

A Capital Budgeting Worksheet for Solar power plant investment in ECOWAS region

Henna Himanka

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<p>Author or authors Henna Himanka</p>	<p>Group or year of entry 2010</p>
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<p>Teacher(s) or supervisor(s) Arkima Anne, Melamies Jaana</p>	
<p>This thesis concentrates on providing information about possible investments in a solar power plant in the Economic Community Of West African States region through a capital budgeting worksheet created for the case company called the Center for Renewable Energy Entrepreneurship and Innovation. Through the worksheet the case company receives valuable information of the expected income and predicted cash flows of the investment as well as crucial calculations related to the investment. Calculations are done by using the most common capital budgeting techniques. The theory and the concepts behind this project are based on managerial accounting and capital budgeting principles.</p> <p>The case company can use the worksheet and the analysis made through the worksheet when seeking a loan for the investment. The worksheet can be used by external parties as well such as bank representatives to evaluate solar power plant investments. The thesis includes an analysis of the possible investment implemented in Ghana because that is the location the case company is currently primarily interested in. The handbook helps the user to use the actual worksheet.</p> <p>According to the analysis, an investment in solar power in Ghana, is profitable and lucrative for the investors. The expected cash flows looks promising - the company has potential to run the business operations and reinvest cash flows back into the company.</p> <p>One objective in this project was to help the case company in the decision making process, which was accomplished. Another objective was to build a worksheet that would work in a long run as well, which was also achieved. With the outcome of this project the case company is able to seek a possible loan from banks because it contains an important financial plan that has been created by using the worksheet.</p> <p>Most risk factors related to doing business in the target country, Ghana, are related to poor access to finance as well as to inflation, tax rates and foreign currency policies. These risk factors also have to be considered before investing.</p>	

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All in all, the solar power plant investment shows a great potential and could bring more welfare to the region and increase the living standards of local people.

Keywords

Investment, Capital budgeting, Income statement, Cash flow statement, Worksheet, Analysis, Risks

Table of content

1	Background Information.....	1
1.1	Introduction	1
1.2	Stakeholders involved in this project	2
1.2.1	The case company	2
1.2.2	About ECOWAS.....	2
1.2.3	About EBID (ECOWAS bank of investments and development)	3
1.2.4	About Seagren United Consultants LLC.....	4
1.3	The Problem Statement.....	5
1.4	Project Objectives (PO's).....	6
1.5	Key concepts.....	7
2	Theoretical framework	10
2.1	Managerial Accounting.....	10
2.1.1	Operating expenses	10
2.1.2	Capital expenditure Budget.....	11
2.1.3	Budgeted Income Statement	11
2.1.4	The Cash Flow Statement.....	11
2.2	About Capital Budgeting.....	12
2.3	Demarcation.....	13
2.4	Solar power as a sustainable solution.....	14
3	Methods	17
3.1	Project Management	17
3.2	Project Tasks (PT's)	18
3.3	Calculation Methods	21
3.4	Analysis for the investment speculated in Ghana.....	23
3.4.1	Analysis of the projected Income.....	25
3.4.2	Analysing the expected costs.....	26
3.4.3	Analysis of the Cash Flow Statement	27
3.4.4	Analysing the ratios.....	29
3.5	Risk assessment.....	31
4	Conclusion.....	34

4.1	Key findings	34
4.2	Project Evaluation and self-assessment.....	34
5	References.....	36
6	Attachments	42
	Attachment 1. Map of Concepts related to the Capital Budgeting.....	1
	Attachment 2. GANTT' chart.....	2
	Attachment 3. The Worksheet. Country Information.	3
	Attachment 4. The Worksheet. Plant Module Information.....	4
	Attachment 5. The Worksheet. Investment related Information.	5
	Attachment 6. The Worksheet. Budgeted Income Statement.	6
	Attachment 7. The Worksheet. Cash Flow Statement.....	11
	Attachment 8. User Manual.....	15

1 Background Information

This chapter summarizes the topic of this thesis. It will introduce the stakeholders and objectives as well as the background of the project.

1.1 Introduction

The solar power industry is a big growing market that offers a lot of business opportunities and will employ more people in the near future. There is a growing need for renewable energy solutions, such as wind and solar power, and governments have recently started to support the establishment of new renewable energy plants in different countries. (Narbel, Timilsina & Kurdgelashvili 2011, 2.)

A good example of the support can be seen in the South African region, where the South African Renewables Initiative ('SARI') was launched in 2011 to support renewable energy solutions that would later on bring economic and social benefits to the area. In this project, many partnering countries were involved such as Germany, the United Kingdom and Denmark. (The South African Renewables Initiative 2011.)

Based on studies made in Africa, African people are mostly interested in greener solutions that are cost-effective. (The South African Renewables Initiative 2011.)

All in all, Africa offers a perfect location for solar energy, and interest in investing in solar power in Africa has increased tremendously during the recent years. Solar power has the potential to provide enough energy for peoples' needs, and due to the fact that it is not polluting the environment, it is a very good alternative for fossil fuels and worth investing into.

The best outcome of investing in solar power energy plants is an increased welfare for the local community - while getting return on investment. It is clear that a lot of capital is required in order for this kind of investment to be financially feasible, which

makes capital budgeting a crucial part of the planning process to succeed in reassuring the source of the capital.

The aim of this thesis is to offer the needed information of the possible investment in solar energy in the ECOWAS region, and therefore help management in their decision-making process in that area.

1.2 Stakeholders involved in this project

This chapter introduces all the parties that are involved in this project, most importantly the case company itself.

1.2.1 The case company

The whole project is prepared for a company called CREEIN (Center for Renewable Energy Entrepreneurship and Innovation) which was established in 2010 to support technicians and entrepreneurs that are interested to work in business dealing with renewable energy solutions. (About CREEIN 2014.)

In a nutshell, the company offers support in terms of training entrepreneurs in the field of marketing, designing and running operations in this specific business. CREEIN focuses mostly on providing a practical approach to renewable energy solutions, such as wind, bio energy, hydro and solar technologies. (About CREEIN, 2014.)

1.2.2 About ECOWAS

The ECOWAS, which is the Economic Community of West African States, contains 15 countries, and was established in 1975 to increase cooperation and integration between the West African countries. The aim of ECOWAS was to increase prosperity among people. (United Nations 2014.)

The ECOWAS region can be seen in the map below.



Figure 1. Map of the ECOWAS' location in the African continent.
(World Bank 2014.)

1.2.3 About EBID (ECOWAS bank of investments and development)

EBID is a financial institute, and its main objective is to increase economic development in the ECOWAS region, but also fund different projects that support growth and development in the region. The aim is to bring more prosperity to the community. Usually projects that are supported by EBID are related to transport and telecommunication, or are projects that bring about solutions that reduce poverty. Sustainable energy solutions are supported to a great degree, which is why the ECOWAS region is a good target area for solar power investments. (EBID - About Us 2014.)

The worksheet is specifically designed to help evaluate the economic feasibility of a solar power plant, and the worksheet will be used to present the key financial arguments to EBID when seeking financing with them. The worksheet also enables EBID itself to analyse solar power projects presented to them.

1.2.4 About Seagren United Consultants LLC

Seagren United Consultants ('SUC') is a consultancy firm originally established in Delaware, in the United States. Its current owners operate in Helsinki, Finland. The company focuses on providing all necessary services for attracting investments in companies that are either at their seed capital phase or 1st financing round phase. The company works on a referral basis only.

This worksheet is commissioned by SUC to further the development of its client's project, CREEIN (see above), by seeking concessionary loans from Europe with the support of the data and statements of this thesis. Seeing as EBID (see above) is a vital stakeholder in the project and an outspoken supporter of collaboration, SUC allowed the thesis work to be extended in such a way that it would allow any potential project owner to utilize it.

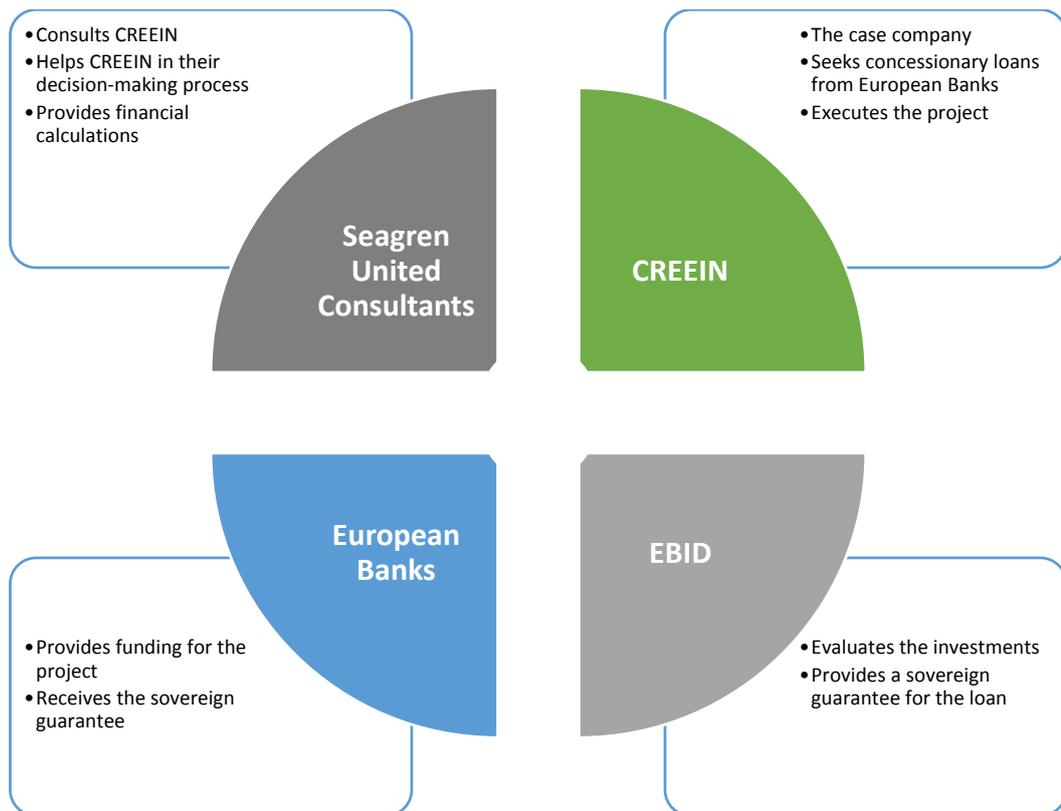


Figure 2. Stakeholder Roles.

1.3 The Problem Statement

Many different issues have to be considered when planning for a possible investment. It is essential to determine the profitability of the investment, as well as the liabilities related to the investment. Due of the fact that a solar power plant requires a significant amount of capital investment, it is essential to prepare a capital budget for the project.

Before investing the project owners have to analyse bank loan terms and find 'sweet spots' for interest rates to ensure sustainable repayment and determine a feasible payback period for the investment. The feasibility of an investment varies between countries, and therefore it is crucial to perform research on the effect the speculated location has. Different countries have different tax rates, and some might offer tax incentives for this kind of investment - and even direct grants. Also costs related to the investments differ between countries. In summary, the overall potential to gain profit through an investment varies a lot between countries.

Here are some essential questions that this thesis will focus on in order to help the case company in its decision making:

- What is the forecasted rate of return for the investment?
- Is the project profitable?
- What is the realistic payback period for the investment and with what interest rate?
- Is the suggested cash flow feasible?
- What are the risk factors related to the project?

A capital budgeting worksheet will be created to provide the needed information and help mitigate the financial risks related to the investment. The worksheet will help the company in planning for the investment and predicting its cash flow in the long run.

The worksheet can also be used when seeking loans from banks as it shows the essential figures related to the investment and the solar power plant's financials.

1.4 Project Objectives (PO's)

The project objectives in this thesis have been considered together with the case company.

The main objective of this project is to build a worksheet which offers the needed information related to debt financed solar power investments in the ECOWAS region. The worksheet itself has to be automatic and thus should work even if the conditions are to change. The worksheet must also be convenient to use – the main reason why a handbook will also be created.

The second objective is to provide the necessary financial reports for the case company via a worksheet in order for it to seek a loan from a bank. This means that a budgeted income statement, as well as a cash flow statement, are part of the worksheet. The worksheet also calculates important ratios for analysing purposes, such as debt coverage ratio and net present value, to name a few. The expected costs are also analysed in the worksheet.

