

Environment is under
constant threat as a
result of
modernisation



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The environment is under constant threat as a result of modernisation, business activities, constant growth and development. All these are human activities that affect the immediate environment. The depletion in natural resources especially by the oil and gas companies such as the Pipeline Product Marketing Company (PPMC) has resulted in serious environmental impacts. Therefore, the need for sustainability and sustainable development cannot be overemphasized as it has become more important over the last two decades (Micheal & Lan, 2000; Carbon Trust, 2008; Hahn, 2001; Cunningham et al., 2005). These accounts for the increasing pressure on governments to develop a response to a variety of problems which range from the use of natural resources to pollution control. In response, variety of environmental protection legislation and regulations were formulated with the aim of protecting the environment (Powley, 2004; IEMA 2005). The increase in natural resources consumption between 1961 and 1990 by 25% every 10 years resulted in serious environmental impacts in the form of acid rain. This leads to raising acidity in the soil and water thereby causing damage to forest crops, and freshwater fish and wildlife. Methane emission and mining waste, oil spills, air pollution by sulphur dioxide, nitrogen oxide and carbon dioxide as a result of burnt coal, oil or gas including climate change are also causes of environmental impacts (Micheal & Lan, 2000; Edwards, 2000; Jaccard, 2005). PPMC is a subsidiary of the Nigerian National Petroleum Corporation owned by the Federal Republic of Nigeria. The company is involved in oil processing, production and marketing. PPMC was established to offer excellent customer services by transporting crude oil to the Nigerian three refineries as well as moving white petroleum products to existing markets. Its main objective is to profitably and efficiently market

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refined petroleum and petrochemical products in the domestic market as well as in the ECOWAS sub region and also provide marine services (PPMC, 2009).

INVESTMENT PROJECT

The PPMC's monitoring and inspection department has 36 vehicles, a vehicle in each of the 36 states of Nigeria. The vehicles are used as official cars by staff in order to move in-between their offices, depot and filling stations and monitor and inspect their daily operational activities. Each car covers hundreds of kilometres daily due to the long distance between their office, filling stations as well as depots which are located far out of the city for environmental purpose. Every car consumes approximately 50 litres of petrol per day. However, it is environmentally unfriendly as they pollute the environment with carbon emissions. The company has set a target to drastically reduce or if possible to stop polluting the environment. Therefore, the senior management wants to accomplish a viable project with a length of 4 years, to improve their environmental performance and upgrade its corporate social responsibility. This project is expected to be a non-profit project that could bring many savings to the company and return the initial investment in 3 years in order to avoid risk. The decision of expecting the payback period of 3 years was made by the senior management after careful consideration of the company's payback criteria which is 5yrs.

PPMC has a standard of judging all its investments objectively, so as to determine whether the payback period is good or bad thereby passing an objective judgement as to know if the investment is worthy to be taken or not. Reducing or stopping the amount of petrol that is used during their daily

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activities, will support the company to obtain good corporate image and cost savings as each litre of petrol is N65 (Naira). In addition the company spends an average of N25, 000 monthly for maintenance on every car. PPMC is experiencing a great loss of resources as a result of this high petrol consumption every day there by polluting the natural environment. The vehicles have been used for approximately 6 years which has exceeded its guarantee period of 1 year. They are being used at maximum level as PPMC operates everyday including weekends and public holidays due to their nature of work and huge demand for their supply. The company is currently spending N52, 920, 000 annually trying to maintain and fuel the old vehicles. The breakdown of these expenses is shown below:

Annual cost of fuel and maintenance (Running cost).

This includes running cost of fuel, repairs and monthly checks.

Monthly cost of fuel = $50 \times 36 \times 30 \times 65 = \text{N}3, 510, 000$

Annual cost of fuel = $\text{N}3, 510, 000 \times 12 = \text{N}42, 120, 000$

Monthly cost of maintenance = $\text{N}25, 000 \times 36 = \text{N}900, 000$

Annual cost of maintenance = $\text{N}900, 000 \times 12 = \text{N}10, 800, 000$

Total Annual Expenditure = $\text{N}42, 120, 000 + \text{N}10, 800, 000 = \text{N}52, 920, 000$

In order to solve the above mentioned issues, PPMC management have decided to replace the old vehicles with brand new electric cars. These electric cars use neither petrol nor diesel, they have zero emission and their only by product is water. The car is known as Honda FCX Clarity, it is a Fuel

Cell Electric Vehicle (FCEV). This vehicle has won the world green car award, during the 2009 World Cars Awards in New York. This award has upgraded Honda's corporate image by exposing its commitment towards a green environment. In addition, Honda already has an excellent history of environmental leadership as they are known to be manufacturers of low emission vehicles under an improved regulatory requirement (Honda, 2009). It is rated by the Union of Concerned Scientists (UCS) as the greenest auto maker for four different times in a row (UCS, 2007). The car generates electricity through the V flow fuel cell stack and stores it by the use of its highly efficient lithium ion battery, which helps recover energy. It also monitors electrical flow through its power drive unit and propels the vehicle (Honda, 2009).

