AN EVALUATION OF INVENTORY MANAGEMENT SYSTEM OF A SOLAR ENERGY ESTABLISHMENT.

A CASE STUDY OF AGILET SOLAR ENERGY LIMITED, UYO.

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09/BA/AC/927

APRIL, 2014.

AN EVALUATION OF INVENTORY MANAGEMENT SYSTEM OF A SOLAR ENERGY ESTABLISHMENT: A CASE STUDY OF AGILET SOLAR ENERGY LIMITED, UYO.

BY

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A PROJECT SUBMITTED TO THE DEPARTMENT OF ACOUNTING, FACULTY OF BUSINESS ADMINISTRATION, UNIVERSITY OF UYO, UYO, AKWA IBOM STATE, NIGERIA.
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELOR OF SCIENCE (B.Sc) DEGREE IN ACCOUNTING

APRIL, 2014.

DECLARATION

I hereby declare that this project entitled “An Evaluation of the Inventory Management System of a Solar Energy Establishment, a case study of Agilet Solar Energy Limited, Uyo” has been written by me and that it is the record of my own research work . It has not been presented in any previous application for a degree. All sources of information are specifically acknowledged using references.

……
Akpan, Edidiong Samuel
April, 2014.

CERTIFICATION

This project entitled: An evaluation of inventory management system of a Solar Energy Establishment**,** a case study of Agilet Solar Energy Limited, Uyo by Akpan, Edidiong Samuel (09/BA/AC/927)

Meets the regulations governing the award of the degree of Bachelor of Science (B.Sc) in accounting of the University of Uyo and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This project is dedicated to the Almighty God and especially to my mother Mrs. Aniefiok Samuel Akpan for her unrelenting supports and advice. Also to my brothers and sister for their understanding and encouragement throughout my stay in the University.

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I am grateful to some people who have contributed in no small measure to my successful completion of this programme.

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ABSTRACT

Inventory has been indentified by experts as the backbone of every enterprise, including construction and installation companies. Effective and efficient management of inventory is one of the core issue militating against their performance. The study was conducted at Agilet Solar Energy Limited, Uyo to examine the practice of inventory management in the company. After identifying problems like lower customer services, higher costs incurrence, stocking of excessive inverters than are necessary, using poor processes, practices and antiquated support system and material shortages, data were sourced from both the primary and secondary sources. The descriptive and the analytical statistical techniques were adopted in conducting the study. Sample sizes of 24 staff were selected from a population of 50 using the Yaro Yamen's sample size determination formula. A total of 24 questionnaires were collated, analyzed and interpreted to validate the research questions and hypotheses, using simple percentage technique and chi-square method to test the hypotheses. The study revealed the company is fully aware of the existence of inventory management systems and also employs it in decision making. Revelation of inconsistency and inexperience staff were the prominent problems, detected and recommendations like staff training, computerized system and internal control system to enhance consistency were suggested by the researcher.

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CHAPTER ONE

INTRODUCTION

1.0 Overview of the Study

From time immemorial, inventories have constituted the most significant element of the current assets of a large majority of firms around the globe. For any company that sells merchandised, inventory is an extremely important asset. According to Needles, et al (2007: 332) “Managing this asset is a challenging task. It requires not only protecting goods from theft or loss but also ensuring that operations are highly efficient”. Base on the above analogy, the evaluation of inventory system of Agilet Solar Energy Limited tends to be a little bit different from evaluating inventory in a merchandizing or a manufacturing firm, because the subject matter of discussion is a construction firm. As such, what may be inventory for it may not necessarily be inventory for manufacturing and merchandizing firm. According to Anwana (2009:3),

> We are made to understand that conventional fuel source have created a myriad of environmental problems, such as global warming, acid rain, smog, water pollution, rapidly filling waste disposal sites, destruction of habitat from fuel spilling. Solar energy system otherwise referred to as photo-voltaic (PV) system does not pose these environmental problems. Today, the majority of PV modules use silicon as their major component. The silicon cells manufactured from one ton of sand can produce as much electricity as burning

> 500,000 tons of coal. Photovoltaic technology also creates jobs. In 2005, the solar industry directly employed at least 55,000 people in jobs such as research manufacturing development and installations. Also the PV installation market grew 34% worldwide in 2005. The field is growing and there is a need for qualified installation professionals.

According to Wikipedia, (2014:3) “Economists have predicted that photovoltaic will be the most rapidly growing form of commercial energy after 2030, with sales exceeding $100 billions. In fact, the use of solar renewable energy is expected to double by the year 2010, which would create more than 350,000 new jobs in countries in around the globe. Thus, photovoltaic system is no surprise the clean, reliable source of electric power regarded as the future of energy production”. It is on the backdrop of this important and revealing finding that this research was undertaken not just to evaluate the inventory system of the firm involved, but also to create and make recommendation of inventory practices that conforms with the conventional inventory system. According to Weygandt, et al (2012: 220), “the amount of inventory carried by a company has significant economic consequences. Inventory management is a double-edged sword that requires constant attention. On one hand, management wants to have a great variety and quantity on hand so that customers have a wide selection to choose from and items are always in stock. But such a policy may incur high carrying costs, e.g.

investment, storage, insurance obsolescence and damage. On the other hand, low inventory levels lead to stock outs and lost sales".

It should be noted that the fact that the elements of inventory may not necessary be the same between a merchandising, manufacturing and construction firm. As such, it becomes imperative to highlight what these entails in this context. For instance, inventories of manufacturing concerns are made of raw materials, work-in-progress (WIP) and finished goods while that of the merchanding firm embraces whatever that could be procured for resale to customers by way of finished goods. However, the case study which is a construction company that deals with designing, sizing and installation of solar energy for homes, offices, roads and firms etc, its inventory consists of mostly work in progress and finished goods. Based on this fact, it becomes ensuring that the right quantity and quality of inventory is provided at the right time and at the right place. As such this calls for good inventory management.

Just like Horngren, et al (2002: 764) puts it, "inventory management extends to stock valuation or inventory methods, in that a particular method affects income statement as well as balance sheet". Deducing from the above, it becomes imperative to comprehend that good inventory management is crucial to the success of companies around the globe. To be at the top of the game of business, good

inventory management is the key to bothretailing, wholesaling, manufacturing and construction firms. In Agilet, inventory system is integrated with the designing, sizing and installation facet of the firms working life cycle. So it becomes necessary for solar energy firms to strive for inventory control system and imperative for proper stock valuation and consistency in the use of a chosen method, so as to avoid distortion in the financial statements and other books of account. Based on this components, history and works of this research, construction, firms need an orderly inventory valuation system to efficiently and effectively plan and control its inventories in order to enhance profitability measurements.

1.1 **Statement of Problem**

According to Anwana (2009:4) “Solar energy industry is made up of three aspects which are designing, sizing and installation”. Agilet solar energy limited does all three of this aspect and as such relates with inventories as Siamese twins. They work in pari-passu, any attempt to separate them will to a great extent pose serious challenges to the management of the company. These inventories which include work tools, materials, inverters, solar panels, etc; represent high investment in all ramification of the firm’s transaction. Due to the large size of inventories maintained, not entirely by choice but by necessity. a considerable amount of funds is committed to inventories.

Judging from the above, it implies that failure to maintain good internal control and inventory system would impair the liquidity position of the company by causing a decrease in the growth prospects and low profitability if pragmatic decisions are not taken and are not fully or efficiently and effectively implemented to act as a basis for the theoretical decisions of the firm.

In reality majority of solar energy companies including Agilet Solar Energy Limited suffers the following setbacks in the realm of business practices.

i) High Operating cost

ii) Materials shortages

iii) Excessive inventories

iv) Use of unstandardized practices, processes and antiquated support system.

The listed setback of inventory management above defines the problem of the study.