The financial analysis will be made from the viewpoint of Ghana as a target location, which is currently the location the case company is mostly interested in and has prepared for. However, the worksheet can provide financial information also for other ECOWAS countries if the right data is added to the data input sheet. All analysis of investing in Ghana are supported with charts.

Due to the fact that deciding the location of the investment plays a big role in this project, one project objective is to take into account the variability of several factors that are determined by location, and provide some information of the costs and opportunities related to different countries. It is crucial to be able to analyse what the best location is for the investment - the worksheet showcases the most important variables that can be inputted by the user per country (inflation, labour costs, feed-in-tariff, and tax rate).

1.5 Key concepts

In this section of the thesis the most important concepts of this project are explained to further clarify the topic for the reader.

Cumulative Cash Flow is a sum of operational, financial and investment activities and their cash flows. If the cumulative cash flow is negative the company is not generating enough profit, thus the expenses exceed the profit. In the cumulative cash flow each period's cash flows are added to each other to get a better picture of the total cash flows. (Small Business 2014.)

Debt-service coverage ratio (DSCR) measures a business's ability to pay a certain required amount of debt payment along with interest. The Debt-service coverage ratio is very important in analysing the business's capability to handle its liabilities. (Investopedia 2014.)

Depreciation method must be taken into account when investing in a solar power plant, as the value of an asset will decrease in usage over the time. The depreciation method can be chosen by the company for tax reasons. (Accounting Tools 2014.)

Discount rate affects the time-value of money and is used when generating discounted cash flows to assess the investment's value in the future. It is useful also because it takes into account the future risks related to the cash flows. (Investopedia 2014.)

Discounted Cash Flow (DCF) takes into account all the predicted future free cash flows and discounts them taking into consideration the time-value of money. Therefore it is more realistic than other methods. Especially in inflationary periods the time-value of money becomes crucial. (Shim & Siegel 2008, 290.)

Discounted Return on Investment is calculated from the discounted cash flow, giving a more careful estimate, and is affected by the chosen discount rate to show the relative return in relation to an alternative investment. (Building a business case 2014.)

Free Cash Flow is a very important indicator of fiscal performance of any company. Free Cash Flow indicates the company's cash generation after all necessary capital expenditures and business operation expenses have been deducted. A company must be able to generate profit for its shareholders but also at the same time be able to manage its assets. Most investors are interested in free cash flow for analysing purposes. (Investopedia 2014.)

Internal rate of return (IRR) is one capital budgeting technique used to measure the profitability of an investment. IRR shows the discount rate that turns the net present value of all cash flows to zero. (Investing Answers 2014.)

Net present value (NPV) is one of the capital budgeting techniques that can be used when evaluating the profitability of future investments. Net present value is used to find out the present value of a certain investment. It indicates the present value of future cash flows. (Accounting Coach 2014.)

Real Interest Rate tells the borrower and the lender the real costs and yields of an investment when inflation is taken into account. Real interest rate can be negative which means that the inflation rate exceeds the nominal interest rate. Real interest rate is used to provide a more valid measurement of the benefits of acquiring loans from abroad. (Financial dictionary 2014.)

Return on Investment (ROI) is considered as one of the most important measurement ratios on investments. It will show whether or not it is wise to invest as it shows the actual return on investment. (Building a business case 2014.)

In the **Straight-line depreciation method** the asset value decreases evenly over its useful life. (Accounting Simplified 2014.)

Solar Power is a sustainable and renewable energy resource which harnesses the sun's radiation through thermal or photovoltaic energy generation means.

Sustainability in business means that the company is making an effort to run its business while taking care of the environment. Sustainability is seen as a long-term plan and it should be included in all business operations, not just a few, therefore it requires systematic thinking. (Landrum & Edwards 2009, 4.)

Taxes differ from country to country. That is why it is important to consider them before investing. Some countries might even provide tax incentives if the business belongs to an industry that is supported by the government. In the target country, Ghana, corporate income taxes are negotiable - and although the negotiated tax rate for the case company is currently 20%, for the purposes of this worksheet and analysis 25% (the standard) was used.

Many projects may look good to invest in before the taxes have been conducted but might end up seeming like poor investments after the tax deduction. (Shim & Siegel 2008, 290.)

2 Theoretical framework

This chapter explains which theories and concepts are used in this thesis and which are demarcated from the content.

2.1 Managerial Accounting

The main purpose of this thesis is to provide information for the case company's managers for decision making purposes through capital budgeting, which means that this thesis is based on managerial accounting principles and not financial accounting principles. Simply put, Managerial Accounting helps managers' control and plan business operations, and in this project the focus is on planning corporate finances for the future investment. (Walther 2010, 7.)

Long term planning should contain evaluation of possible opportunities, competition, expansion and resources. Resources such as manpower and equipment should be considered. It is also important to evaluate the company's financial strength and flexibility. (Shim & Siegel 2008, 22.)

Long term planning must include cash requirements for each year and managers need to be aware of the risks involved with debt. Therefore risk assessment is an important part of the planning process. (Roehl-Anderson & Bragg 2004, 83.)

2.1.1 Operating expenses

Operating expenses refer to any expense related to the running of business operations, such as salaries paid, depreciation and taxes. Also, spare parts and maintenance costs form a part of the operating expenses. (Business Dictionary 2014.)

In this project, all operating expenses are taken into account in the worksheet's data input sheets as well as in the budgeted income statement. It is important to allocate all the operating expenses to be able to estimate the profitability of an investment. The

business itself needs to be able to cover all the operating expenses so that it can maintain its business.

2.1.2 Capital expenditure Budget

A capital expenditure budget is used for long term projects and investments, such as the project evaluated in this thesis. A capital expenditure budget concentrates on the capital required for the investment when acquiring a plant and machinery. A capital expenditure budget takes into account how these assets are financed. It also takes into account the timing of the expenditures. A typical capital expenditure budget contains 3 to 10 years of data, however in this project the budget is prepared for 25 years. (Shim & Siegel 2008, 8.)

2.1.3 Budgeted Income Statement

A budgeted income statement shows the expected profit and expenses of a period. Budgeted income statements can be prepared annually, monthly or quarterly. A Budgeted Income Statement will tell whether or not the business is profitable and worth investing in. (Accounting Tools 2014.)

The case company requires information on the forecasted income of the investment, so a budgeted income statement is added to this thesis. The budgeted Income statement will show how much profit the investment will possibly generate. A budgeted Income statement is also required by the lenders when seeking a loan for the investment. The budgeted income statement is prepared for the whole period of 25 years.

2.1.4 The Cash Flow Statement

The Cash flow statement is a very important statement as it demonstrates a company's financial strength. One can say that the most important thing for companies is their liquidity - as companies cannot function without cash. (Business case studies 2014.)

Because cash flow is such an important criteria in the decision making process in capital budgeting, a budgeted cash flow statement is included in this thesis.

The Cash Flow Statement in this project shows the expected cash inflows and outflows of the investment. The cash flow statement is divided into three different categories to track different cash flows more clearly. The three categories are:

1. Operating activities; and
2. Financing activities; and
3. Investment activities.

(1) Operating activities take into consideration cash outflows and inflows linked to internal business operations, i.e. selling goods or services, or issues related to manufacturing processes. (Investing Answers 2014.)

(2) Financing activities in cash flow statements have more to do with external factors, such as issuing bonds or paying dividends. Financial activities usually have to do with the source of funding in the business, such as paying back a bank loan – an issue between the lender and the business owner. (Accounting for management 2014.)

(3) Investment activities deal with items such as asset purchases and disposals. These may include items such as patents, land acquisition, plant acquisition or securities. (Accounting for management 2014.)

Each of the abovementioned has an impact on the overall cash flow statement.

2.2 About Capital Budgeting

When a company is contemplating long term investments with a substantial amount of capital, it is called capital budgeting. Usually capital budgeting is related to funding new buildings, new plants or new machinery. Capital budgeting is a practice that helps a company make the right decisions in terms of their investments. It also helps companies to evaluate the profitability of an investment and prevent losses. (Avercamp 2014.)

Capital Budgeting has several techniques that are helpful when evaluating future investments. Some of these are used in this thesis such as net present value, internal rate of return, payback period and debt-service coverage ratio. The discounted cash flow has also been analysed. These different techniques are explained in the 'concept chapter.

Capital Budgeting can be divided into the following steps:

1. The company decides its long term objectives
2. The company seeks suitable projects for long term investments
3. The company plans and evaluates the possible investment through budgeting
4. The company implements the project
5. Once the project has been implemented, the company controls the investment.

(Financial Web 2014.)

In this thesis the focus is on the evaluating and planning process (3) which will determine whether or not the project will later be implemented.

Capital budgeting techniques are included in this project to help evaluate the possible investment properly.

2.3 Demarcation

Because of the fact that financial accounting concentrates on providing information for external users based on a company's historical financial data, financial accounting is not a part of this thesis. In this thesis the focus is not evaluating the case company's past performance but to plan and measure a possible investment.

A budgeted balance sheet, which would show a snapshot of the company's financial position at a predetermined time, is demarcated from the topic.

Due to the fact that the project does not require information related to the production, a production budget as well as a sales budget are not a part of this thesis. The budgeted

income statement will show expected revenues for the investment and therefore a separate sales budget is not needed.

In terms of capital budgeting techniques, a profitability index is not used in this project, as it is used for comparing profits for certain periods.

The theoretical framework shows the content of the thesis as well as the areas that are not part of it.

The theoretical framework is depicted in the figure below.

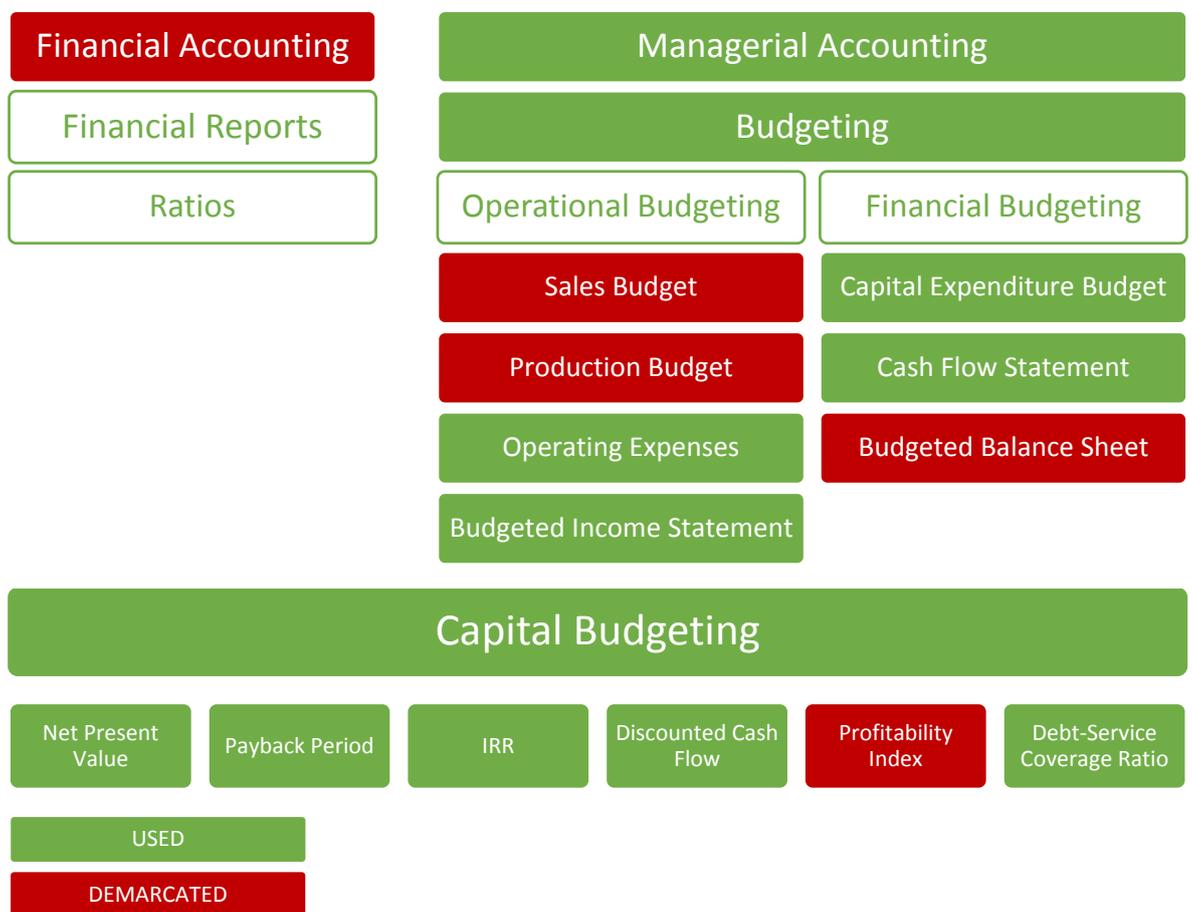


Figure 3. Theoretical Framework.