Honda FCX Clarity has an improved safety measures such as the Vehicle Stability Assist (VSA), Collision Mitigation Braking System (CMBS), six air bags and a unit body structure that is well reinforced. It also has a visual and audio alert which alert the driver in case of any potential collision. Another safety precaution programmed in the vehicle is the prompting of the driver by the automatic tug of the seat belt in case of an unavoidable accident it minimises the speed by breaking force to reduce the impact of collision. Furthermore, it has a very strong electric motor as well as groundbreaking new fuel cell stack. These safety measures have been tested by the United States Federal Safety Standards and it was a success story (Honda, 2009). The purchase of Honda FCX Clarity by PPMC will demonstrate the company's commitment towards the reduction of Co2 emission thereby protecting the environment. The company will also be recognised as the first to introduce

zero emission cars to Nigeria and it will serve as a solution that could bring cost savings.

Total cost of investment

Number of cars to be purchased = 36 cars

Cost of each car = N3, 000, 000

Total amount to be spent on cars = N3, 00, 000 x 36 = N108, 000, 000

Cost of delivery (Shipping) = N300, 000 x 36 = N10, 800, 000

Total cost of investment = N108, 000, 000 + N10, 800, 000 = N118, 800, 000

Annual savings

The investment is expected to save the annual cost of fuel and maintenance;

N42, 120, 000 + N10, 800, 000 = N52, 920, 000

Since the vehicle also comes with a free maintenance package including running cost for 3years 6months in form of a guarantee, as it is a newly introduced vehicle. Honda Company is trying to advertise this environmentally friendly vehicle to the world and attracting customers by covering maintenance and running cost. This is better compared to the guarantee of the old vehicles which is only 1 year. N52, 920, 000 will be saved in the first year, while in the subsequent years N1 per litre will be added due to the projected annual oil product price increment. Therefore the

total cost of investment will save the annual cost of fuel and maintenance. It is important to note that N65 is the current price of the petrol in Nigeria.

Investment appraisal is a technique used by managers to achieve their target. It is the duty of the manager to determine and prove the importance of the project (Akalu, 2001; Mulholland et al., 2003). Therefore, it is important in the planning of this particular environmental project.

PAYBACK PERIOD

The duration of time for the PPMC to gain its initiated investment of N118, 800, 000 on implementation is known as the payback period (Layard & Glaister, 1994). The period of time that cash inflows will become the same with cash outflows is also known as the payback period (ACCA, 2008).

However, it does not consider time value for money which expresses that, amount saved today is much more valuable than the same amount saved in 2 years. This is considered as one of the greatest setback (Dury, 1997).

Initial investment

Annual savings

Table 1

Payback period

Cash flow

Cumulative cash flow

Initial Investment

(118, 800, 000)

(118, 800, 000)

Savings

Year 1	52, 920, 000	(65, 880, 000)
Year 2	42, 768, 000	(23, 112, 000)
Year 3	43, 416, 000	20, 304, 000
Year 4	44, 064, 000	44, 064, 000
Total savings	N183, 168, 000	

Initial Investment = N118, 800, 000

Year 1 and Year 2 savings = 52, 920, 000 + 42, 768, 000 = N95, 688, 000

Year 3 = N43, 416, 000

In order to calculate the payback period with precision and accuracy, the year 3 savings should be broken down to monthly by dividing it by 12 and then the cumulative savings for year 1 and 2 should be subtracted from the initial investment. The result should then be divided by the monthly savings of year 3 to have the actual number of months (McLaney, 1994). This is calculated below:

Savings per month for year 3 = $N43, 416, 000/12 = N3, 618, 000$

$N118, 800, 000 - N95, 688, 000 = N23, 112, 000/N3, 618, 000 = 6.38$

Approximately 6 months.