1.2 **Objectives of the Study**

Choosing this topic was necessitated by the following objectives:

i. To find out the type of inventory management systems use by Agilet Solar Energy Limited, Uyo.

ii. To evaluate the inventory management systems used by Agilet Solar Energy Limited

iii. To ascertain the impact of inventory management on the firms profitability

iv. To analyze the problems associated with inventory management in Agilet Solar Energy Limited

v. To determine the causes of their high cost, materials shortages and excessive.

vi. To ascertain if there is consistency in their chosen inventory management, control and valuation system.

1.3 Research Questions

To assist and guide the researcher in achieving the stated objectives and addressing the problems of the study, the following questions are deduced:

(i) What type of inventory management system is used by Agilet Solar Energy Limited?

(ii) How effective and efficient is the inventory management system used by Agilet Solar Energy Limited?

(iii) How consistent in the use of the chosen inventory management, control and valuation method?

(iv) What are the challenges associated with inventory management in Agilet Solar Energy Limited?

(v) What are the possible remedies to the challenges associated with inventory management in Agilet Solar Energy Limited?

1.4 Research Hypotheses

1. The company employs a standard inventory management system.
2. The inventory management, control and valuation systems are consistently used.

1.5 Significance of the Study

It is believed that at the end of this study, this work would be significant in the following ways:

i) Agilet Solar Energy Limited's management and the management of other construction concern will be able to understand the proper ways of effectively and efficiently managing their stocks.

ii) The dividends and benefits that accrue to a well managed inventory system will be revealed.

iii) It will create awareness and enlightenment to the students, the general public and all solar energy company in particular on the effect of good inventory management system.

iv) This research will act as a reference guide or point to those who have the intention of carrying out further research work in this area of study.

1.6 Scope/Limitations of the Study

The research is expected to span across the entire Agilet Solar Energy Limited, Uyo. To find out specific raw materials used by the company, profit level say for 2 or 3 years, business growth since the last 3 years, number of contract so far executed and number of outstanding (yet to be completed) contract. Although the coverage is limited by a number of factors which include:

(i) **Fund**: The financial cost incurred during the course of the study is an hindrance considering the fact that the researcher is a student and unemployed.

(ii) **Time Span**: The limited time available to the researcher for the completion of this study serves as a constraint as the researcher cannot claim to have covered the field within the time frame.

(iii) **Respondent's Knowledge**: The knowledge possess by the respondents as regards the subject matter is limited and as such sets as a constraint to the research.

1.7 Organization of the Study

The research is divided into five (5) chapters for easy accessibility and comprehension. The first chapter is the introductory chapter which gives an overview of the study, statement of problem, objectives of the study, significance of the study, research questions, research hypotheses scope/limitations of the study, organization of the study, definition of terms used in the study.

Chapter two (2) deals with the review of related literature. In this chapter, the conceptual framework of the study as well as opinions, suggestions and arguments of different authorities and professionals on the subject matter were presented.

Chapter three (3) presents the research methodology, which will show how the data for the study were generated and also a brief historical background of Agilet Solar Energy Limited, Uyo, Akwa Ibom State. Chapter four (4) focuses on data presentation, analysis and interpretation.

Finally, chapter five (5) presents the summary of findings, conclusion and recommendations on the research work.

1.8 Definition of Terms used in the Study

As stated by Agara (2005: 111) stock (inventory) refers to the "physical units of inventory, i.e. goods that a business trades on or manufactures for sale. Stock also includes all items required for proper packaging and raw materials". The basic types of inventory therefore, include:

(a) Raw Materials

(b) Work in progress: Partly finished goods/materials and sub assemblies held between manufacturing stages.

(c) Finished goods: Completed products ready for sale or distribution.

Lead – Time or Delivery Period: This is the time between when an order is placed and when the supplier delivers the goods to the store. A lead time of 20 days will mean that it takes a period of 20 days for goods to be ordered and received into the store (Agara, 2005: 111).

Minimum/Maximum Delivery Period: According to Agara (2005: 111). The earliest time possible for delivery to get to the organization is known as minimum delivery period while the longest period for delivery to reach the organization is known as the minimum time. The maximum delivery periods is called normal delivery period.

Minimum Stock Level: Agara (2005:112) “also states that this is the stock level below which the company maybe running at risk of stock out it is normally kept to ensure that the safety stock is maintained and enough stock to cover minimum usage during the average delivery period. Management after considering the minimum consumption during the minimum delivery period normally fixes this level”.

Inventory Control System: Inventory control is the method of ensuring that the right quantity and quality of the relevant stock is available at the right time and at the right place (Adeniji, 2008:268).

Cycle Time: This is the time between when an order is received and another order is placed (Adeniyi, 2008:270).

Inventory Costs: The total cost component represented as the summation of ordering cost (co), carrying cost (cc), stock outs cost (cl), and the cost of inventory (ci) (Adeniyi, 2008:268)

Photovoltaics: According to www.wikipedia.com (2014) Photovoltaics (Pv) is a method of generating electrical power by converting solar radiation into direct current electricity using semi-conductors that exhibit the photovoltaic effects.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Introduction

This chapter which deals with the review of related literature on the subject matter, forms the theoretical framework for the study. Thus, it is intended to locate the quest for efficient inventory management within the mainstream of existing literature for ease of understanding. Just as Hansen and Mowen (2003:810) has it, "management and control of inventory is strongly related to the ability of firms to obtain the necessary competitive advantage to make money now and in the future". But this idea due to continuous decrease in profitability and resultant failure of manufacturing firms in Nigeria calls to question their proficiency in inventory control. It is necessary to emphasize here that the chapter will mainly focus on the works of various authors on manufacturing/construction companies.

2.1 The Concept of Inventory

The primary objective of inventory accounting is to determine income properly by matching periodic cost with periodic revenue. This idea made Needles (2007:332) to stress that in accounting for inventory, "management must choose among different processing system, costing methods and valuation methods. These

different systems and methods usually result in different amounts of reported net income". Thus, management choices affect investors and creditors evaluations of a company, as well as internal evaluation.

Needless (2007:335) also stated that "the consistence convention requires that once a company has decided on-the-system it will use in accounting for inventory, it must use it from one accounting period to the next unless management can justify a change. When a change is justifiable, the full disclosure convention requires that the company clearly describe the change and its effects in the notes to its financial statements".

2.2 Nature of Inventories Maintained by Manufacturing Firms

According to Lucey (2003:274), inventories are conventionally classified into three (3) forms, namely:

1. Raw materials
2. Work-in-progress
3. Finished goods

The levels of the three kinds of inventories for a firm depend on the nature of its business. A manufacturing firm will have substantially high levels of all three

kinds of inventories while a retail/wholesale or construction/installation firm will have a very high level of finished goods inventories and no raw material and work in progress inventories.

1. Raw Material Inventories

Raw materials are those basic inputs that are converted into finished goods or products through the manufacturing process. According to Pandey (2005:624) raw materials inventories are those units which have been purchased and stored for future productions.

2. Work-in-Progress Inventories

These are partially processed goods that required further processing before sale, and are normally valued at the sum of direct materials, direct labour and allocated manufacturing overheads incurred to date.

Dixon (2001: 67), asserted that the "longer the firm's production cycle, the higher the level of work-in-progress inventory expected".

3. Finished Goods Inventories

According to Albrecht, et al (2005:354) "finished goods are the competed products waiting for sale. A completed car rolling off the auto mobile assembly line is part of finished goods inventory".

4. Supplies or Stores and Spares

According to Pandey (2005:624), firms also maintain a fourth kind of inventory. These forms of inventories include office and plant cleaning materials like soap, brooms, oil, fuel, light bulbs, etc; these materials do not directly enter production, but are necessary for production processes. Usually, these supplies are small part of the total inventory and do not involve significant investment.