2.4 Solar power as a sustainable solution

Solar panels collect sunlight and convert it into electricity. Solar power is a green energy resource which means that it has no harmful impact on the environment, and the potential to generate energy is unlimited. Solar power is sustainable, renewable and it

does not release carbon dioxide or any other toxics into the air, which means that solar power does not contribute to global warming. Other benefits of using solar power include the fact that solar power supports local employment and creates wealth in the region. Solar power does not have any major ongoing costs - once it has been installed almost no recurring costs exist. (Sharma 2014.)

In the table below, one can see the differences between solar power and fossil fuels. Based on the comparison it is obvious that solar power offers a great alternative as an energy source compared to fossil fuels.

Table 1. Solar Power and Fossil Fuels differences.

	Solar Power	Fossil Fuels
Accessibility	Can be used anywhere	Limited Accessibility
Costs	Cost efficient	High costs
Environment	No harmful impacts on the environment	Harms the environment
	Renewable	Non- renewable
Business opportunities	Market growing	Limited opportunities in business
Incentives when investing	Offered by governments	No Incentives
Health aspect	Safe for people	Causes health problems

(McLamb. E, 2011.)

In today's business, the word 'sustainability' has grown big. Businesses understand, that in order to run a successful business the issues revolving around sustainability have to be taken into account. For some companies, it is a strategy to gain good reputation, however sustainability is also increasingly seen as a necessity - an issue that has to be considered to preserve the environment and not destroy it. In fact, pollution was considered as one of the greatest dangers in the world by 44 different nations together with inequality, nuclear weapons, AIDS and other diseases, as well as religious hatred. (Business Insider 2014.)

In 2014, China, Japan and the United States are countries that have invested in solar power the most. (Business Insider 2014.)

Currently, there is an acute energy crisis in Africa - many hospitals and schools are lacking access to electricity, not to mention households. (The Guardian 2014.) Solar power could offer a remedy for this dilemma.

In the African continent the solar energy potential is enormous. In Ghana, which is the country the case company is mostly interested in investing in, the solar energy potential is huge. The daily solar radiation varies from 4 to 6 kWh/m². The highest radiation is in northern Ghana, but radiation is significant also in the south. (OpenEi 2014.)

The solar potential in Ghana is seen in the figure below.

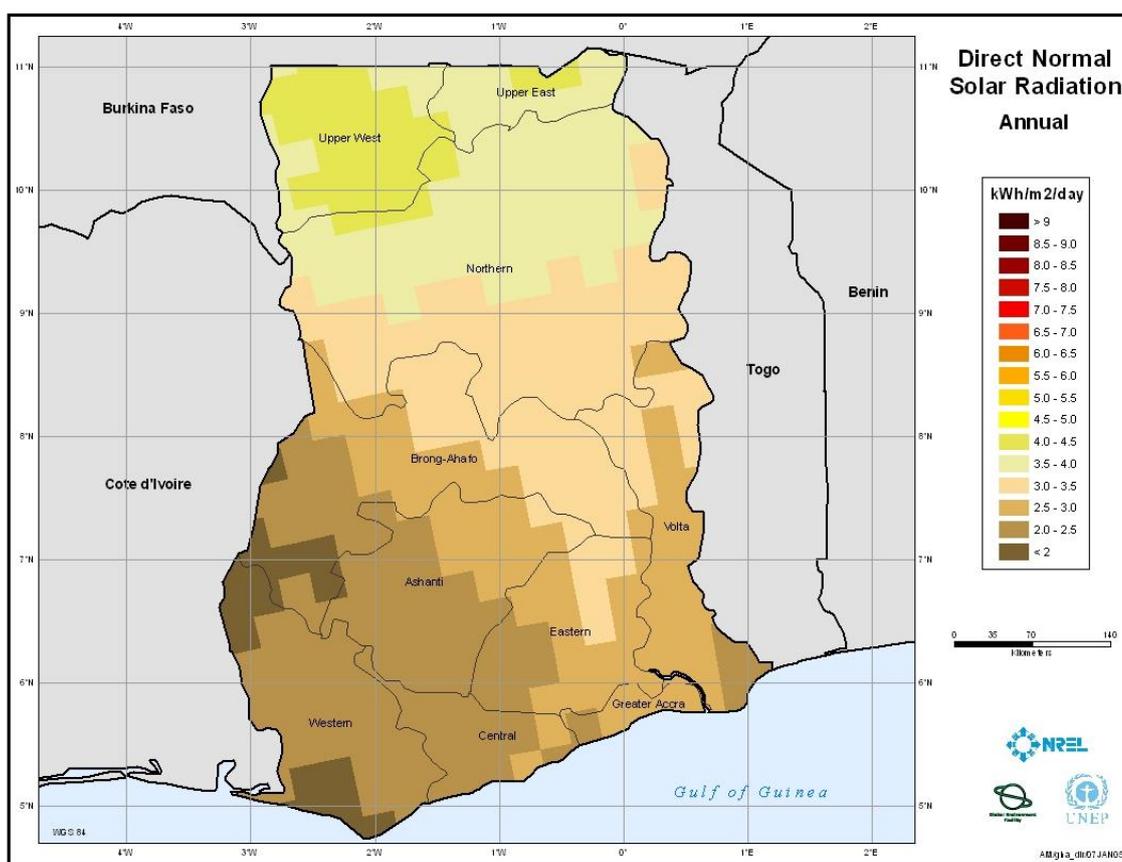


Figure 4. Solar potential in Ghana.
(OpenEi 2014.)

3 Methods

This chapter deals with project management and the methods that are used in this thesis.

3.1 Project Management

What is a project? A project can be defined as “a dream with a deadline” or a “scheduled solution to an existing problem” (Kemp 2006, 3). As this thesis is a project-based thesis, project management plays a big role in the whole process. Project management consists of four essential phases that form the base of any successful project. The chart below shows the main phases of the project.



Chart 1. Project Management phases.

The project starts with project planning. The (1) **Planning** phase is a very important phase of any project. Planning includes brainstorming and negotiations with the project’s stakeholders. The project objectives are set and the needs of the stakeholders are mapped. After proper planning, the expectations of a project are clear, as well as the responsibilities of each party.

The next phase is **project implementation** (2). The project needs to be controlled and monitored. Also the communication between the project executor and the stakeholders must be continuous so that the project outcome will be as successful as it possibly can.

After the project has been successfully implemented it is time to conclude the whole project (3). **Concluding the project** also means that the outcome of the project is delivered to the right party.

The final phase is **project evaluation** (4) in which the project results are evaluated and recommendations are made. Self-assessment is also vital part of this phase. Was the project successfully implemented? What went wrong? How can one improve oneself? Are the results valid? These are the essential questions one must seek an answer to.

3.2 Project Tasks (PT's)

The project-related tasks are explained here. Overall it is crucial to follow the timeline in projects and keep communicating with the stakeholders.

PT 1: **Negotiation** with the case company was where the whole project started. It was crucial to find out the objectives for the project. These objectives were also set during the negotiations. The scope of the thesis was planned together with the case company - this was done based on the case company's needs. The negotiations were conducted in meetings, via e-mail and via phone calls.

The case company's responsibility was to deliver data related to the solar power plant investment and also offer support throughout the project.

The author's responsibilities dealt with the project execution, following the timeline and delivering what was expected.

PT 2: **Theory research** had to be done early on, as the theory would support the whole project. Theories were searched from different sources – from books and from internet sources. The main purpose was to get the big picture of the theories and concepts dealing with the project. Based on the research a theoretical framework was created.

PT 3: Task 3 was to establish the **Background Information**. The data was given by the case company itself but also other sources were used. The task was to learn more about the stakeholders as well as learn more about solar power.

PT 4: In order to evaluate the investment for the case company a **capital budgeting worksheet** needed to be created. This was done using Microsoft Excel. This task was very important as it revealed different issues that needed to be considered in order to successfully complete the project. Theory was used to support the worksheet creation. It became obvious that the worksheet must contain different sheets for different information and it also had to function automatically to adapt to changes.

PT 5: **Showing the Worksheet template to the case company**. After the Worksheet template was created the task was to show it to the case company to get crucial feedback and improvement suggestions for development. This was done via e-mail. This task confirmed that the worksheet would work as it should and would meet the case company's requirements.

PT 6: The task was to **finalise the capital budgeting worksheet**. The main concern was to prepare a worksheet that was fully automated and this task required a lot of effort. Based on the feedback from the case company crucial ratios needed to be added to the worksheet to measure the profitability of the investment. These were techniques dealing with the free cash flow, discounted cash flow and techniques measuring the company's capabilities to handle its liabilities.

PT 7: Data related to the target investment country, Ghana, **was inputted to the Worksheet input sheets**. Several sources were used, such as the Bank of Ghana and the World Bank's reports, to find out the necessary information about Ghana. Inflation rates and tax rates were added to the sheet. The case company itself also provided information related to the target investment country.

PT 8: **An analysis of the Investment** had to be reported based on the Worksheet data output sheets. It was crucial to see how the Worksheet really worked in practice.

The data output sheets showed the expected Income of the Investment as well as the predicted cash flows of the investment. At this point charts were created to support the analysis.

The risks related to the investment needed to be analysed as well.

PT 9: To help the users use the actual worksheet, the task was to **create a user-guide for the case company**. This was done by using software called Adobe Illustrator. Before the software could be used, the important functions of the software had to be learned. The first task was to plan the layout of the user-guide and then use the software for implementation.

PT 10: **A conclusion of the project was prepared**. The success of the project needed to be evaluated and a self-assessment had to be prepared. This task concluded the project. The Capital budgeting Worksheet was then sent to the case company along with the user-guide.

PT 11: **The final task was to train the case company** to use the capital budgeting worksheet and discuss about the findings of the project. Based on the project outcome the case company was able to make decisions according to the project implementation in the near future. The training was done through a conference call because there was no opportunity to arrange a meeting face to face.

The project tasks and the outcomes of each task are seen in the matrix below.

Table 2. Overlay Matrix.

	Project task	Subject	Sub tasks	Sources/ Tools	Outcome
Task 1	Negotiations	Solar power plant investment as a whole	Project Objectives and tasks determined.	meeting, e-mail, phone	Scope of the thesis agreed - Project kickoff.
Task 2	Theory research	Capital budgeting, managerial accounting	Finding the theories and the key concepts to support the project.	Budgeting Basics and Beyond , Shim, J. K & Siegel, J, Controller's function , Roehl-Anderson, J. M & Bragg, S. M. And Internet sources.	Theoretical framework prepared. Key concepts defined.
Task 3	Background Information	Stakeholder information. Small study about solar power.	Deciding how much information is needed.	Data collected from the case company and using sources: World Bank about ECOWAS, about EBID	Background information collected and reported.
Task 4	Creating a Worksheet template	Solar power plant costs, variables, Capital budgeting techniques, Income Statement, Cash Flow Statement.	Accounting point of view in the worksheet.	Microsoft Excel. Using theory to support the worksheet.	A capital budgeting worksheet template completed.
Task 5	Showing the worksheet template to the case company	Seeking approval from the case company.	Questions related to the project.	E- mail with the case company.	The worksheet accepted. Improvement suggestions received from the case company.
Task 6	Finalising the Worksheet	Capital budgeting techniques, ratios included. Creating charts.	Making the worksheet fully automated.	Microsoft Excel. Theory framework supporting the work.	The Worksheet fully prepared.
Task 7	Data input	Adding data to the data input sheets.	Ghana related information added for analysing purposes.	Data received from the stakeholders, internet sources: World Bank, Bank of Ghana.	Investment related information for Ghana collected and inputted to the worksheet.
Task 8	Analysis	Solar power Investment in Ghana. Risk assessment.	Evaluating the investment for the case company.	Using the worksheet and the charts for analysis. World Economic Forum for the risk assessment.	Analysis prepared and reported.
Task 9	Creating an user-guide	About the worksheet usage.	Designing and writing instructions.	Adobe Illustrator.	The user-guide ready.
Task 10	Conclusion	Concluding the project.	Self assessment and project evaluation.	The Project and the outcome.	Project concluded.
Task 11	Training	The Worksheet and analysis.	Showing the results for the case company.	Through a meeting. Microsoft Excel, The user-guide.	The case company trained to use the tool. The findings discussed with the case company.

