other is the present value method. The former is similar to an amortization of a loan to be paid at a certain interest per year for the useful life of the investment. The present value method is the same as in the determination of the present value of the revenues and costs. The annualized method is to be used when there is no existing rates or market price and the investment is only for one year and the revenues are the same every year. When the investment takes more than one year and the revenues per year are not the same the resulting cost per metric ton have to be adjusted upward by trial and error to arrive at the desired rate of return. Under the present value method, there are existing rates as what it is now and to be increased based on the ratio of the present value of the revenues and the costs. In either case the result is the cost per metric ton. The cargo volume by 2010 is 1.1.014 million metric tons for foreign volume and 3.310 million metric tons for domestic volume for the total of 4.324 million metric tons. However, the average volume is 3.923 million metric tons.

#### FIRST METHOD: Annualized Method

	10.00%	12.00%	15.00%
1. Annualized Investment	P 138.050	P 163.760	P 203.260
2. Operating Costs	32.400	32.400	32.400
TOTAL	P 170.450	P 196.160	P 235.660

The cost per metric ton is P43.45 at 10% P50 at 12% and P60 at 15%.

10%	:	$P 170.450 / 3.923 = P 43.45/mt$
12%	:	$P 196.160 / 3.923 = P 50.00/mt$
15%	:	$P 235.660 / 3.923 = P 60.00/mt$

#### SECOND METHOD: Present Value Method

	10.00%	12.00%	15.00%
1. PV of Revenues	P 780.560	P 634.669	P 481.797
2. PV of Costs	P 1,473.675	P 1,412.588	P 1,339.169

The ratio between the present values is 1.8878 for the 10% ( $P1,473.675 / P780.560$ ), 2.2256 for the 12% and 2.7795 for the 15%. The total revenue by 2010 is P105.05 million at a volume of 4.324 million metric ton. The average revenue then is P 24.29 per metric ton. Hence, the increase will be this average revenue multiplied by the ratio and as follows:

10%	:	$P 24.29 \times 1.8878 = P 45.85$ say P 46.00/mt
12%	:	$P 24.29 \times 2.2256 = P 54.00$ say P 54.00/mt
15%	:	$P 24.29 \times 2.7795 = P 67.51$ say P 68.00/mt

The present value of the revenues based on the increase rates will equal already the present value of the costs hence, the rate of return will be the same as the discount rate used.

The next problem is How are the increase rates be apportioned among the different charging items. The present rates show that the revenue of foreign cargo traffic subsidized the cost for the domestic cargo traffic.

**Table 17-39**  
**UNIT REVENUE UNDER THE PRESENT RATES**

CHARGING ITEMS	DOMESTIC		FOREIGN		TOTAL	
	AMOUNT	/MT	AMOUNT	/MT	AMOUNT	/MT
A. VESSELS						
1. Port Due	P 0.000	P 0.00	P 6.328	P 6.24	P 6.328	P 1.46
2. Berth Fee	P 4.329	P 1.31	P 9.140	P 9.01	P 13.469	P 3.12
TOTAL	P 4.329	P 1.31	P 15.468	P15.25	P 19.797	P 4.58
B. CARGO						
1. Wharfage	P 9.592	P 2.90	P 28.922	P 28.53	P 38.515	P 8.91
TOTAL A & B	P 13.921	P 4.21	P 44.391	P 43.78	P 58.312	P 13.49
C. SHARE CH	P 23.103	P 6.98	P 22.980	P 22.66	P 46.083	P 10.66
TOTAL A TO C	P 37.024	P11.19	P 67.371	P 66.44	P 104.395	P 24.14
D. SHARE PASS.	P 0.630	P 0.15	-	-	P 0.630	P 0.15
GRAND TOTAL					P 105.025	P 24.29

The PPA revenue from the vessels and cargo traffic will show that the revenue from foreign traffic is around 10 times more than that of the revenue from domestic traffic. The above table also shows that at 10% or 12% discount rate, the average charge per metric tons of foreign traffic at P66.44 is more than the computed increase at P46 or P54 per metric ton and the average charge per metric ton of domestic traffic at P11.19 is very low. Hence, the revenue from the foreign traffic subsidizes the cost of the port facilities for the domestic traffic.

There is no problem recovering investment cost in ports which handle purely foreign traffic but it is the problem imports handling purely domestic traffic which is the present case in most ports under PPA. It would be hard for PPA to convince investors to finance, manage and operate port handling purely domestic traffic since the rate of return for the investment in port facilities is very, very low. It is recommended that there should be no cross subsidization.

On the other hand, it is not recommended that the wharfage be the same for both foreign and domestic cargo traffic volume. The reason is that the free storage days are different at two days for the domestic and 6 days for the foreign volume hence, the storage area to be provided at these free dwell time is 3 times more for the foreign traffic. The wharfage fee then should be higher for the foreign cargo traffic.