2.3 Need to Hold Inventories

Maintaining inventories arise only when companies hold inventories. This involves incurrence of storage fund and handling costs. If it is expensive to maintain inventories. Drury (2004:1076), identifies three general reasons for holding inventories. These are:-

a) **Transaction motive**: This emphasis the need to maintain inventories to facitate smooth production and sales operations. In involves holding inventories to take care of the day-to-day operations of the firm.

b. **Precautionary motive**: This necessitates holding of inventories to guard against the risk of unpredictable changes in demand and supply forces and other factors (Pandy,2005:625).

c. **Speculative motive**: This according to Drury (2004:1076) influences the decision to increase or decrease inventory levels to take advantage of price fluctuations. When it is expected that future input prices may change, a firm might maintain higher or lower inventory levels to speculate on he expected increase or decrease in future prices.

2.4 Costs Associated with Inventories

According to Adeniji (2008:268), some of these cost components and their sub components include:

a. **Ordering (Acquisition) costs**: These are costs incurred in placing the order up to the point of receiving the goods into the warehouse. Most of these costs are administrative nature. These costs will include among others the following:

i. Cost of issuing purchase order-remuneration of purchasing department staff.

ii. Transportation cost

iii. Cost of loading and off loading

iv. Cost of getting payments to the supplier

v. Cost of communication e.g. on delay in supply or when wrong quantities and defective inventories are delivered.

b. **Carrying (holding) costs**: These are the costs incurred whenever a material is stored. They are incurred because the firm has decided to maintain inventory.

c. **Underage or stock out costs**: This are the costs involved when customers demand cannot be met because the stock is exhausted.

d. **Cost of inventory**: This is actual costs of items placed in stock. The per unit cost of the items may vary with some quantity discounts.

e. **Set-up costs**: These are the costs incurred when goods are manufactured internally. They are the costs incurred when production is changed from one process to another.

2.5 Inventory Valuation Methods

According to Davidson et al (2002:98), “inventory costing problem arises because of two unknown financial data. These are which are the cost of goods sold and the amount of the ending inventory. In most cases, new items are mixed with the old units on shelves, in bins and physical identification becomes impractical.

When these happens, the accountant traces cost flow and not flow of goods, using cost flow assumption. The accountant computes the acquisition cost applicable to units remaining through the use of several assumptions with respect to the flow of cost factors (such as FIFO, LIFO, Weighted Average, etc), to provide practical bases for the measurement of periodic incomes".

Although there are other valuation methods in regard to inventory such as: standard price, specific identification, based stock, last purchase price (L.P.P), etc; This study will duel on only three widely used methods viz; first in first-out (FIFO), last-in-first-out (LIFO), and weighted average (WA). The selection of these methods is usually guided by the principle of matching of current cost with corresponding current revenue. As in the words of Olagunji (1997:27), "the problems, which methods of stock valuation would minimize the distortion in the stock figure and possible in the profit and not just choosing any method any how. According to him, that is the basis for the choice of method(s)". This position is in accordance with NASBs. SAS 4 (1984).

Fess and Warren (1995) maintained that the three assumptions commonly in use with regards to inventory valuation are:

a. Cost flow is in the order in which the expenditure were made.

b. Cost flow is in the reserve order in which the expenditure were made.

c. Cost flow is an average of the expenditure. Given these assumptions, each of the methods is discussed below.

2.5.1 First-In-First-Out (FIFO) Method

According to Needles, et al (1996:378), the first in, first out (FIFO) method is based on the assumption that the costs of times acquired should be assigned to the first items sold. The costs of the goods on hand at the end of a period are assumed to be from the most recent purchases, and the costs assigned to goods that have been sold are assumed to be from the earliest purchases. The FIFO method to be from the earliest purchases. The FIFO method of determining inventory costs may be adopted by any business, regardless of the actual physical flow of goods, because the assumption is made regarding the flow of costs and not the flow of goods.

Merits of FIFO

Eton (2003:85) and ICAN (2006:27), enumerate the merits of FIFO to include:

a) It is a very realistic method because in the real world situation, materials are issued out of stores in the order in which they are received.

b) The value placed on closing stocks is reasonably fair, since it relates closely to current market prices and so no profits or losses will arise.

c. The methods is very easy to operate especially where price tend to be relatively stable.

d. It is suitable where material is of comparatively high value and not in frequent demand.

e. It is an actual cost system.

On the other hand, the FIFO method is pregnant with the following short comings put forward by Inam (2000:21):

a. It is argued that the comparison of one job against another is difficult because cost will depend on when materials were drawn from the stores.

b. More realistically, issue price may not reflect current economic values.

c. This method is cumbersome since continuous updating of stock values is required.

2.5.2 Last-In-First-Out (LIFO) Method

According to Needles et al (1996:379), “the last in first out (LIFO) method of costing inventories is based on the assumption that the costs of the last items purchased should be assigned to the first items used and that the cost of the ending inventory reflects the cost of merchandise purchased earliest”.

Merits of LIFO

Inam (2000), highlighted the following advantage of using LIFO as a method of inventory values:

a. The issue prices are closer to current economic values.

b. During inflation, stock values are conservative thus, reducing the risk of profits being overstated through the inclusion of holding gains.

c. Cost are reasonably accurate.

Demerits of LIFO

According to ICAN (2006:29), its demerit includes the following:

a. It involves considerable clerical work.

d. The valuation of stock balance may not be accepted for income tax purposes.

c. It cannot be fairly used for the purpose of comparing job costs.

Weighted Average (WA) Method

Fess and Warren (1995:45) stress that this method assumes that "cost flow is an average of expenditure is based on the assumption that cost should be charge against revenue, according to the weighted unit cost of goods sold".

Merits of Weighted Average

According to ICAN (20006:30), weighted average method has the following advantages:

a. Its use is not limited to materials with stable prices

b. The need to calculate a new ruling price arises only.

c. It presents a fair indication of stock values.

Demerits of Weighted Average

a. It is difficult to operate

b. Puling prices usually run to a number of decimal places.

c. Issues on production and other uses may not reflect economic values.

2.6 Factors Affecting Inventory Valuation Decision

According to Wood, et al (2003), some of the factors which causes a particular basis to be chosen, include:

a. **Ignorance**: The personalities involved may not appreciate that fact that there are more than one possible way of valuing stock.

b. **Convenience**: The basis chosen may not be the best for the purposes of profit calculation, but it may be the easiest to calculate.

c. **Custom**: It may be the particular method used in a certain trade or industry.

d. **Taxation**: The whole idea of choosing a particular basis may be to defer payment of tax as long as possible.

e. **Lack of information**: if proper records have not been kept then such bases as the average cost and LIFO methods may not be easy to calculate.

f. **Advice of the auditor(s):** Many firms use a particular basis because the auditors recommended its use in the first instance. So, a new auditor may also recommend that a different method should be used.

2.7 The Problems of Inventory Valuation

Davidosn, et al (2002:98) identified that the particular problem areas regarding stock valuation include:

a. Allocation of production overhead and

b. The determination of net realizable value. It is important to note that some of these problems have been already, analyzed in this work; and the rest will be discussed in subsequent sections of this work.

2.8 Basis of Inventory Valuation

According to Kam (1999:13). “the primary basis of accounting for inventories is cost. Cost has been generally defined as the price paid or consideration given to acquire an asset. As applied to inventory, cost means the sum of the applicable expenditure and charges directly or indirectly incurred in brining an article to its existing condition and location”. The rate for assigning costs of physical unit of goods and services affect both at which inventory appears on the balance sheet. This is because the cost associated with units of goods that have been sold becomes that cost of goods which affects unsold units form the closing inventory on the balance sheet”.

This may either occur because of price changes of physical determination of the particular item in inventory. Generally accepted accounting principles (GAAP) requires the use of lower of cost or market as the basis of measuring inventory. This is specifically applied when only if the utility of goods has diminished in their disposal during the ordinary course of business. Infact, in computing market value, GAAP for inventory valuation and measurement of cost of goods sold requires a combination of three valuation bases namely.

a. The historical cost basis

b. The replacement cost basis, and

c. The net realization value basis.

However, Davidosn, et al (2002:99) “observe that during the period of rising price, replacement cost and net realizable value are likely to be higher than the acquisition cost or historical cost. Thus, valuation at cost and lower cost or market methods usually gives the same valuation”.