3.3 Calculation Methods

This chapter shows the different calculation methods that were used in this thesis and demonstrates how they are calculated.

Profit Margin (%)

$$\frac{\text{Net Income}}{\text{Total Revenue}} \times 100$$

(Investing Answers 2014.)

EBITDA margin (%)

$$\frac{\text{EBIT}}{\text{Total Revenue}} \times 100$$

(Business News daily 2014.)

Net Present Value (NPV)

$$\sum_{t=1}^t \frac{C_t}{(1+r)^t} - C_0$$

Where:

C_t = net cash inflow during the period

C_0 = initial investment

r = discount rate

t = number of time periods.

(Accounting Coach 2014.)

Free Cash Flow

Operating Cash Flow – Capital Expenditures

(Investopedia 2014.)

Discounted Cash Flow

$$DCF = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \dots + \frac{CF_n}{(1+r)^n}$$

Where:

CF = cash flow for the period

r = discount rate

(Investopedia 2014.)

Return on Investment (ROI)

$$\frac{\text{Cumulative Cash Flow} - \text{Initial Investment}}{\text{Initial Investment}} \times 100$$

(Entrepreneur 2014.)

Internal Rate of Return (IRR)

$$\left[\sum_{t=1}^t \frac{C_t}{(1 + IRR)^t} - C_0 \right] = 0$$

The rate at which NPV is zero, where:

C_t = net cash inflow during the period

C_0 = initial investment

IRR = internal rate of return

t = number of time periods

(Investing Answers 2014.)

Debt-service coverage ratio (DSCR)

$$\frac{\text{Net Operating Income}}{\text{Total Debt Service}}$$

(Investopedia 2014.)

Cash flow from operations

$$EBIT + Depreciation - Tax Payments$$

(Investopedia 2014.)

Real Interest Rate (%)

$$\text{Nominal Interest rate} - \text{Inflation rate}$$

(Financial dictionary 2014.)

3.4 Analysis for the investment speculated in Ghana

This chapter evaluates the possible solar plant investment made in Ghana. The evaluation is based on the capital budgeting worksheet created in this project. The risk factors have been evaluated in this chapter as well.

To be able to analyse the investment, the data with regards to Ghana was received from the case company. These figures change over time and some of them are based on assumptions.

Even though some data is based on assumptions, the analysis gives the best possible evaluation of the project and is valid as the volatility between different solar power modules is great depending on their quality.

A summary of the data:

Finances

Loan amount: **2 800 000 euros**

Inflation rate **16.5 %**

Cost of capital, (Interest rate) **4 %**

Discount rate **6 %**

Repayment percentage of EBIT **30 %**

Tax rate **25 %**

Operating Expenses

Average maintenance costs per module (spare parts) **565 euros/year**

Insurance costs per module **500 euros/year**

Module Acquisition cost **70 000 euros/module**

Labour costs per Module **12 628 euros/year**

Installation cost **400 000 euros**

Inverter cost **500 000 euros**

Land purchase price **500 000 euros**

Factors Related to Revenue Generation

Total power generation per operating hour **2000 kWh**

Feed-in-tariff **0.14 euros/kWh**

Loss on module **0.5 %/year**

Power plant lifecycle **25 years**

Irradiation **7300 000 kWh/year**

3.4.1 Analysis of the projected Income

The budgeted income statement shows that the expected net income will increase for 11 years from the investment due to decreasing interest payments, but after that starts to decrease due to the fact that the modules will lose some of their effectiveness in usage (loss on module). The chart below shows the expected income line.

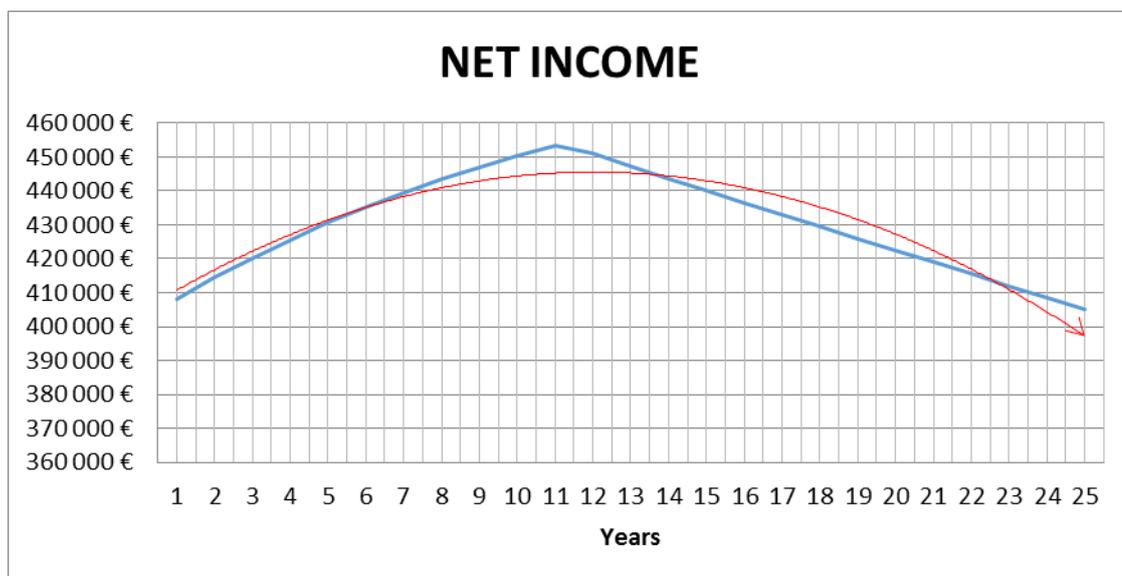


Chart 2. Expected Net Income.

Even though the income starts to decrease the budgeted income statement shows that the investment is still profitable. The profit margin is 44 % even in the weakest year of net income (the final year of the investment) and the debt-service coverage ratio remains approximately 2 throughout the investment. The EBITDA margin is 73 % which means that the core business operations are very profitable.

The following chart visualizes the completion of debt repayment, straight line depreciation and the slow decline of net income.

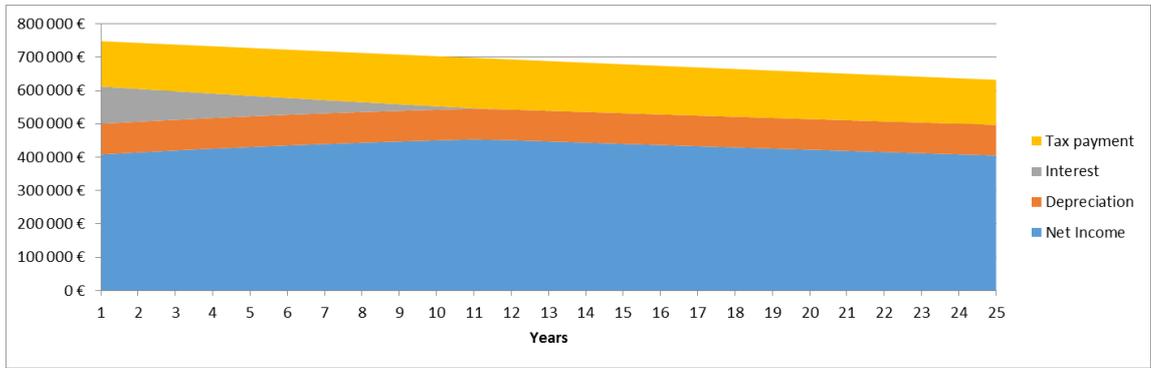


Chart 3. The relationship between different items on the income statement.

3.4.2 Analysing the expected costs

Based on the analysis, the largest costs in this investment are labour costs (totalling 92 % of the total fixed costs). Insurance costs and maintenance costs (spare parts) are both approximately 4 % of the total fixed costs. In the future the users can also input data related to asset management costs and other fixed costs - at this point they are not considered.

The cost structure for the investment is shown below:

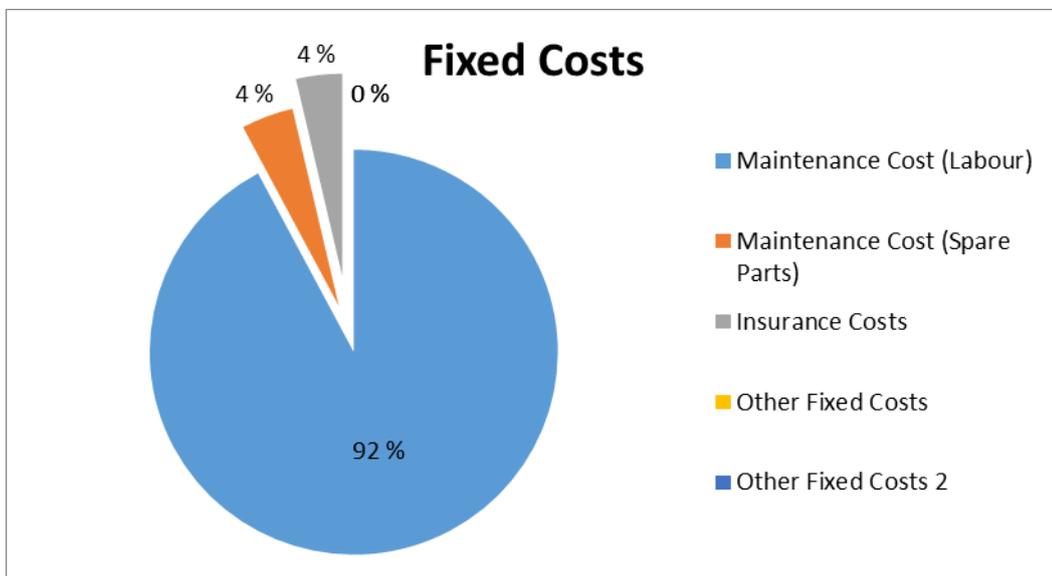


Chart 4. Expected fixed costs for the investment.

3.4.3 Analysis of the Cash Flow Statement

The cash flow from operations stay positive throughout the investment. The fact that the income is expected to decrease over the years is also shown in the Income Statement.

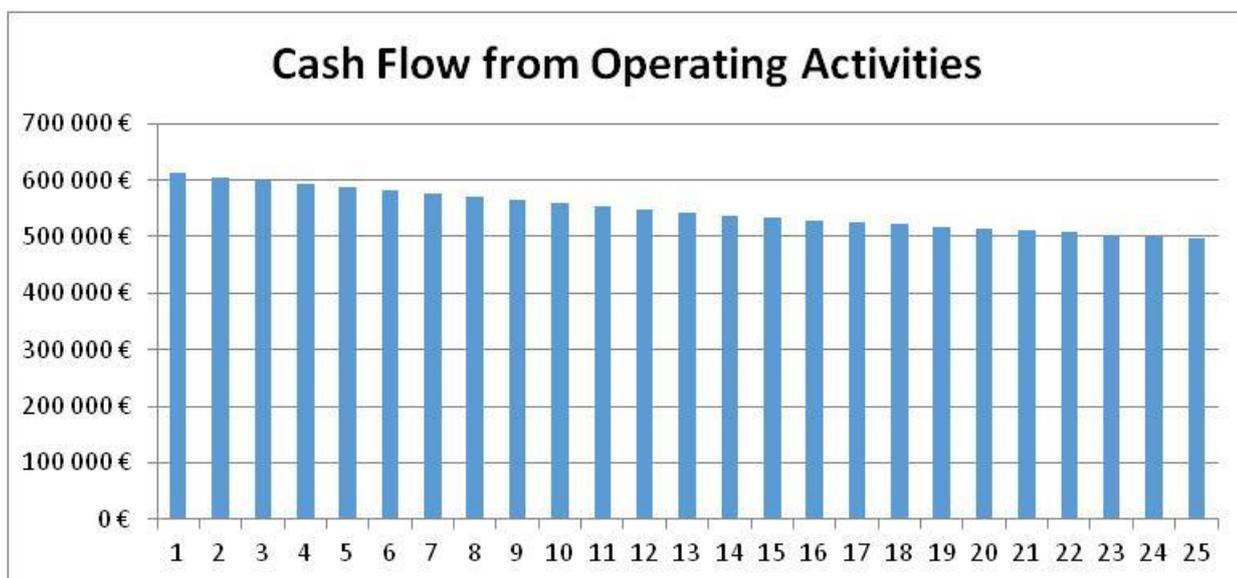


Chart 5. Expected Cash Flow from operations.