If the share from the income of the operator and from income of the passengers which is P10.81 per metric ton (P10.66 + P0.15), then the revenue from the wharfage and the berthing fees per metric ton are as follows:

10%	:	P 46.00 - P 10.80 = P 35.20/mt
12%	:	P 54.00 - P 10.80 = P 43.20/mt
15%	:	P 68.00 - P 10.80 = P 57.20/mt

The problem now is the allocation of the revenue per metric ton between the berthing fee and wharfage fee. If 10% is allocated to former, then the berthing fee should be equal to P3.50 per metric ton or a revenue of P15.134 million of the cargo traffic by 2010 at 4.324 million. The total GRT-days as shown above is 20.240 million by 2010 so the berthing fee is about P0.75 per GRT-day. The remaining amount of P31.7 per metric tons (P35.20 - P3.50) is for the wharfage. It is stated above that the foreign cargo traffic requires more of the land side facilities due to higher dwell time. Since some of the costs of the wharf structures and overhead costs will be absorbed by the cargo traffic and that the allocation of these costs is the same for both the domestic and foreign cargo traffic, the wharfage fee of the foreign cargo traffic is about 2.0 times that of the domestic cargo. The wharfage fee then for the domestic traffic is P25.70 while the fee of the foreign traffic is P 51.40 per metric ton.

However, it is to be noted that the share being deducted from revenue per metric ton is the average of both traffic but the share from the foreign revenue is actually higher and the difference is P12 per metric ton (P22.66 - P10.66) which should be deducted from the wharfage fee. On the other hand, the share from the domestic revenue is actually lower and the difference is P 3.68 per metric ton (P 10.66 - P 6.98) which should be added to the wharfage fee. As such, the wharfage fee is P 39.40 per metric ton ( P51.50 - P12) for foreign cargo traffic and P 29.38 per metric ton (P25.70 + P3.68) for the domestic cargo traffic.

The above computation is for 10% discount rate. Similar computations are undertaken for 12% and 15% discount rates. To check the results of the computations, the weighted fee of foreign and domestic traffic should be equal to the increased fee as determined above at P46 for 10%, P54 for 12%, and P68 for 15%. The domestic traffic volume is 76.55% of the total cargo traffic by 2010 and the foreign traffic is 23.45%. The fees at different discount rates are shown in the following table.

**Table 17-40**  
**POSSIBLE FOR THE PORT CHARGES**

ITEMS	FOREIGN	DOMESTIC
A. 10.00%		
1. Berthing		
Per GRT-day	P 0.75	P 0.75
Per MT	P 4.33	P 3.26
2. Wharfage Fee	39.40	29.38
3. Share from CH	22.66	6.98
4. Share from Pass.	-	0.15
TOTAL	P 66.39	P 39.77
B. 12.00%		
1. Berthing		
Per GRT-day	P 0.92	P 0.92
Per MT	P 5.32	P 4.00
2. Wharfage Fee	51.00	6.98
3. Share from CH	22.66	0.15
4. Share from Pass.	-	
TOTAL	P 78.98	P 46.31

ITEMS	FOREIGN	DOMESTIC
C. 15.00%		
1. Berthing		
Per GRT-day	P 1.22	P 1.22
Per MT	P 7.05	P 5.30
2. Wharfage Fee	71.43	45.39
3. Share from CH	22.66	6.98
4. Share from Pass.	-	0.15
TOTAL	P 101.14	P 57.82

The check is as follows:

$$10\% : \quad P 66.39 \times 0.2345 + P 39.77 \times 0.7655 \\ = P 15.57 + P 30.23 = P 46.00/mt$$

$$12\% : \quad P 78.98 \times 0.2345 + P 46.31 \times 0.7655 \\ = P 18.55 + 35.45 = P 54.00/mt$$

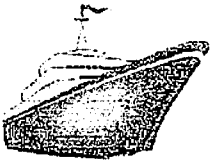
$$15\% : \quad P 101.14 \times 0.2345 + P 57.82 \times 0.7655 \\ = P 23.72 + 44.28 = P 68.00/mt$$

It is to be emphasized that the above rates attempt to reduce and eliminate the cross subsidization however, there are still some since percentage share is still higher for the foreign traffic than for the domestic traffic. It is also emphasized that the port due is not included anymore. PPA can also try different allocation between the berthing fee on one hand and the wharfage on the other hand provided that the objective is the reduction if not the elimination of cross subsidy. Share of the same percentage for the domestic and foreign revenues should also be explored.