Kam (1999:13) “portray that historical cost refers to the cost at the time of acquisition. In accounting, the term acquisition cost and historical costs means one and the same thing”. By this idea he meant that the advocates of purchase prices provide the market relevant inventory information for decision making. They

maintain that historical cost basis of inventory valuation is objective, not only because it is the amount paid by the entity, but also because it was the market price at that time. However, the opponents of historical cost method maintain that with the application of the historical cost basis, the figure shown on the balance sheet for inventory would become outdated to the extent that prices have changed since the time the items were acquired. This, they say often mislead user of financial statements.

2.9 Inventory Valuation and Cooperate Profitability

Based on the above data in section 2.5, it become obvious that the summary of the three major inventory valuation methods revealed differing effects/results on the profitability of an organization, especially, for cost of goods sold and net profit on income statement, as well as the closing inventory. It is worth noting that if the costs of inputs were stable, all the three methods would yield the same result. But where the price fluctuates the there methods would invariably yield different results for the inventory at the end of the period, the cost of the merchandize sold and net income during the period.

Having observed this trend, Fess and Warren (1995:95) “give their generalization of the impact of using various methods of inventory valuation on the

profitability of an organization, thus: “The method that yield the lowest for the cost of merchandise sold, will yield the highest figure for gross profit and net income reported on the income statement, it will also yield the highest figures for the inventory reported on the balance sheet”. On the other hand the method that yields the highest for the cost of merchandise sold, will yield the lowest figures for gross profit and net income and the lowest figure for inventory on the balance sheet”.

Flesher and Felsher (2002:30), “observed that the use of FIFO during a period of rising price, will results in a greater amount of net income than the other two methods. This way, much of the benefits of the large amount of gross profit is lost, as inventory is continually replenished at ever higher cost”.

Schroeder (2001;65); “during the period of rising prices, FIFO may give exaggerated impression of profitability, which may mislead financial statement users and which could result in the payment of additional income taxes. Fess and Warren (1995:85), argue that “the major criticism of the use of LIFO methods is the tendency to maximize the effect of inflationary and deflationary trends on the amount reported as net income”. They however, conceded that the value of merchandize inventory on the balance sheet will usually be about the same as it current replacement costs”.

In the same view, Smith, et al (1999:316) highlighted that “during the period of inflation, the use of LIFO method will result in alesser amount of net income than the other two methods. This is as a result of the fact that costs are most nearly approximate their cost of replacement. Johnson and Gentry (1997:265)”, further adds that during inflationary period the use of LIFO method results in lower reported taxable income and, thus lower income tax payment and increasing the amount of cash available for expansion and other purposes. This position is shared by Kieso, et al (2007:315) “that tax benefits are the major reason why LIFO has become popular as long as price level and inventory quantities do not decrease. The reverse effect however will occur in the period of deflation as the LFIO method will yield the highest amount of income”.

On that note, Dupress and Mardes (1998:334), advised that, “any chosen method should be consistently followed from year-to-year, except, where there is a valid reason for a change”. It is worthy of note that the standard requires management to ensure that whatever method chosen provides the fairest practicable approximation to actual cost incurred in brining the product to its present location and condition”.

2.10 The Concept of Management

According to Dressler (2001:68), management refers to two things.

1. Collectively to the managers of an organization

2. To the study of what managers do. In the words of Keontz an Weihroich (2005), management is the process of designing and maintaining an environment in which individuals, working together in groups effectively and efficiently accomplished selected aims.

2.11 Inventory Management

In the Words of Lasher (1997:470), “inventory management refers to the overall way a company oversees its inventory and uses its control system to manage the benefits of carrying inventory against the cost. Precisely inventory management could be defined as the planning and controlling of investment in raw materials, work-in-progress, and finished goods so as to maximize profit”. Hence, managing inventories involves two (2) closely related management or manager’s functions, they are:

i. Planning for inventories

ii. Controlling of inventors

The planning aspect is concern with such decisions as what to store or produce, where to procure goods, what are the most economical arrangements for transportation, storage, inspection and other such operations. The control aspect on the other hand, is concerned with decisions order and what type of inventory cost control system should be adopted for optimal operations (Akpakpan, 2005:180). According to Brigbam and Gapenski (1994:809), inventory management focuses on five (5) basic questions:

1. Hold many units should be order or produced at a given time?

2. At which point should inventory be ordered or produced?

3. What inventory items warrant special attention?

4. How does our firm's inventory management compare with other firms?

5. Can changing prices which affect inventory cost be hedged?

2.12 Who Manages Inventories

Inventory is usually managed by a functional area such as manufacturing or operations. The executives in charge of those areas generally have board latitude in choosing inventory levels and management methods. Finance gets involved in an overview or policing way. If inventory levels become too high, it is the job of

financial management to call attention to the fact that things might be runned more efficiently. Financial people generally monitor the level of cost or obsolete inventory that has to be written off and ensure that it doesn't become excessive. They also supervise periodic physical inventories (counts) that reconcile quantities actually on hand with the firm's records (Iasher, 1997:468).

Worthy of note is the fact that although the financial department does not itself manage the typical firms inventory, it has a responsibility to ensure that those who do manage it acts effectively.

2.13 Objective of Inventory Management

In the context of inventory management, the firm is faced with the problem of meeting two conflicting needs. This according to Pandey (2005:625), are;

i. To maintain a large size of inventories of raw material and work-in-progress to efficient and smooth production and of finished goods for uninterrupted sales operations.

ii. To maintain a minimum investment in inventories to maximize profitability. Both excessive and inadequate inventories are not describable. These are two danger points within which the firm should avoid. The objective of inventory management should be to determine and maintain optimum level

of inventory investment. The optimum level of inventory will lie between the two danger points of excessive and inadequate inventories.

According to Fondly (2005:625), the major dangers of over investment are:

(a) Unnecessary tie-up of the firm's funds and loss of profit

(b) Excessive carrying costs.

(c) Risk of liquidity.

The aim of inventory management, thus, should be to avoid excessive and inadequate levels of inventories and to maintain sufficient inventory for the smooth production and sale operations. Efforts should be made to place an order at the right time with the right source to acquire the right quantity.

According to Pandey (2003: 626), an effective inventory management should:

- Ensure a continuous supply of raw material to facilitate uninterrupted production.
- Maintain sufficient stocks of raw materials in period of short supply and anticipate price changes.
- Maintain sufficient finished goods inventory for smooth sales operations and efficient customer services.
- Minimize the carrying coast and time.

- Control investment in inventories and beef it at an optimum level.

2.14 Inventory Control and Management Techniques

According to Pandey (2005:633) “in managing inventories, the firms objective should be consonance with the shareholder’s wealth maximization principle. A firm needs an invent control system to effectively manage its inventory. There are several inventory control systems in practice. They range from simple system to very complicated systems. The nature of the business and its size, dictate the choice of an inventory control system.

To manage inventories efficiently, answers should be sought to the following two questions:

- How much should be ordered?
- When should it be ordered?

There is no single appropriate way to managing inventory. Success is achieve through frequent reviews attention to details and manual systems (Lasher, 1997:470). In the rest of this chapter some well-known ideas and techniques that address inventory management shall be discussed.

2.15 The Economic Order Quantity (EOQ) Model

According to Horngren, et al, (2006:692) the economic order quantity (EOQ) model is a decision model that under a given set of assumptions, calculates the optional quantity of inventory to be ordered.

Assumptions of EOQ

Adeniji (2008:270) enumerates the following assumptions:

- Demand rate is constant and can be ascertained
- There is zero lead time on orders
- Stock outs are not allowed and the safety or buffer stock can be ignored.
- The purchase price per unit is constant and hence quantity discounts are not allowed
- Orders arrive instantaneously and not gradual
- The ordering cost per order is known
- The annual holding cost per item can be determined and is constant.

Methods of Determining EOQ

Adenijo (2008:271) stated the following methods:

- Tabular method
- Graphical method

- Mathematical method (Algebraic process).