The Net Cash Flow from investing activities demonstrate the net gain or loss from investing activities. The cash outflow from investing activities shows the initial investment totalled 2 800 000 euros. Other activities at this point do not exist.

Cash outflows from financing activities consist of debt repayments and paid interests, dividends and grants are omitted as neither are considered for the case company.

The Net Cash Flow shows each year's totalled cash flows. The figure below shows the net cash disbursement for the whole investment period. The figure shows that the net cash flow is positive for the whole investment period. The highest peak in net cash flow around 12th year of the investment is explained by the fact that no loan repayment or interests exist anymore, as the loan has been paid back. All in all the cash flow statement demonstrates strong profitability as well as strong financial health.

The figure below shows the expected net cash flow for the investment period.

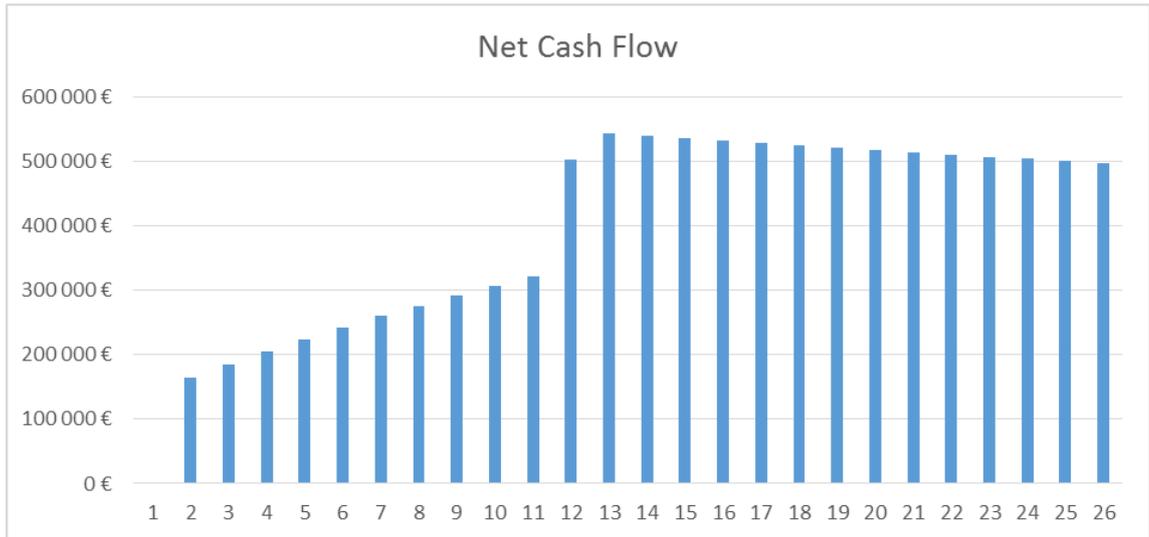


Chart 6. Net Cash Flow disbursement.

As mentioned before, in this thesis the free cash flow indicates the company's cash flow balance after the business operations and possible capital expenditures. Because of the fact that the case company is not expected to conduct any other capital expenditures besides the initial investment itself, the free cash flow shows good expected performance. The free cash flows indicates that the company is able to run its business operations and can consider reinvesting capital to the business if needed. If a company has opportunities to reinvest, it has opportunities to grow.

The expected free cash flow is seen in the chart below.

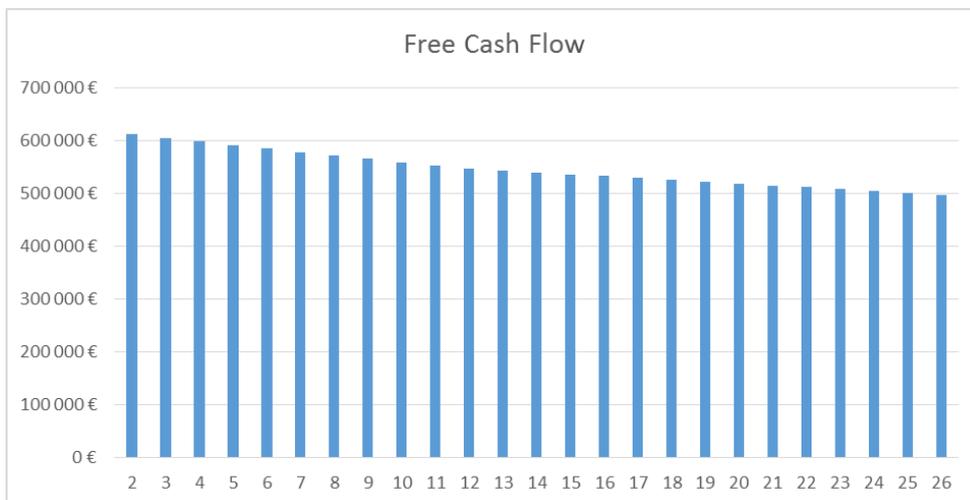


Chart 7. Free Cash Flow.

The chart below shows the net cash flow versus discounted cash flow. The discounted cash flow is still positive at the end of the expected investment period which indicates that the solar power plant investment is risk free and lucrative, even though the discounted cash flow is only ~25% of the actual cash flow.

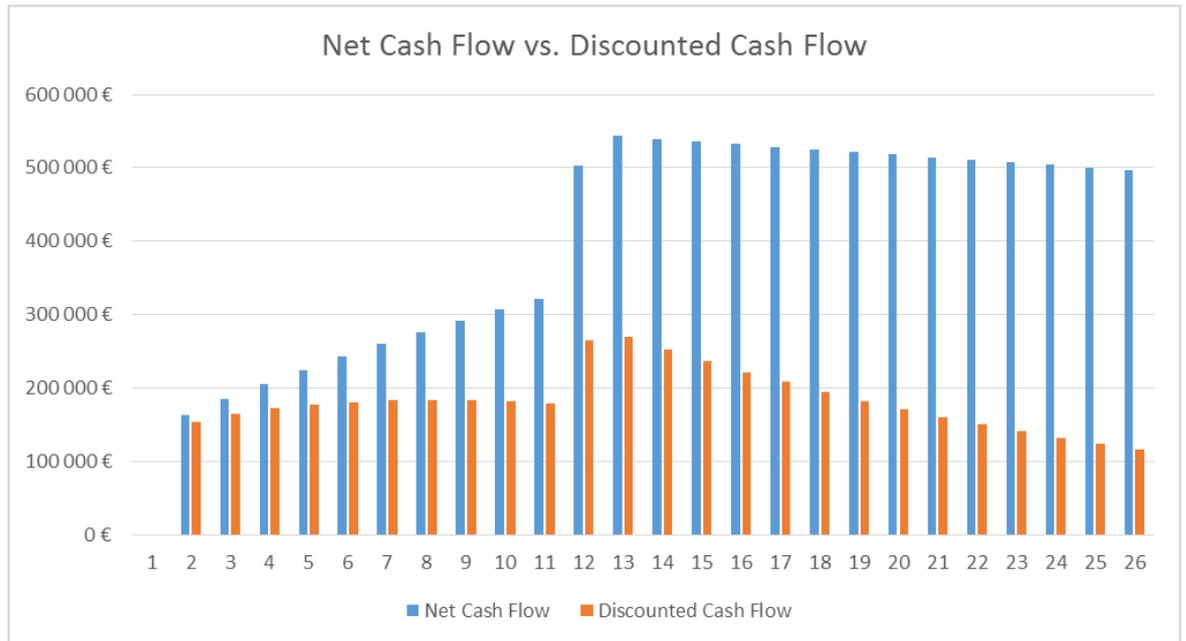


Chart 8. Net Cash Flow compared with Discounted Cash Flow.

3.4.4 Analysing the ratios

The EBITDA margin for the investment is 73 %, which is a good result, as it indicates the profitability of company's core operations.

The Net present value for the possible investment is 4 107 420 euros. Due to the fact that the NPV is positive, it can unquestionably be said that the company is generating value for the shareholders. (Investing Answers 2014.)

The internal rate of return for this investment is approximately 21 %. The result indicates that the internal rate of return is good for the investment. The higher the rate is, the better the investment should be. This result would mean that the investor would get approximately 20 % profit in a year when investing in this project.

The project's ROI is 266 % already in the first year which tells that the project is, at a very early stage, able to generate enough profit and is therefore highly lucrative for the investors. The **Discounted ROI** however is 64%, which is a more conservative estimate of the overall ROI when the time-value of money is taken into account.

The debt-service coverage ratio (DSCR) for the project is very high (1.95). This means that the company is able to handle its liabilities more than well related to the bank loan and repayments. Investors are usually seeking companies whose debt-service coverage ratios are over 1.

The data input and output in the capital budgeting worksheet are seen in the tables below.

Table 3. Data Input.

INPUT		
Item	Value	Notes
COUNTRY DETAILS		
Corporate Income Tax	25.00 %	Ghana Corporate Tax Rate
Feed-in-tariff	0.14 €	Ghana Feed-In-Tariff
Avg. Labour Costs per hr	7.00 €	Estimated average
PLANT DETAILS		
Power Generation per hour	2 000	kW
Operating hours per year	3 650	Estimated hours
Total power output	7 300 000	kWh
Cost of Solar Power Plant	2 800 000 €	According to bid
COST OF CAPITAL		
Loan Amount	2 800 000 €	
Interest Rate	4.00 %	Sought Interest Rate
Repayment Rate of EBIT	30.00 %	
Discount Rate	6.00 %	

Table 4. Data Output.

OUTPUT		
Item	Result	Notes
REVENUE BREAKDOWN		
Sales Revenue	1 022 000 €	First Year
EBIT	656 140 €	First Year
EBT	544 140 €	First Year
Net Profit	408 105 €	First Year
Repayment	254 545 €	Average
KEY RATIOS		
Sales Margin	40.00 %	First Year
EBITDA Margin	73.00 %	First Year
ROI	266.00 %	Discounted ROI 64%
Debt-Service Coverage Ratio	1.95	First Year
IRR	21.00 %	
NPV	4 107 420 €	
Payback Period	11 years	

(The Capital Budgeting Worksheet.)

3.5 Risk assessment

Sub-Saharan countries have had a positive economic growth (5 % in 2013) and the growth is expected to continue in the future. This includes Ghana, which is one of the most developed and economically stable countries in the area. Most risks related to doing business in Ghana currently are access to finance, tax rates, inflation and regulations related to foreign currencies - these all have an impact on investments and should be considered before investing. The fiscal deficit is going to grow in Ghana - the government deficit was 10.8 % of Ghana's GDP in 2013. This may affect tax rates and cause higher interest rates. The inflation rate in Ghana has been 11 % which is relatively high. (World Economic Forum 2014, 40.)

Since 2013, the inflation rate has increased to be as high as 16.5 %. (Bank of Ghana 2014.)

All in all Ghana's competitiveness Index was 111 and it has improved since 2013 when the Index was 114. However environmental sustainability has not improved in rankings. (Imani Centre for policy and education, 2014.)

Ghana's competitive advantages lie in these areas:

- Intellectual property protection
- Strength of investor protection
- Efficiency in government spending of public revenue
- Judiciary independence (no governmental influence)
- Private sector better than public sector in performance
- Stable macroeconomic environment
- Markets show growth potential

Weaknesses are seen in the following areas:

- Weak currency
- High inflation
- Detrimental policies in foreign currency controls
- Fiscal deficit; Government debt over 60 %
- Access to financing
- New technologies are not used effectively to increase productivity
- Labour market inefficient.