Payback period is 2years 6 months

NET PRESENT VALUE (NPV)

NPV is realised by using a discount rate to determine the current value of future savings and subtracting the capital cost (Hannagan, 2008). This method accepts with projects that have positive NPV. The method also makes comparison between present value of cash outflows and inflows from an investment (ACCA, 2008).

The table below shows the number of years (4), future value (FV), cash flow, discount factor (DF) 15% and the present value (PV). The first step in calculating NPV is to multiply the cash inflow (savings) by the DF of each year to get the PV. Then, sum up the PV and deduct the initial investment from the total PV to arrive at the NPV (Mclaney, 1994). 15% DF was selected not to make profit but to avoid risk; it was selected after considering the current base rate of the Central Bank Nigeria which is 13. 2% as the base rate keeps appreciating every year (CBN, 2009). Inflation rate in Nigeria increases, therefore oil product price will also appreciate.

Table 2

NPV calculation

CF in Naira (N)	DF (15%)	PV in Naira (N)	
Initial investment	(118, 800, 000)	1. 000	(118, 800, 000)

Savings

Year 1	52, 920, 000	0. 870	
	46, 040, 000		
Year2	42, 768, 000	0. 756	
	32, 333, 000		
Year 3	43, 416, 000	0. 658	
	28, 568, 000		
Year 4	44, 064, 000	0. 572	
	25, 205, 000		
Total savings	183, 168, 000		132,
	146, 000		

NPV = Total PV of savings – PV of investment

$N132, 146, 000 - N118, 800, 000 = 13, 346, 000$

The project has a positive NPV as such it should be undertaken.

INTERNAL RATE OF RETURN (IRR)

IRR is a very important technique that influences the decision making as to whether or not an investment should be approved. It is interested in projects whose IRR are greater than the target rate of return. It also considers time value for money (ACCA, 2008). In order to have precision in calculating the IRR similar steps will be taken as how the NPV was sorted. However, it will require calculations at two different stages (NPV1 and NPV2) with two

different DFs and normally both DFs should be greater than the DF used to determine the NPV. Finally the IRR formula will then be applied.

$$\text{IRR} = \text{NPV1} \times (\text{B} - \text{A}) + \text{A}$$

$$\text{NPV1} - \text{NPV2}$$

Table 3: IRR calculation

Years	Cash Flows	DF (at 18%)	PV
Year 0	(118, 800, 000)	1. 000	(N118, 800 Initial investme-+nt)
Year 1	52, 920, 000	0. 847	44, 823, 000
Year 2	42, 768, 000	0. 718	30, 707, 000
Year 3	43, 416, 000	0. 609	26, 440, 000
Year 4	44, 064, 000	0. 516	22, 737, 000
Total savings	183, 168, 000		124, 707, 000

$$\text{NPV1} = 124, 707, 000 - 118, 800, 000 = + 5, 907, 000$$

Table 4:

Years Cash flow	DF (at23%)	PV
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Year 0	(118, 800, 000)	1. 000	(118, 800, 000)
Year 1	52, 920, 000	0. 813	43, 024, 000
Year 2	42, 768, 000	0. 661	28, 270, 000
Year 3	43, 416, 000	0. 537	23, 314, 000
Year 4	44, 064, 000	0. 437	19, 256, 000
Total savings	183, 168, 000		113, 864, 000

$$\text{NPV2} = 113, 864, 000 - 118, 800, 000 = - 4, 936, 000$$

$$\text{IRR calculation: } 5907 \times (23 - 18) + 18$$

$$5907 - (- 4936)$$

$$\text{IRR} = 20. 7\%$$

NON – FINANCIAL FACTORS

The key purpose of an environmental initiative according to Sheldon and Yoxon (2003) is to reduce environmental impacts of an organisation in ways which makes business sense. The direct result of this provides organisations with benefits which include the use of alternative source of energy to

increase in an organisation's efficiency, thus providing the organisation with a competitive edge. In addition, it ensures compliance with environmental regulations and increases organisation understands of how its activities impact the environment (Brady, 2006). PPMC has a lot to benefit apart from the financial savings. The organisation will be contributing its own quota towards achieving sustainability. This will result in environmental performance improvement through the initiative of purchasing brand new cars to reduce or stop carbon emissions. The initiative will reduce pollution, minimise waste, protect the natural environment and provide better corporate social responsibility as well as good corporate image to the organisation. Furthermore, status of the company's reputation will be upgraded as it is encouraging green environment and legal compliance (Aslaksen & Synnedstvedt, 2003). It will also assists in the implementation of environmental policy, while improving compliance with legislation and corporate image (Sheldon & Yoxon, 2003).