2.15.1 The Reorder Point

The problem of how much to order is solve by determining the economic order quantity, yet an answer should be sought for the second problem, when to order. This is a problem of determining the reorder point. The reorder point, as defined in chapter one of this study, is that inventory level at which an order should be placed to replenish the inventory pandey (2005:624) stated that to determine the reorder point under certainly, we should know the following:

(a) lead time

(b) average usage

(c) economic order quantity

2.15.2 Tracking Inventories

The amount of attention that should be given to controlling inventories of particular item varies with the nature and cost of the item. Some pieces are very expensive and for that reason alone warrant a great deal of attention (Lasher,1997:474).

2.15.3 The ABC System

Pandey (2005:634) opines that ABC system tend to measure the significance of each item of inventories in terms of its value.

2.15.4 A Two – Bin System

Railborn, et al (1996:656) portray that this system two containers or stocks of inventory are available for production needs. When it is necessary to begin using materials from the second bin after the first container must have been used up, a purchase order is placed to refill the first bin.

2.15.5 A Red-Line System

Railborn et al (1996:656) stated that “a red line is painted inside an inventory container at a designated order point when the red-line becomes visible, a purchase order is issued for replenishment”.

2.15.6 The Computerized Inventory Control System

Pandy, (2005:634-635) “explain this control system as an automatic system of counting inventories, recording withdrawals and revising the balance. There is an in-built system of placing order as the computer notices that the reorder point has been reached. The computer information system of the buyers and suppliers are

linked to each other". As soon as the supplies computer receives an order from the buyers system, the supply process is activated.

2.15.7 Periodic Stock Taking

Agara (2005:136) stated that periodic stock taking is a system whereby once or twice a year, normally not more than that, a physical stocktaking exercise is carried out by the headquarters on the stock of the branch offices or on its central stock. This exercise is carried out for the following purposes.

(a) To ascertain the nature of closing stock as confirmed by physical presence of the stock for the balance sheet.

(b) To discover obsolete items and recommend write off action

(c) To confirm figures entered in the bin cards and stories ledger

(d) To authenticate the results of the perpetual inventory system which existed through the year.

(e) To have a holistic view of the stock movement for the year

2.15.8 Perpetual Inventory Control Method

Agara (2005:135) portrayed that this is a continuous or regular checking of stock items against the stock records. The system requires the recording of every receipt and issue of materials into or from stores. This usually involves the use of

two sets: The bin card showing the physical balance of the stock and the stores ledger record, which shows the physical stock and the monetary value.

2.15.9 Just-In-Time (JIT) System

JIT systems developed in Japan, is considered as one of the main contributions of Japanse manufacturing success (Lucey,2003:578). The system involves a continuous commitment to the pursuit of excellence in all phases of manufacturing system design and operation (Drury,2004:967). According to Pandey (2005:634) “in this system, material or manufacturing components and parts arrive to the manufacturing sites or stores just few hours before they are put to use. The delivery of materials is synchronized with the manufacturing cycle and speed. In JIT system, since poor quality material or components could half the production, the JIT inventory system therefore complements the total quality management (TQM).

In the words of Lucey (2003:578), a JIT environment is composed of the following:

- A moved towards zero inventory
- Elimination of non-value Added activities
- An emphasis on perfect quality ie zero defects

- Short set-up
- A move towards a batch size of one
- 100% on time deliveries
- Demand-pull manufacture

It is this later characteristic that gives rise to the name, just-in-time. Production only takes place when there is actual customer demand for the product, so JIT work on a pull-through basis which means that products are not made to go into stock.

Benefits of JIT System

According to Heitger, et al (1996:686), the following benefits are attributable to the adoption of JIT systems.

1. It leads to excellence
2. Reduction of inventory levels
3. It unmasks problems
4. It greatly involves employees
5. It increases quality

6. It increases flexibility

7. It increases cash flow's

Limitation of JIT Systems

In the words of Hansen, et al (2003:824-826), JIT is not simply an approach that can be purchased and plugged in with immediate results. Its implementation should be more of an evolutionary process than a revolutionary process. Patience is needed. Time is enquired for example, to build sound relationship with suppliers. He also stress that workers might also be affected by JIT system. Sharp reductions in inventory buffers may cause a regimented workflow and high levels of stress among production workers. The most glaring deficiency according to Hansen, et al (2003:826) is the absence of inventory to buffer production interruption, current sales are being constantly threatened by an unexpected interruption in production. The JIT manufacturing companies are also willing to place current sales at risk to achieve assurance of future sales. Thus, losing sales is a real cost of installing a JIT system.

2.16 The Inventory Management Process

Having discussed different inventory management techniques above, it is very useful in determining the optimum level of inventory and findings answers to

the problems of reorder point and safety stock. These techniques are very essential to economize the use of resources by minimizing the total inventory costs.

Pandey (2005:635) said that it should however be realized that inventory management, more than the use of techniques, is a managerial process of continuous planning, co-ordination, control and monitoring, motivation" etc. The goal of wealth maximization is affected by the efficiency with which inventory is managed. The task of managing inventory primarily vests with the operating or functional managers, purchase manager, materials control manager, production manager and marketing manager. Financial manager has no operating responsibility to control inventory. He has a role to analyze the behavior of inventory and report its implications to operating managers the financial manager should see that an optimum amount of funds is invested in inventory. He should introduction the policies, which reduce the lead time regulate usage and thus, minimize safety stock. According to Van Horne (2005:37), the net effect would be to reduce inventory investment and thus, increase the firm's prospects of making more profits.

2.17 Requirements for Effective Inventory Management

There are basic functions of management in relationship to inventory management. One is to establish a system of keeping track of items in inventory, and the other is to make decisions about how much and when to order.

Therefore, to be effective, Stevenson (2002:545) opined that management must have the following:

a. A system to keep track of the inventory on hand and on order.
b. A reliable forecast of demand that includes an indication of possible forecast error.
c. Knowledge of lead-times and lead-time variability.
d. Reasonable estimate of inventory holding cost, ordering cost, shortage costs etc.
e. A classification system for inventory items.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This study was conducted to evaluate the inventory management system of a solar energy establishment “a case study of Agilet Solar Energy Limited Uyo, Akwa Ibom State, Nigeria”. Described here is the research methodology of the project as designed, developed and implemented in the field.

3.1 Research Design

Research design according to Taylor (2008:36), is the basic plan which guides the data collection and analysis of the research. The descriptive and analytical research methods were employed in the study.

3.2 Brief Historical Background of Agilet Solar Energy Limited, Uyo, Akwa Ibom State

Agilet solar energy limited is a sole proprietorship investment in the solar energy installation industry that was established in 2005 and registered with the cooperate affairs commission (CAC).

Like most infant investment in the Nigerian industrial sector, Agilet was established with the vision to enlighten people about solar energy and to bring it closer to the consumer's door steps with a targeted customer base in the south-south geo-political zone of the Federal Republic of Nigeria.

Agilet has grown from one level to another with a capital base of N20, 000,000 and has a work force enrolment of 10 to 11 staff excluding the contract staffs. On this note, it is pertinent to know that the solar energy industry is made up to three aspects, which are designing, sizing and installation and Agilet solar energy limited does all three.

3.3 Method and Sources of Data Collection

During the course of the study, data were gathered from both primary and the secondary sources. Primary sources included all the structured questionnaires sent out to the employees and management of Agilet Solar Energy Limited, Uyo for responses. The secondary sources included all the information gotten form already existing materials, such as text books, journals, magazines, published and unpublished articles, internet, newspapers and other periodicals.

3.4 Population and Sample Size Determination

According to Nsini et al (2005:20) “population is any theoretical specified aggregation of items or elements”. However www.wikipedia.com defines population as a “summation of all the organisms of the same group or species, who live in the same geographical area and have the capability of interbreeding”. Base on this study, the first definition by Nsini et al (2005:20) seems appropriate for the research. The population of Agilet Solar Energy Limited, Uyo constitutes a total of fifty staff. This forms the population of the study.