(Imani Centre for policy and education 2014.) (World Economic Forum 2014, 192.)

Safety issues have to be considered when investing in solar power plants in Ghana, even though the political and social environments are stable - the worksheet takes this into account by providing an input method for power plant security costs.

Issues that can cause problems when investing in Ghana and therefore must be considered are seen in chart below:

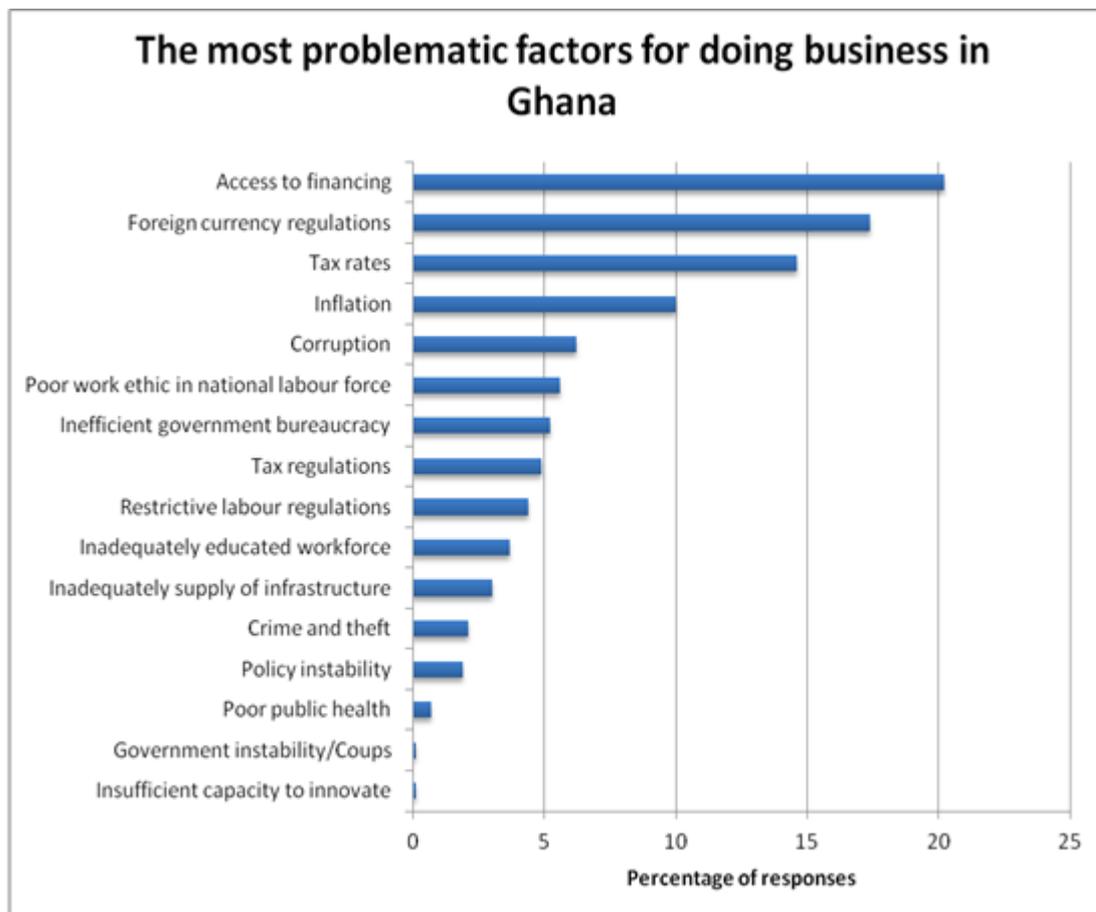


Chart 9. The most problematic factors for doing business in Ghana.
 (World Economic Forum 2014, 192.)

4 Conclusion

This chapter will conclude the whole thesis. What have been the key findings of this project, how would the author describe the project and what has it taught to the author?

4.1 Key findings

The ECOWAS region offers a highly potential location for solar power plants because the solar irradiation in the region is tremendous. Especially in Ghana, where the markets show growth potential and where the political and social environments are stable.

Based on the analysis made in this thesis, the particular investment seems very profitable. The expected cash flows of the investment look promising and the case company can handle its liabilities easily, becoming debt-free within 11 years - maybe even earlier. The project can be considered very good for investors as the internal rate of return is as high as 21 %. The EBITDA margin also being 73 % indicates that the core business operations are profitable and the expected costs of the investment are not too high. The profit margins also look promising during the whole lifespan of the power plant.

When investing in solar power in Ghana, it is important to take into consideration risk factors that can have an impact on the business. In Ghana the greatest issues deal with foreign currency regulations, tax rates, inflation and poor access to financing. Also other issues have to be considered such as safety issues.

All in all, the investment seems very promising and it could improve the lives of thousands of people, generate revenue for the case company and benefit the investors.

4.2 Project Evaluation and self-assessment

I find this project successful as every objective that was set in the beginning of the project was met. This topic has been really fascinating for me as it deals with sustainability

and the solar power industry that is ever growing, and one could say still waiting to be discovered by the investors and entrepreneurs.

Evaluating the possible investment taught me a lot about capital budgeting and the importance of having to distinguish and choose the correct assumptions to work with from the beginning – any missed assumption added later on in the project could have had major impacts on the worksheet and generate an exponential workload that certainly would have delayed the project.

This project has been very multi-faceted as I have been able to use different skills when conducting the project. I have used knowledge and practical skills from accounting but have also prepared analyses as well as used my creativity when designing the user-guide.

The projects and assignments that were previously done in school helped me understand the overall picture and what the expectations of my input for this project would be.

The project taught me project management skills and helped me understand that one has to consider and apply very practical approaches to investment projects, such as this, in order to get a realistic result.

Simply put, I have been very privileged to work in this fascinating project with wonderful people. My hopes for the future are that the Capital Budgeting Worksheet is used by many different parties when seeking help for evaluating solar power plant investments, and that the interest towards solar power investment will increase in the future.

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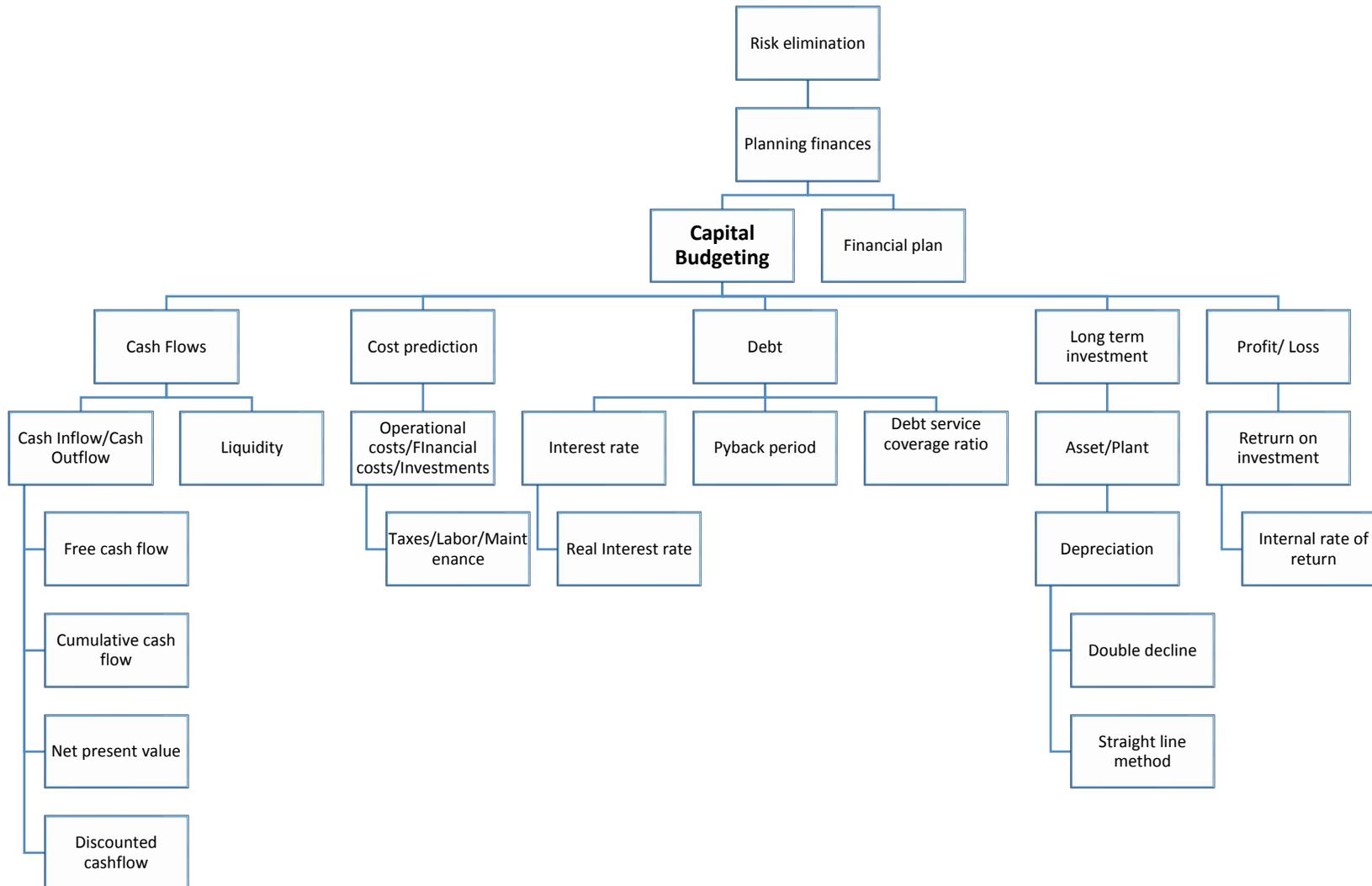
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6 Attachments

Attachment 1. Map of Concepts related to the Capital Budgeting.



Attachment 2. GANTT chart.

Gantt chart						30.06.-06.07.	07.07.-13.07.	14.07.-20.07.	21.07.-27.07.	28.07.-03.08.	04.08.-10.08.	11.08.-17.08.	18.08.-24.08.	25.08.-31.08.	01.09.-07.09.	08.09.-14.09.	15.09.-21.09.	22.09.-28.09.	29.09.-05.10.	06.10.-12.10.	13.10.-19.10.	20.10.-26.10.	27.10.-02.11.	03.11.-09.11.	10.11.-16.11.	
						Objective	Project Tasks	Sub tasks	Timeline (Gantt-chart item)																	
1.	Providing information about the investment	1.1.	Negotiations	1.1.1.	Project Objectives and tasks determined.	6.7.-9.7.2014	Yellow	Yellow																		
		1.2.	Theory research	1.2.1.	Finding the theories and the key concepts to support the project.	6.7.-1.8.2014	Yellow	Yellow	Yellow	Yellow																
		1.3.	Background Information	1.3.1.	Deciding how much information is needed. Background Information reporting	1.8.-15.8.2014				Yellow	Yellow															
2.	To create a capital budgeting worksheet	2.1.	Creating a Worksheet template	2.1.1.	Accounting point of view in the worksheet.	15.8.-30.8.2014					Yellow	Yellow														
		2.2.	Showing the worksheet template to the case company	2.2.1.	Questions related to the project.	30.8.-7.9.2014							Yellow	Yellow												
		2.3.	Finalising the Worksheet	2.3.1.	Making the worksheet fully automated.	7.9.-15.9.2014									Yellow	Yellow										
		2.4.	Data input	2.4.1.	Ghana related information added for analysing purposes.	15.9.-20.9.2014										Yellow										
3.	Analysing the results	3.1.	Analysis	3.1.1.	Evaluating the investment for the case company.	20.9.-30.9.2014											Yellow	Yellow								
		3.2.	Creating an user- guide	3.2.1.	Designing and writing instructions.	30.9.-15.10.2014												Yellow	Yellow							
4.	Recommendations & Conclusion	4.1.	Conclusion	4.1.1.	Self assessment and project evaluation.	15.10.-3.11.2014														Yellow	Yellow	Yellow	Yellow			
		4.2.	Training	4.2.1.	Showing the results for the case company.	7.11.2014-11.11.2014																		Yellow	Yellow	

Attachment 3. The Worksheet. Country Information.