### COST ESTIMATE TOTAL DAVAO PORT PROJECT

ITEMS		UNIT	QTY	UNIT PRICE	AMOUNT (million)
1.0	GENERAL EXPENSES				
1.1	Mobil/Demobil	LS			P 15.500
1.2	Temp. Facilities	SM	500	6,000	3.000
1.3	Engineer's Facilities	SM	250	6,000	1.500
TOTAL 1.0					P 20.000
2.0	WHARF STRUCTURES (25,515 SM)				
2.1	Wharf Structures	SM	25,515	25,250	P 644.254
2.2	Rubber Dock Fenders	SET	101	100,000	10.100
2.3	Bollards	SET	49	80,000	3.920
2.4	Bitts	SET	49	50,000	2.450
2.5	Used Tires	SET	304	3,000	0.912
TOTAL 2.0					P 661.636
3.0	RECLAMATION (193,185 SM)				
3.1	Hydraulic Fill	CM	525,000	130	P 68.250
3.2	Rock Bulkhead (front)	SET	1,215	100,000	121.500
3.3	Rock Bulkhead (side)	SET	320	50,000	16.000
3.4	Consolidation	SET	195,000	130	25.350
3.5	Geotextile	SET	11,000	300	3.300
TOTAL 3.0					P 234.400
4.0	RUNWAYS (8,030 SM)				
4.1	Concrete (0.20)	CM	1,606	5,000	P 8.030
4.2	RSB (90 kg/cm)	MT	145	35,000	5.075
4.3	Stranded Wire (36 kg/cm)	MT	58	120,000	6.960
4.4	Sand Cushion (0.05)	CM	402	350	0.141
4.5	Base Course (0.30)	CM	2,810	400	1.124
4.6	Sub-base Course (0.30)	CM	2,409	350	0.843
4.7	Conc. Bed Slab (0.05)	CM	402	4,000	1.608
4.8	RSB of 4.7 (104 kg/cm)	MT	40	35,000	1.400
4.9	Subgrade Preparation	SM	8,030	50	0.401
4.10	Misc.	LS			0.516
TOTAL 4.0					P 26.098
5.0	PAVING BLOCKS (59,870 SM)				
5.1	Blocks (50/SM)	PC	3,020,000	20	P 60.400
5.2	Placing of Blocks	SM	59,870	70	4.191
5.3	Sand Cushion (0.05)	CM	2,994	350	1.048
5.4	Cem. Treated Base (0.15)	CM	8,980	850	7.633
5.5	Base Course (0.15)	CM	8,980	400	3.592
5.6	Sub-base Course (0.40)	CM	23,948	350	8.382
TOTAL 5.0					P 85.246
6.0	ASPHALT PAVEMENT (65,000 SM)				
6.1	Asphalt (2.67 SM/MT)	MT	24,345	2,350	P 57.211
6.2	Base Course (0.20)	CM	13,000	400	5.200
6.3	Sub-base Course (0.20)	CM	13,000	350	4.550
TOTAL 6.0					P 66.961

ITEMS		UNIT	QTY	UNIT PRICE	AMOUNT (million)	
7.0	BUILDINGS					
7.1	Pass. Term. Bldg.	SM	600	15,000	P	9.000
7.2	CFS	SM	1,700	12,000		20.400
7.3	Transit Sheds	SM	8,500	10,000		85.000
7.4	Main. Shop/Power House	SM	1,125	10,000		11.250
7.5	Gate Complex	SM	720	8,000		5.760
7.6	Amenities	SM	58	10,000		0.580
7.7	Admin. Building	SM	750	15,000		11.250
7.8	Equip. Depot	SM	375	8,000		3.000
TOTAL 7.0					P	146.240
8.0	UTILITIES/OTHERS					
8.1	Drainage, Sewer/Water	LS			P	20.000
8.2	Elevated Tank	LS				9.700
8.3	Power Lighting	LS				9.000
8.4	CHB Fence	LM	1,800			4.950
8.5	Tie Down Anchor	LS				6.800
8.6	Landscaping	LS				2.000
TOTAL 8.0					P	45.450
GRAND TOTAL					P	1,286.031
SAY					P	1,286.000



# Chapter 18

## Environmental Assessment

## Chapter 18

# ENVIRONMENTAL ASSESSMENT

### 18.1 GENERAL

The basis of project implementation is the 25-year Master Development Plan which is divided into four (4) development phases.

It is recognized that economic benefits arising from these port development and improvement projects should not be diminished by detrimental environmental consequences. Experience throughout the world indicates that such adverse consequences can be eliminated, or at least reduced to acceptable levels, by giving proper consideration to environmental aspect at the planning, design and implementation stages. The early incorporation of these environmental considerations which is the purpose of this exercise will surely ensure the sustainable utilization of coastal and marine resources that would eventually yield considerable amount of benefits.