Considering the size of the population and since it will be difficult to reach and deal with every member of the population, it becomes necessary to use a sample size that is adequate and manageable. To achieve this, the Yaro Yamen’s formula is used in the determination of the sample size.

The formula is given as:

$$n = \frac{N}{1 + N(e)^2}$$

Where: n = sample size

N = population size

e = % error

I = constant

$$\therefore \quad n = \frac{50}{1 + 50\,(0.15)^2}$$

$$= \frac{50}{1 + 50\,(0.0225)}$$

$$= \frac{50}{2.125} = 23.52941176 = 24$$

From the above calculation, a sample size of 24 staff was studied.

3.5 Questionnaire Design and Administration

The questionnaire was deigned in order to obtain direct answers from the respondents, by using simple words they could understand and response to easily. It was structured in strict compliance with the objective of the study and the research questions. Section A of the questionnaire consist of personal profile of the respondent, whereas section B consists of mostly closed ended and few open-ended questions for staff and management while section C consists of questions for management only. This was to enable the respondent answer the questions with little or no difficulties.

3.6 Data Analysis Techniques

The statistical tool used for analysis was simple percentage method. A frequency of the response received from the respondents was made and represented

by a table. A contingent table was formed to obtain the expected frequency (fe). Consequently a scientific analysis was undertaken. The chi-square (x2) method was used to present the data collected on the table. Furthermore, after obtaining the value of the chi-square (x^2), a critical value was calculated to either accept alternative hypothesis (Hi) or reject the null hypothesis (Ho).

The chi-square (x^2) test is a non-parametric test, it is used to test whether an observed an observed frequencies differ significantly from what was expected. It is often referred to as a goodness of fit test.

The chi-square (2) formula is given as;

$$X^2 = E \frac{(fo-fe)^2}{fe}$$

Where, fo = frequency of the observed value

fe = expected frequency of any value

x^2 = computed chi-square (x^2) value.

This is done to enable the researcher draw valid conclusion and recommendations.

3.6.1 Percentage Analysis

Simple percentage method of analysis will be used in the analysis of the research questions. The formula is given as:

$$X\ \% = \frac{f_o}{f_e} \times \frac{100}{1}$$

Where: fo = observed frequency

fe = total frequency

3.6.2 Decision Rule

The percentage responses from the questionnaires were analyzed and ranked to show relative usage. Responses with the highest magnitude or percentage were used to draw inferences on the population. This objectively means that responses with the highest frequency were assumed to be generally accepted to a particular question.

The decision criteria for accepting or rejecting hypothesis have the following characteristics.

1. The x^2 test is always a one tailed test lying to the right.
2. The smallest value of x^2 is zero. This will only occur when the observed frequencies are equal to expected frequencies. ie (fo=fe-0). In other words, when fo-x^2 = 0, therefore x^2 will have a positive value which increases as the differences between fo and fe increases.
3. Though fo must be whole numbers, fe need not be.
4. Percentages need not be used as far as x^2 is concerned in analysis of x^2.

In taking decision for x^2 test, if x^2 computed is less than the x^2 table value (critical value) then the null hypothesis (Ho) will be accepted. If the x^2 computed is greater than the critical value, Ho will be rejected.

3.6.3 Null Hypothesis (H_O)

a. The company does not employ a standard inventory management system.

b. The inventory management, control and valuation systems are not consistently used.

CHAPTER FOUR

PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

4.0 Introduction

This chapter presented the responses to the questions on the questionnaire administered to respondents. Based on their responses, analysis were carried out and the results were interpreted.

4.1 Questionnaire Administration/Distribution

To achieve the objectives of the research, a total of twenty-four (24) questionnaire were administered to the respondents who were bonafide members of staff of Agilet Solar Energy Limited, Uyo. Two (2) of the top management staff and twenty-two (22) members of the junior staff of Agilet Solar Energy Limited, Uyo were administered with questionnaire.

Twenty (20) questionnaire were completed and returned in usable form, which represented 83% of the total questionnaire sent out as shown in table 4.1

Table 4.1: Total number of questionnaires distributed and returned

Respondents	Number administered	Number returned	Percentages (%)
Managing Director	1	1	4
Financial manager	1	1	4
Store officer	1	1	4
Other staff	21	17	71
Total	24	20	83

(Source: field survey, 2014)

4.2 Validation of Relevant Research Questions

This section presents analysis of the data collected through the questionnaire administered. Staff responses per relevant question were analyzed below:

Research Question 1

What type of inventory management system is used by Agilet Solar Energy Limited? To find out the type of inventory management systems used in Agilet Solar Energy Limited, the responses of respondents are tabulated below.

Table 4.2: Type of inventory management systems used by Agilet Solar Energy Limited.

Options	**Number of respondents**	**Percentage of respondents**
ABC system	5	25
Optium level system	5	25
The computerized system	3	15
Periodic Review system	7	35
Others, please specify	-	-
Total	20	100

Sources: field survey,2014: Appendix ll, question 7.

Form table 4.2 above, five (5) respondents representing 25% agreed that the company adopts the ABC system of inventory management. Five (5) maintained that the company uses the optimum level system, which represents 25%. Seven (7) respondents representing 35% agreed on the periodic review system. While three (3) respondent representing 15% choosed the computerized system as the system adopt by the firm. Form the above analysis, it could be rightly concluded that the company adopts the periodic review system of inventory management technique. It is worthy of note that due to the percentage of usage of the other inventory management systems, the system use by Agilet Solar Energy Limited varies based on the need, usage, time and purpose needed by its business life cycle.

Research question 2

How effective and efficient is the inventory management system used by Agilet Solar Energy Limited?

To find out the level of effectiveness and efficiency of the inventory management system used by Agilet Solar Energy Limited the responses of respondents are tabulated below;

Table 4:3: The Level of Effectiveness and Efficiency of the Inventory Management Systems used by Agilet Solar Energy Limited.

Options	Number of respondents	Percentage of respondents
Very High	3	15
High	14	70
Very low	-	-
Low	3	15
Total	20	100

Source: field survey, 2014: Appendix lll, questions 8

From table 4.3 above, three (3) representing 15% of respondents considered the level of inventory management system in Agilet Solar Energy Limited to be very high: fourteen (14) respondents that is 70%, maintained that the level of efficiency and effectiveness of inventory management is reasonably high while

three (3) respondents which is 15% maintained that the efficiency and effectiveness of the system is low. From the above analysis, it could be affirmed that the level of efficiency and effectiveness of the inventory management systems used by Agilet Solar Energy Limited is high but not very high.

Research question 3

What is the impact of inventory management systems on the firms profitability? To ascertain the impact of inventory management system by Agilet Solar Energy Limited, on its profitability, the responses gathered form the respondents are tabulated below:

Table 4.4: The Impact of Inventory Management Systems on the firm's Profitability

Options	**Number of respondents**	**Percentage of respondents**
Very great	12	60
Great	8	40
Little		-
No effect		-
Total	20	100

Source: field survey,2014: Appendix lll, question 14

From table 4.4 above, twelve (12) respondents, which represented 60% affirmed that the impact of inventory management system used by the firm on its

profitability is highly significance. While eight (8) representing 40% considered the impact of the system used to be great. From the above analysis, it therefore means that the impact of inventory management system used by the firm on its profitability is very great.

Research question 4

What are the problems associated with inventory management in Agilet Solar Energy Limited? To find out this, the responses of respondents gathered are tabulated below.

Table 4.5: The Problems Associated with Inventory Management in Agilet Solar Energy Limited

Options	**Number of respondents**	**Percentage of respondents**
Delay of deliveries by suppliers	2	10
Weak internal control system	5	25
Inexperienced staff	13	65
Others, please specify	-	-
Total	20	100

Source: field survey,2014, Appendix lll, question 12.

From table 4.5 above, two (2) respondents, ie 10% agreed that delay of deliveries by suppliers is the problem associated with inventory management in Agilet Solar Energy Limited. Five (5) respondents representing 25% accepted that, weak internal control system is the problem with inventory management while thirteen (13) respondents representing 65% maintained that the problem of inventory management in Agilet. Solar Energy Limited could be attributed to inexperienced staff.