Country specific details		
Taxes	25.00 %	
Feed in tariff	0.14 €	per kWh
Avg. Maintenance Labour Cost	7.00 €	per hour
Inflation	16.50 %	

Attachment 4. The Worksheet. Plant Module Information.

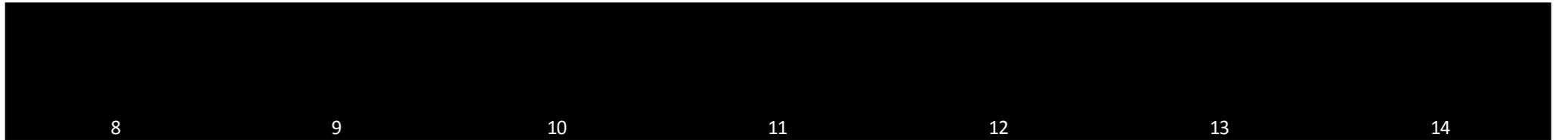
Plant Module Information		p.a.							
	Modules Installed	20	units						
	Module Power Generation per Operating Hour	100	kW						
Total Power Generation per Operating Hour		2000	kW						
	Plant Operating Hours p.a.	3650	hours						
Irradiation (kWh)		7300000	kWh						
	Loss on Module Yield	0.50 %							
	Labor Need per Module p.a.	1804	hours	Security p.a.	1752	Maintenance p.a.	52	Amount Of Guards per 8 hour shift	4
Costs Per Module									
Labor Cost per Module p.a.		12 628 €							
	Insurance Cost per Module p.a.	500 €							
	Maintenance Spare Parts Cost per Module p.a.	565 €							
Power Plant Cost									
	Acquisition Price per Module	70 000 €							
Module Acquisition		1 400 000 €							
	Land Acquisition	500 000 €							
	Inverter	500 000 €							
Total Power Plant Cost (without installation)		2 400 000 €							
Power Plant Salvage Value		100 000 €							
	Installation Costs	400 000 €							
Total Power Plant Cost		2 800 000 €							
Power Plant Lifecycle / Intended Depreciation Time		25	years						
Depreciation Method									
1= STRAIGHT LINE, 2=DOUBLE DECLINE		1	choose						
Variable Costs									
Administrative Costs			%	of Sales Revenue					
Operating Costs			%	of Sales Revenue					
Land Lease			%	of Sales Revenue					
Asset Management			%	of Sales Revenue					
Optional Item 1			%	of Sales Revenue					
Optional Item 2			%	of Sales Revenue					
Optional Item 3			%	of Sales Revenue					

Attachment 5. The Worksheet. Investment related Information.

Investment Need Details			
Power Plant Cost	2 800 000 €		
Investment Details			
Repayment % of EBIT	30.00 %		
Cost of capital (interest rate)	4.00 %	Discount rate	6 %
Loan Amount	2 800 000 €		
Real Interest Rate	-12.50 %		
Repayment Details			
Financial Year	Annual Payment	Annual Interest	Unpaid Balance
	N/A	N/A	2 800 000 €
1	336 442 €	112 000 €	2 463 558 €
2	321 451 €	98 542 €	2 142 107 €
3	307 068 €	85 684 €	1 835 039 €
4	293 268 €	73 402 €	1 541 771 €
5	280 027 €	61 671 €	1 261 745 €
6	267 323 €	50 470 €	994 422 €
7	255 135 €	39 777 €	739 286 €
8	243 442 €	29 571 €	495 844 €
9	232 224 €	19 834 €	263 620 €
10	221 463 €	10 545 €	42 158 €
11	42 158 €	1 686 €	0 €
12	0 €	0 €	0 €
13	0 €	0 €	0 €
14	0 €	0 €	0 €

Attachment 6. The Worksheet. Budgeted Income Statement.

INCOME STATEMENT							
Financial Year	1	2	3	4	5	6	7
Projected Income							
Irradiation (kWh)	7300000	7263500	7227183	7191047	7155091	7119316	7083719
Sales Price per KWh	0,14 €	0,14 €	0,14 €	0,14 €	0,14 €	0,14 €	0,14 €
Loss on Module Yield kWh	N/A	36500	36318	36136	35955	35775	35597
Sales Revenue	1 022 000 €	1 016 890 €	1 011 806 €	1 006 747 €	1 001 713 €	996 704 €	991 721 €
Variable Costs							
Variable Costs	0 €	0 €	0 €	0 €	0 €	0 €	0 €
Total Variable Costs	0 €	0 €	0 €				
Gross Profit Margin %	100,00 %	100,00 %	100,00 %	100,00 %	100,00 %	100,00 %	100,00 %
Fixed Costs							
Maintenance Cost (Labour)	252 560 €	252 560 €	252 560 €	252 560 €	252 560 €	252 560 €	252 560 €
Maintenance Cost (Spare Parts)	11 300 €	11 300 €	11 300 €	11 300 €	11 300 €	11 300 €	11 300 €
Insurance Costs	10 000 €	10 000 €	10 000 €	10 000 €	10 000 €	10 000 €	10 000 €
Other Fixed Costs	0 €	0 €	0 €	0 €	0 €	0 €	0 €
Other Fixed Costs 2	0 €	0 €	0 €	0 €	0 €	0 €	0 €
Total Fixed Costs	273 860 €	273 860 €	273 860 €				
EBITDA	748 140 €	743 030 €	737 946 €	732 887 €	727 853 €	722 844 €	717 861 €
EBITDA Margin %	73 %	73 %	73 %	73 %	73 %	73 %	72 %
Depreciation	92 000 €	92 000 €	92 000 €				
EBIT	656 140 €	651 030 €	645 946 €	640 887 €	635 853 €	630 844 €	625 861 €
EBIT Margin %	64,20 %	64,02 %	63,84 %	63,66 %	63,48 %	63,29 %	63,11 %
Interest	112 000 €	98 542 €	85 684 €	73 402 €	61 671 €	50 470 €	39 777 €
Earning Before Tax	544 140 €	552 488 €	560 261 €	567 485 €	574 182 €	580 374 €	586 084 €
Tax payment	136 035 €	138 122 €	140 065 €	141 871 €	143 545 €	145 094 €	146 521 €
Net Income	408 105 €	414 366 €	420 196 €	425 614 €	430 636 €	435 281 €	439 563 €
Profit margin %	39,93 %	40,75 %	41,53 %	42,28 %	42,99 %	43,67 %	44,32 %

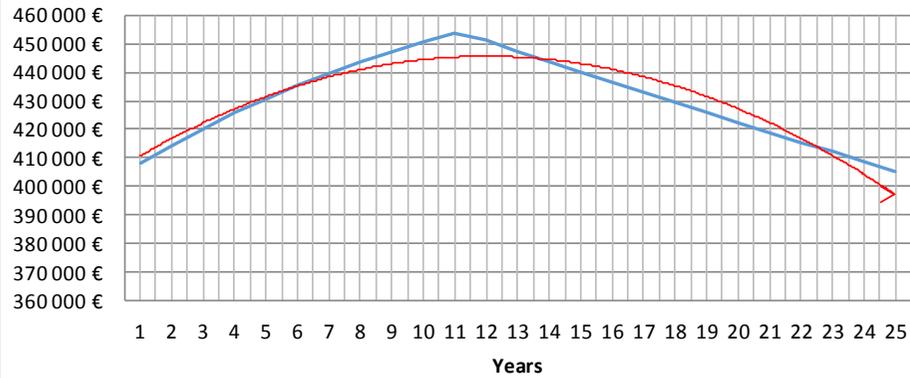


8	9	10	11	12	13	14
7048301	7013059	6977994	6943104	6908388	6873846	6839477
0,14 €	0,14 €	0,14 €	0,14 €	0,14 €	0,14 €	0,14 €
35419	35242	35065	34890	34716	34542	34369
986 762 €	981 828 €	976 919 €	972 035 €	967 174 €	962 339 €	957 527 €
0 €	0 €	0 €	0 €	0 €	0 €	0 €
0 €						
100,00 %	100,00 %	100,00 %	100,00 %	100,00 %	100,00 %	100,00 %
252 560 €	252 560 €	252 560 €	252 560 €	252 560 €	252 560 €	252 560 €
11 300 €	11 300 €	11 300 €	11 300 €	11 300 €	11 300 €	11 300 €
10 000 €	10 000 €	10 000 €	10 000 €	10 000 €	10 000 €	10 000 €
0 €	0 €	0 €	0 €	0 €	0 €	0 €
0 €	0 €	0 €	0 €	0 €	0 €	0 €
273 860 €	273 860 €	273 860 €	273 860 €	273 860 €	273 860 €	273 860 €
712 902 €	707 968 €	703 059 €	698 175 €	693 314 €	688 479 €	683 667 €
72 %	72 %	72 %	72 %	72 %	72 %	71 %
92 000 €	92 000 €	92 000 €	92 000 €	92 000 €	92 000 €	92 000 €
620 902 €	615 968 €	611 059 €	606 175 €	601 314 €	596 479 €	591 667 €
62,92 %	62,74 %	62,55 %	62,36 %	62,17 %	61,98 %	61,79 %
29 571 €	19 834 €	10 545 €	1 686 €	0 €	0 €	0 €
591 331 €	596 135 €	600 514 €	604 488 €	601 314 €	596 479 €	591 667 €
147 833 €	149 034 €	150 129 €	151 122 €	150 329 €	149 120 €	147 917 €
443 498 €	447 101 €	450 386 €	453 366 €	450 986 €	447 359 €	443 750 €
44,94 %	45,54 %	46,10 %	46,64 %	46,63 %	46,49 %	46,34 %

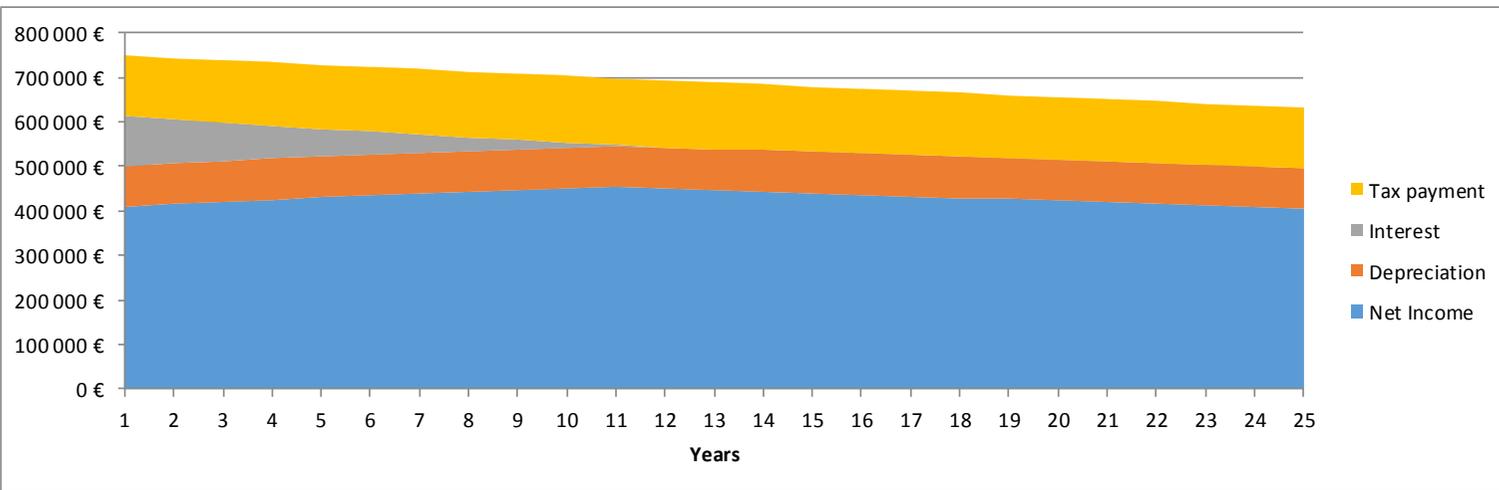
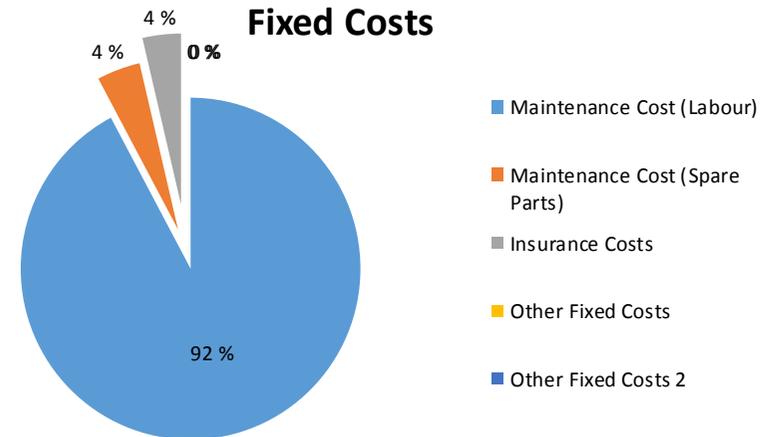
15	16	17	18	19	20	21
6805280	6771253	6737397	6703710	6670192	6636841	6603657
0,14 €	0,14 €	0,14 €	0,14 €	0,14 €	0,14 €	0,14 €
34197	34026	33856	33687	33519	33351	33184
952 739 €	947 975 €	943 236 €	938 519 €	933 827 €	929 158 €	924 512 €
0 €	0 €	0 €	0 €	0 €	0 €	0 €
0 €						
100,00 %	100,00 %	100,00 %	100,00 %	100,00 %	100,00 %	100,00 %
252 560 €	252 560 €	252 560 €	252 560 €	252 560 €	252 560 €	252 560 €
11 300 €	11 300 €	11 300 €	11 300 €	11 300 €	11 300 €	11 300 €
10 000 €	10 000 €	10 000 €	10 000 €	10 000 €	10 000 €	10 000 €
0 €	0 €	0 €	0 €	0 €	0 €	0 €
0 €	0 €	0 €	0 €	0 €	0 €	0 €
273 860 €	273 860 €	273 860 €	273 860 €	273 860 €	273 860 €	273 860 €
678 879 €	674 115 €	669 376 €	664 659 €	659 967 €	655 298 €	650 652 €
71 %	71 %	71 %	71 %	71 %	71 %	70 %
92 000 €	92 000 €	92 000 €	92 000 €	92 000 €	92 000 €	92 000 €
586 879 €	582 115 €	577 376 €	572 659 €	567 967 €	563 298 €	558 652 €
61,60 %	61,41 %	61,21 %	61,02 %	60,82 %	60,62 %	60,43 %
0 €	0 €	0 €	0 €	0 €	0 €	0 €
586 879 €	582 115 €	577 376 €	572 659 €	567 967 €	563 298 €	558 652 €
146 720 €	145 529 €	144 344 €	143 165 €	141 992 €	140 824 €	139 663 €
440 159 €	436 587 €	433 032 €	429 495 €	425 975 €	422 473 €	418 989 €
46,20 %	46,05 %	45,91 %	45,76 %	45,62 %	45,47 %	45,32 %