### 18.2 EXISTING ENVIRONMENTAL SETTING

The nature and extent of the port development and/or improvement project impacts depend directly on the environmental characteristics of the project site. These environmental factors include (a) wave direction, (b) characteristics of the marine environment, (c) near shore currents and other physical oceanographic characteristics and processes, (d) terrestrial inputs such as rivers, streams and storm drains, (e) land tenure in the local community, (f) existing on-and-off shore uses in the surrounding area and, (g) other concerns that may influence design and site choice.

Outlined below are the observed setting of Sasa Wharf.

Existing Environmental Setting in Terms of	
1. Presence of squatter community/ies	Yes
2. Degraded coastal water quality	Yes
3. Presence of nearby corals	Yes
4. Presence of environmental facilities (wastewater treatment plant and solid waste management scheme)	No
5. Siltation	Yes
6. Proximity to population center/s	Yes
7. Expected difficulty of acquiring ECC	Moderate

During the initial site characterization study, the following were also undertaken:

1. Interview with port management staff regarding the port activities and plans related to environmental enhancement and protection;
2. Interview with the local people and the concerned Local Government Units (LGUs) to solicit their concern as Inputs to the EIA study; and,

3. Initial Scoping Session with the DENR-Regional Staff specifically with Regional Technical Director (RTD) Gregorio T. Estrada of Region XI, and RTD Teotimo M. Redulla and Mr. Josefino P. Belocura Jr. of Region IX to confer the need for an IEE or EIS for the project.

### 18.3 ENVIRONMENTAL IMPACT

The Master plan indicates that majority of the works to be undertaken include the construction of new wharf, new container yards, new open storage areas, new buildings, major reclamation behind the revetment (containment wall), and so on.

#### 18.3.1 Planning Stage

##### A. Resettlement and Relocation

The envisaged rehabilitation work to be undertaken at the existing port would require the relocation/resettlement of various government offices inside the port. At the expansion areas, settlers living along the shoreline would have to be relocated/resettled.

##### B. Expropriation

Phase I development would require the expropriation of about 13,000 sq. meters thus would be dislocating businesses and other commercial activities. Another expropriation would be required for access ways to Gates 2 and 3, and an area for government relocation site and truck holding area at the new Gate 1.

#### 18.3.2 Construction Stage

##### A. Water Quality

During construction, dredging and reclamation works, water quality would definitely be affected. It is therefore important to assess the effect and extent of this activity.

##### B. Air Quality

Air quality would be affected due to such machineries as dredgers and pile driving barges. It is expected that the environmental effect would not be very significant.

##### C. Noise and Vibration

The movement of heavy construction machineries, truck and trailers, etc., would be the major source of noise and vibration. Pile driving would significantly increase noise however, since the area is away from residential quarters, this is not considered a very significant factor.

### 18.3.3 Operation Stage

The additional port facilities would gravely impact on the existing national highway due to high generation/attraction of traffic.

## 18.4 REQUIRED ENVIRONMENTAL STUDY

Supplementing with what had transpired during the initial session with the DENR-Regional Office staff of Regions IX and XI, the Environmental Specialist has decided to meet the Head of the EIA Division of the Environmental Management Bureau (EMB) for concurrence. Based on this meeting/discussion and initial project description provided by the Environmental Consultant to EMB, the following are the applicable criteria to be considered in the conduct of the environmental impact assessment study for this port:

- A. Issuance of ECC for any port project (new development or expansion project) is the responsibility of the DENR-Regional Office since port project is not listed as one of the environmentally critical projects (ECPs) under Proclamation 2146. Based on DENR protocol, only those projects that fall under the category of ECPs are to be submitted for review and approval to the Environmental Management Bureau (EMB) of the Department of Environment and Natural Resources (DENR).
- B. Based on the "Final Version" of the Procedural Manual for DAO 96-37, the following are the applicable criteria in deciding the need for an IEE or IES for port projects with reclamation component/s.
  - 1. Port project with reclamation component of five (5) hectares and below shall require an Initial Environmental Examination (IEE). The IEE shall be submitted to the concerned DENR-RO for review and approval.
  - 2. Port project with reclamation component of greater than five (5) hectares but less than 25 hectares shall require an Environmental Impact Statement (EIS) or full-blown EIA study. The EIS document shall be submitted to the concerned DENR-RO for review and approval

The acceptable of the EIS document by the DENR-RO may depend on their existing technical capability to review, evaluate and approve the submitted EIS documents. In case of lack of enough technical personnel to undertake such workload, the DENR-RO may request the proponent to directly submit the EIS document to the Environmental Management Bureau (EMB).

- 3. Port project with reclamation component of equal to or greater than twenty-five (25) hectares shall require an EIS (or full-blown EIA study to be submitted to DENR-EMB for review and approval).

In conclusion based on the above criteria, the proposed port development and rehabilitation projects for Sasa Wharf would require an EIS or full-blown environmental study.