From the responses of respondent above, it could be agreed that in experienced staff is the most feasible problem of inventory management in Agilet Solar Energy Limited.

Research question 5

What are the possible solutions to the problems associated with inventory management in Agilet Solar Energy Limited?

To find out this, the responses of respondent gathered are tabulated below:

Table 4.6: The Possible Solutions to the Problems Associated with Inventory Management in Agilet Solar Energy Limited.

Options	**Number of respondents**	**Percentage of respondents**
Providing the staff with adequate training	3	15
Designing of good internal control system	2	10
Prompt deliveries by suppliers	2	10
All of the above	13	65
Total	20	100

Source: field survey, 2014, Appendix lll, question 13

From table 4.6 above, three (3) representing 15% of the respondents considered obtain A while two (2) representing 10% maintained obtain B and C respectively and thirteen (13) representing 65% agreed that all the options are some of the possible solutions to the problems associated with inventory management in Agilet Solar Energy Limited.

Research question 6

What is the inventory valuation method(s) used by Agilet Solar Energy Limited?

To find out this, the responses of respondents gathered are tabulated as follows:

Table 4.7: The valuation method(s) used by Agilet Solar Energy Limited

Options	**Number of respondents**	**Percentage of respondents**
FIFO	7	35
LIFO	6	30
Weighted Average	4	20
Simple Average	3	15
Others, please specify	-	-
Total	20	100

Source: field survey, 2014, Appendix ll, question 17.

From table 4.7 above, seven (7) representing 35% of respondents maintained that the firm adopts the first-in-first-out (FIFO) method of inventory valuation, while six (6) representing 30% believe that the last in-first-out (LIFO) method is used and four (4) representing 20% held that weighted Average (WA) method of inventory valuation is used by the company. Simple Average method was accepted by three (3) representing 15% of respondents. It therefore follows that Agilet solar energy limited by providence uses the FIFO method due to the nature of its inventory.

Other Relevant Questions

What are the costs associated with inventory management in your company?

To find out this, the responses of respondents gathered are tabulated below:

Table 4.8: The Cost Associated with Inventory Management in Agilet Solar Energy Limited

Options	**Number of respondents**	**Percentage of respondents**
Acquisition cost	-	-
Holding cost	-	-
Stock-out cost	-	-
Set-up cost	-	-
All of the above	20	100
Total	20	100

Source: filed survey,2014, Appendix lll, question 9.

Table 4.8, showed that twenty (20) representing 100% of the respondents affirmed that the listed costs above are associated with inventory management in Agilet Solar Energy Limited.

When inefficiency and ineffectiveness is attributed to inventory management, which of these negative effects are identifiable? To find out this, the responses of respondents gathered are tabulated below:

Table 4.9: The Effects of Inefficiency and Ineffectiveness in Managing Inventory in Agilet Solar Energy Limited

Options	**Number of respondents**	**Percentage of respondents**
Decreases in profitability margin	-	-
Loss of sales	-	-
Loss of customers goodwill	-	-
Production steppage	-	-
All of the above	20	100
Total	20	100

Source: field survey 2014, Appendix lll, question 10 and 11

From table 4.9 above twenty (20) representing 100% of the respondents affirmed that the options above are the effect of inefficiency and ineffectiveness in managing inventory in Agilet Solar Energy Limited.

Which of these would you consider as benefit(s) to be derived from a well managed inventory system by your company?

To find out this, the responses of respondents are tabulated below:

Table 4.10: Benefit(s) to be Derived from A well Managed Inventory System by Agilet Solar Energy Limited

Options	Number of respondents	Percentage of respondents
Enhancing interrupted flow of production	-	-
Maintaining sufficient finished goods for smooth sales operations and efficient customers service	-	-
Control of investments, thus curbing over or under investments in inventories	-	-
Minimization of the ordering and carrying costs	-	-
All of the above	20	100
Total	20	100

Source: field survey,2014, Appendix lll, question 5.

From table 4.10 above, all respondents agreed, and affirmed that the options above are benefits to be derived from well managed inventory systems by Agilet Solar Energy Limited.

Testing of Hypothesis

Hypothesis no .1

Ho (NULL) the company does not employ a standard inventory management system.

H1 = The company employs a standard inventory management system.

Aim: To find out whether the company employs a standard inventory valuation and control system.

Validation of Null Hypothesis No. 1

Variables	**Number of respondents**	**Percentage**
Yes	17	85
No	1	5
Not sure	2	10
Total	20	100

fe = 20/3 = 6.7

Table 4.11 Computed x^2 value for Null Hypothesis

fo	fe	fo-fe	$(fo-fe)^2$	$(fo-fe)^2/fe$
17	6.7	10.3	106-09	15.83
1	6.7	-5.7	32.49	4.85
2	6.7	-4.7	22.09	3.29
20				23.97

$X^2 = (fo-fe)^2/fe = 23.97$

Theoretical: Degree of freedom (df) = (R-1) (c-1)

= (3-1) (3-1)

= 2 x2 =4

Testing at 5% significant level = 9.49

If the computed value of x^2 is greater than the theoretical value of x^2 the null hypothesis be rejected. In this case 23.97 is greater than the table chi-square value of 9.49; therefore, the Ho is rejected and Hi is accepted, that means the company employs a standard inventory management system.

Hypothesis No 2

Ho = (Null) the inventory management, control and valuation system are not consistently used.

Hi = (Alternative): The inventory management control and valuation system are consistently used.

Aim: To test if the inventory valuation, management and control system are consistently used in the company.

Validation of Null Hypothesis No. 2

Variables	**Number of respondents**	**Percentage**
Yes	3	15
No	7	35
Not sure	10	50
Total	20	100

Table computation X^2 value for null Hypothesis

fo	fe	fo-fe	$(fo-fe)^2$	$(fo-fe)^2/fe$
3	6.7	13.7	13.69	2.04
7	6.7	0.3	0.09	0.01
10	6.7	3.3	10.89	1.62
20				3.67

$X^2 = (fo-fe)^2/fe = 3.67$

Theoretical: Degree of freedom (df) = (R-1) (c-1)

= (3-1) (3-1)

= 2 x2 = 4

Testing at 5% significant level = 9.49

If the computed value of x^2 is greater than the theoretical value of x^2, the null hypothesis is rejected. In this case 3.67 is less than the table chi-square value of 9.49, therefore the Ho is accepted and Hi is rejected. That means that the company inventory management, control and valuation system are not consistently used.

4.3 Summary of Findings

From the data gathered and analyzed, effective and efficient management of inventory contributes immensely to the profit maximization of the company as witness in table 4.4. The study revealed that the company is fully aware of the existence of inventory management system and that it adopts the periodic review system of inventory management. This is evidenced in table 4.2.

The analysis indicated that the most prominent problem associated with inventory management in the company is inexperience staffs. Other problems also visible in the study are weak internal control system. These were evidence in table 4.5. Table 4.7 showed that inconsistency was the major problem associated with the type of inventory valuation method used by Agilet Solar Energy Limited as there was little variation in numbers and percentages of the choosen methods by the firm.

The analysis of the study showed that providing the staff with adequate training, designing of good internal control system, prompt deliveries by the suppliers and maintaining of sufficient stock to smoothen the production and sales operations of the company are some of the possible solutions to the associated problems revealed by the study. This were evidenced in table 4.6 and 4.10.

Also in Hypothesis 1, it is proven that the company employs a standard inventory management system. The null hypothesis was tested and rejected at the expense of the alternative hypothesis. Finally, it was also seen that the company inventory management control and valuation system was not consistently used.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter was designed to present the summary of the entire work, its conclusion and recommendations, which will be of benefits to the management of Agilet Solar Energy Limited and other Solar Energy construction and installation firms.