Moreover, PPMC will demonstrate good operations within a safe and clean environment thereby creating a friendly environment for staff and the public (Edward, 2004). This will help sort out social matters and improve health and safety. Since, the electric cars have a highly improved safety measures that could provide ways of pollution control to protect the people and their environment (Edward, 2004). The company could also benefit from changes within the organisation, by delivering this environmental initiative that deals with environmental impacts such as climate change and global warming caused by their emissions (Murray, 2003). In addition, it will support the company to identify and minimise its impacts on the environment so as to

enhance its corporate social responsibilities through the use of an alternative source of energy. This will not only promote their business environment but will promote the global environment at large. Purchasing the zero emission vehicles will pave way for the organisation to achieve sustainable development since it is a strategy that could consider maximum utility of resources. In addition, the project is not aimed at profit making but returning of initial investment.

SUGGESTIONS/DISCUSSIONS AND CONCLUSION.

The rate of interest at which the investment cost leads to investment benefit is known as the IRR. This means that, all investment gains are with the time value for money and at the interest rate, the investment has a zero NPV (ACCA, 2008). This investment appraisal has demonstrated the use of IRR to value the cash flow and raise it as a consequence of the investment while determining it with inflation (ACCA, 2008). For example, a higher target rate of return was chosen, so that even in a situation where the inflation rate rises the company will still save cost. Interest rate may rise to 15% during the life time of the project due to the increasing inflation rate in Nigeria, as history has shown that Nigerian base rate rises up to 0.45 every year. Therefore, risk is incorporated and the project is considered less risky. The IRR is 20.7%, this has shown a very good risk margin considering the Nigerian economic instability. Furthermore, the advantage of the IRR being 20.7% is that, even if the interest rate increases the project will still be economically good.

Base rate of the Central Bank of Nigeria was used to determine the cost of capital and calculate the initial NPV. The base rate was also used to <https://assignbuster.com/environment-is-under-constant-threat-as-a-result-of-modernisation/>

incorporate inflation by discounting cash flows to get the future value.

Inflation changes value for money, this is the main reason for using the base rate in determining the discount factor for the NPV calculation. Two discount rates were used to solve the equation of IRR which assumes that NPV changes with discount rate but this is not the case in reality. The positive result of the NPV means that the project should be accepted and the chosen discount rate of 15% helped identify the actual value of the savings to be made, based on the fact that the project is anticipated to make an overall savings. However, the actual value of IRR is more important as it considers the current economic climate and the future interest rate of Nigeria. The result has shown that the IRR is higher than the target rate of return. It is important to note that, base rate is used to determine NPV not IRR while IRR assumes that NPV is zero.

The savings to be realised by PPMC as a result of the new initiative as well as the indication of an attractive Payback period upon investment is clearly exposed. Payback period 2 years 6 months is a good payback period since, the criteria requires payback of the initial investment in 5yrs. Hence, it would have been a bad payback period if it exceeds 5years. Furthermore, PBP was used to support other data because it is not enough to serve as criteria for investment. The company will continue to benefit from the project for years even after returning the initial investment. PPMC could consider using a different discount rate for this project since it is aimed at executing an environmental project and not profit making. This appraisal has been thoroughly evaluated and has proven that the investment is reasonable (McLaney, 1994). Since, the company will spend only N65, 880, 000 more on

the annual maintenance cost (52, 920, 000) and save N52, 920, 000 in the first year and more in the subsequent years at the same time stopping the carbon emissions from the old cars.

In addition, it is a mandatory for the company to meet up the government's requirement to reduce environmental impact and comply with the prevailing legislation. If the organisation was not to invest in this project the money would have been channelled to the federation account and budgeted to execute other projects in other sectors or Nigerian ministries. However, PPMC has the authority to use any reasonable amount to improve its environmental performance or execute any viable project that will be beneficial to the organisation. Finally, the calculation resulted in a less discount rate where NPV1 became positive and a greater discount rate where NPV2 remain negative and IRR fell in between the two discount factors (ACCA, 2008). The 3 investment appraisal techniques were fully utilised to determine the project's viability. This has proven that the project is economically viable (Mclaney, 1994). In view of this, the investment appraisal is affordable and worthy of acceptance. Moreover, the purchase of the electric cars is the best option, as it will not only reduce carbon emissions but will stop the emissions from the old vehicles completely, thereby upgrading the company's image as well as enhancing its overall environmental performance.