5.1 Summary of the Study

A study of Agilet Solar Energy Limited, Uyo was necessary given its identified problems, which are lower customer services, higher, costs, storing of excessive inventories than are necessary, using of poor processes, practices and antiquated support systems and material shortages etc. The study was designed to achieve the following objective. To find out the type of inventory management systems use by Agilet Solar Energy Limited, Uyo, to evaluate the inventory management systems used by the firm, to ascertain the impact of inventory management on the firms profitability, to analyze the problems associated with inventory management in Agilet Solar Energy Limited, to determine the causes of

their high cost, material shortages and excessive inventories and finally to give necessary suggestions and recommendation for improvement.

The review of related and relevant literature in chapter two (2) of the study was carried out to established the historical framework for the study. It was conducted to fine out what experts and eminent scholars had. Said or written on the subject matter of discussion, in order to add flesh and authority view for a sound academic understanding of the research.

5.2 The Study Revealed the Following Findings

1. The research revealed that the impact of inventory management on the company's profit is very great. It was also discovered that the type of inventory management systems the company adopts is the periodic review system.

2. The study also found out that the most prominent and prevalent problem associated with the management of inventory in the company is inexperienced staff.

3. The analysis of the study indicated that providing the staff with adequate training, design of good internal control system, prompt deliveries by

suppliers are some of the possible solutions that could curb or arrest the associated problems.

4. The study revealed that enhancing, uninterrupted flow of production, control of investments, minimization of ordering and carrying costs and smooth sales operations and efficient customers services are some of the benefits the company could derived from a well managed inventory systems.

Finally, as observed from the tested hypotheses the company employs a standard inventory management system but the inventory management control and valuation system were not consistently used.

5.3 Conclusion

The following conclusions were made about the company. The most prominent problems associated with inventory management in the company is inexperience staff and inconsistency. Thus, providing the staff with adequate training, design of good internal control system, prompt deliveries by suppliers and maintaining of sufficient stock to smoothen the production and sales processes, are the possible solutions to the problems revealed by the study.

5.4 Recommendations

The following recommendations were made:

The use of computer is the most contemporary development in decision making process. With the use of computer, limitations of inventory management could be removed.

a. Manpower training programmes should be regularly organized for staff responsible for inventory procurement to enhance their performance against the backdrop of increasing challenges to modernization.

b. Sufficient inventory of installation materials should be maintained in periods of short supply and anticipated price changes.

c. A good working internal control system should be designed so as to facilitate effective and efficient management of inventories in the company.

d. The company-suppliers relationships of the firm should be made smoothen and stronger for prompt delivery services.

f. There is need for the management of Agilet solar Energy limited to be consistent in the chosen methods of inventory. On that note, the FIFO (first in , first out) method should be adopted because it conforms with the Generally Accepted Accounting Principles (GAAP) and is easy to calculate.

g. The inventory management control and valuation system should be used consistently.

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APPENDIX 11

Department of Accounting,
Faculty of Business Administration
University of Uyo.
P.M.B. 1017,
Uyo, Akwa Ibom State.
March 7,2014.

Dear Respondent,

I am a final year student in the Department of Accounting of the above named institution. As part of the requirements for the award of Bachelor of Science (B.Sc) Degree in Accounting, I am undertaking a research on "An Evaluation of the inventory management system of a solar Energy establishment" A case study of Agilet Solar Energy Limited, Uyo.

Please, kindly complete the attached questionnaire to enable me complete this study on time. Be assured that any information given shall be treated with absolute confidence and for the purpose of this research.

Thanks for your co-operation.

Yours sincerely,

Akpan, Edidiong Samuel
(Researcher)

APPENDIX 11

QUESTIONNAIRE

SECTION A: PERSONAL DATA

Please kingly response to the questions in this questionnaire by ticking (√) right against the correct option(s) of your choice from the alternatives given and/or supply the information as required.

1. Sex: Male ☐ Female ☐
2. Age: 20-30 ☐ 31-40 ☐ 41-50 ☐ 51 and above ☐
3. How long have you been a staff of this company? (a) 1-3 years ☐
   (b) 4-6 years ☐ (c) 7-9 years ☐ d) 10 years and above ☐
4. What is your highest educational qualification? (a) OND/NCE ☐
   (b) B.Sc./NND ☐ (c) MBA/M.SC/MPA ☐ (d) others, please
   specify ……
5. What is your current post in the company?
   ……

SECTION B: FOR STAFF AND MANAGEMENT

6. Is your company aware of the existence of inventory management systems?
   (a) Yes ☐ (b) No ☐ (c) Not sure ☐
7. If your option to question (6) above is “yes” which of these inventory management systems does your company adopt?

(a) ABC system ☐ (b) Optimum level system ☐

(c) Computerized system ☐ (d) Periodic review system ☐

(e) Others, please specify……

8. What is the level of operational performance of the inventory management system used by your company? (a) Very high ☐

(b) High ☐ (c) Very low ☐ (d) low ☐

9. What are the cost associated with inventory management in your company?

(a) Acquisition cost ☐ (b) Holding cost ☐

(c) Stockout cost ☐ (d) set-up cost ☐ (e) all of the above ☐

10. Does ineffectiveness of inventory management has any negative effect(s) on your company? (a) Yes ☐ (b) No ☐ (c) Not sure ☐

11. If your option to question (10) above is "yes" which of these negative effects are identifiable? (a) Decrease in profitability ☐

(b) Loss of sales ☐ (c) loss of customer's goodwill ☐

(d) Production stoppage ☐ (e) All of the above ☐

12. What are the problems faced by your company in managing its inventories?

(a) Delay of deliveries by suppliers ☐ (b) Weak internal control system ☐

(c) Inexperienced staff ☐

(d) Others, please specify ……

13. Based on your experience, which of the following would you consider as the best possible solution(s) to the problems faced by your company in managing its inventory?

(a) Providing the staff with adequate training ☐

(b) Design of good internal control system ☐

(c) Prompt deliveries by suppliers ☐

(d) All of the above ☐

14. To what extent does the costs of managing inventory affect the company's profit? (a) Very Great ☐ (b) Great ☐ (c) Little ☐

(d) No effect ☐

15. Which of these would you consider as benefit(s) to be derived from managing inventory properly by your company?

(a) Enhancing uninterrupted flow of production ☐

(b) Maintaining sufficient finished goods for smooth scales operations and efficient customer's services ☐

(c) Control of investment thus, curbing over or under investment in inventories ☐

(d) Minimization of the ordering and carrying costs ☐

(e) All of the above ☐

16. Is your company consistent in the use of the chosen inventory valuation method? (a) Yes ☐ (b) No ☐ (c) Not sure ☐

17. If your option to question (16) above is “yes”, which inventory valuation method has it been using? (a) First in, first out (FIFO) ☐

(b) Last in, first out (LIFO) ☐

(c) Weighted average ☐ (d) simple average ☐

(e) Others, please specify……

18. How effective is the internal control system of your company in ensuring that inventories are properly accounted for? Very effective ☐ moderately effective ☐ less effective ☐

19. How effective are the measures taken to curtail material shortages? Very effective ☐ moderately effective ☐

Less effective ☐

SECTION C

FOR MANAGEMENT

1. Does your company use any raw-material in it construction/ Installation processes? (a) Yes ☐ (b) No ☐

2. If your option to question (1) above is "yes" please specify some of the raw-materials used in its designing, sizing and installation processes?

   …….

   ……

3. How will you rate the profit level of your company for the last 3 years?

   (a) Very high ☐ b) High ☐ c) Very low ☐ d) Low ☐

4. To what extent is the growth of your business in the last 3 years? (a) At increase ☐ (b) At decease ☐ (c) Normal ☐

5. How many contracts have your company executed since the last two years ?

   (a) 10-30 contracts ☐ (b) 30-50 contracts ☐

   (c) 50-70 contracts ☐ (d) 70 and above ☐

6. What is the number of outstanding (yet to be completed) contracts doing the same period? (a) 5-10 ☐ (b) 10-15 ☐ (c) 15-20 ☐ d) 20 and above ☐