22	23	24	25	Total
6570638	6537785	6505096	6472571	171958445
0,14 €	0,14 €	0,14 €	0,14 €	0,14 €
33018	32853	32689	32525	827429
919 889 €	915 290 €	910 713 €	906 160 €	24 074 182 €
0 €	0 €	0 €	0 €	0 €
0 €				
100,00 %	100,00 %	100,00 %	100,00 %	0 €
252 560 €	252 560 €	252 560 €	252 560 €	6 314 000 €
11 300 €	11 300 €	11 300 €	11 300 €	282 500 €
10 000 €	10 000 €	10 000 €	10 000 €	250 000 €
0 €	0 €	0 €	0 €	0 €
0 €	0 €	0 €	0 €	0 €
273 860 €	273 860 €	273 860 €	273 860 €	6 846 500 €
646 029 €	641 430 €	636 853 €	632 300 €	17 227 682 €
70 %	70 %	70 %	70 %	
92 000 €	92 000 €	92 000 €	92 000 €	2 300 000 €
554 029 €	549 430 €	544 853 €	540 300 €	14 927 682 €
60,23 %	60,03 %	59,83 %	59,63 %	
0 €	0 €	0 €	0 €	583 182 €
554 029 €	549 430 €	544 853 €	540 300 €	14 344 500 €
138 507 €	137 357 €	136 213 €	135 075 €	3 586 125 €
415 522 €	412 072 €	408 640 €	405 225 €	10 758 375 €
45,17 %	45,02 %	44,87 %	44,72 %	

NET INCOME



Fixed Costs



Attachment 7. The Worksheet. Cash Flow Statement.

PREDICTED CASH FLOW									
Financial Year	NOW	1	2	3	4	5	6	7	
Operating Activities									
EBIT	0 €	656 140 €	651 030 €	645 946 €	640 887 €	635 853 €	630 844 €	625 861 €	
Depreciation	0 €	92 000 €	92 000 €	92 000 €	92 000 €	92 000 €	92 000 €	92 000 €	
Tax payments	0 €	136 035 €	138 122 €	140 065 €	141 871 €	143 545 €	145 094 €	146 521 €	
Net Cash from Operations	0 €	612 105 €	604 908 €	597 880 €	591 015 €	584 307 €	577 751 €	571 340 €	
Investing Activities									
Purchase of Plant & Eqp.	2 800 000 €	0 €	0 €	0 €	0 €	0 €	0 €	0 €	
Net Cash from Investing	-2 800 000 €	0 €	0 €	0 €	0 €	0 €	0 €	0 €	
Financing Activities									
Proceeds from exercise of share options	0 €	0 €	0 €	0 €	0 €	0 €	0 €	0 €	
Interest Paid	0 €	112 000 €	98 542 €	85 684 €	73 402 €	61 671 €	50 470 €	39 777 €	
Proceeds from Loans	2 800 000 €	0 €	0 €	0 €	0 €	0 €	0 €	0 €	
Repayment of Loans	0 €	336 442 €	321 451 €	307 068 €	293 268 €	280 027 €	267 323 €	255 135 €	
Dividends Paid	0 €	0 €	0 €	0 €	0 €	0 €	0 €	0 €	
Grants Received	0 €	0 €	0 €	0 €	0 €	0 €	0 €	0 €	
Net Cash from Financing	2 800 000 €	-448 442 €	-419 994 €	-392 752 €	-366 669 €	-341 698 €	-317 793 €	-294 912 €	
Net Cash Flow	0 €	163 663 €	184 914 €	205 128 €	224 346 €	242 610 €	259 958 €	276 428 €	
Cumulative Cash Flow	0 €	163 663 €	348 577 €	553 705 €	778 052 €	1 020 661 €	1 280 619 €	1 557 047 €	
Discounted Cash Flow		154 399 €	164 573 €	172 229 €	177 703 €	181 292 €	183 260 €	183 840 €	
Free Cash Flow	-2 800 000 €	612 105 €	604 908 €	597 880 €	591 015 €	584 307 €	577 751 €	571 340 €	
Net Present Value (NPV)	4 107 420 €								
Internal Rate of Return (IRR)	20,62 %								
Debt service coverage ratio (DSCR)		1,95	2,03	2,10	2,19	2,27	2,36	2,45	
Return on investment (ROI)		266 %							
Discount rate		6 %							
Discounted Return on investment		64 %							

8	9	10	11	12	13	14
620 902 €	615 968 €	611 059 €	606 175 €	601 314 €	596 479 €	591 667 €
92 000 €	92 000 €	92 000 €	92 000 €	92 000 €	92 000 €	92 000 €
147 833 €	149 034 €	150 129 €	151 122 €	150 329 €	149 120 €	147 917 €
565 069 €	558 935 €	552 931 €	547 052 €	542 986 €	539 359 €	535 750 €
0 €	0 €	0 €	0 €	0 €	0 €	0 €
0 €	0 €	0 €	0 €	0 €	0 €	0 €
0 €	0 €	0 €	0 €	0 €	0 €	0 €
29 571 €	19 834 €	10 545 €	1 686 €	0 €	0 €	0 €
0 €	0 €	0 €	0 €	0 €	0 €	0 €
243 442 €	232 224 €	221 463 €	42 158 €	0 €	0 €	0 €
0 €	0 €	0 €	0 €	0 €	0 €	0 €
0 €	0 €	0 €	0 €	0 €	0 €	0 €
-273 014 €	-252 058 €	-232 007 €	-43 844 €	0 €	0 €	0 €
292 056 €	306 877 €	320 923 €	503 209 €	542 986 €	539 359 €	535 750 €
1 849 103 €	2 155 980 €	2 476 903 €	2 980 111 €	3 523 097 €	4 062 456 €	4 598 206 €
183 239 €	181 640 €	179 202 €	265 084 €	269 847 €	252 872 €	236 963 €
565 069 €	558 935 €	552 931 €	547 052 €	542 986 €	539 359 €	535 750 €
2,55	2,65	2,76	14,38	0,00	0,00	0,00

22	23	24	25
554 029 €	549 430 €	544 853 €	540 300 €
92 000 €	92 000 €	92 000 €	92 000 €
138 507 €	137 357 €	136 213 €	135 075 €
507 522 €	504 072 €	500 640 €	497 225 €
0 €	0 €	0 €	0 €
0 €	0 €	0 €	0 €
0 €	0 €	0 €	0 €
0 €	0 €	0 €	0 €
0 €	0 €	0 €	0 €
0 €	0 €	0 €	0 €
0 €	0 €	0 €	0 €
0 €	0 €	0 €	0 €
507 522 €	504 072 €	500 640 €	497 225 €
8 756 438 €	9 260 510 €	9 761 150 €	10 258 375 €
140 840 €	131 965 €	123 647 €	115 853 €
507 522 €	504 072 €	500 640 €	497 225 €
0,00	0,00	0,00	0,00

Attachment 8. User Manual.

Capital Budgeting Worksheet Guide.pdf 1 11.11.2014 19:02:27

USER MANUAL

CAPITAL BUDGETING WORKSHEET FOR SOLAR POWER PLANTS

For Entrepreneurs, Investors and Institutions
2014

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FOREWORD

This guide's purpose is to help users to use the capital budgeting worksheet. The capital budgeting worksheet was created to evaluate the economic feasibility of solar power plant investments in the ECOWAS region, however it can be used other similar projects as well as it is not dependent on location nor other conditions.

The worksheet contains data input sheets (3 first excel sheets) and data output sheets (2 last excel sheets). The user will add data related to the investment on the data input sheets and can evaluate the results in data output sheets. The data output sheet is supported with charts. The data output sheets contain the budgeted Income Statement sheet and the predicted Cash Flow Statement - all required in financial planning.



TABLE OF CONTENTS

THE FIRST SHEET <i>Country Details</i>	3
THE SECOND SHEET <i>Power Plant Details</i>	4 - 5
THE THIRD SHEET <i>Investment Details</i>	6
THE FOURTH SHEET <i>Budgeted Income Statement</i>	7 - 9
THE FIFTH SHEET <i>Predicted Cash Flow</i>	10 - 11



THE FIRST SHEET

This sheet (data input sheet) is created for information related to the investment location - country specific data. The user inputs data to the yellow cells - other cells are fully automated.

The user inputs data about estimated (A) tax rates, (B) feed-in-tariff, (C) labour costs and (D) inflation. These all vary from country to country and differs in every case.

These all will affect to the last two sheets that will show the estimations about the investment profitability and predicted cash flows.

1. Input the expected corporate income tax rate in the target country.

Country specific details	
Taxes	25,00 %

2. Input the 'feed-in-tariff' or expected sales price per kWh produced.

Feed in tariff	0,14 € per kWh
----------------	----------------

3. Input the average labour cost of maintenance personnel in the target country.

Avg. Maintenance Labour Cost	7,00 € per hour
------------------------------	-----------------

4. Input the current inflation rate of the target country.

Inflation	16,50 %
-----------	---------

THE SECOND SHEET 1 / 2

This sheet (data input sheet) is created for information related to the power plant. The user inputs all related data to the power plant - how many modules will be installed- estimated maintenance hours - estimated loss on each module- Installation costs- land acquisition price- inverter cost- costs per module.

The user has to input data about the estimated life cycle of the power plant and also chooses the depreciation method - either straight line depreciation (1) or double decline (2). The cells that the user has used in this sheet will affect on the last sheets of the worksheet (Budgeted Income Statement sheet and the predicted Cash Flow sheet).

1. Input information of how many modules will be installed.

Plant Module Information		p.a.	
Modules Installed		20	units

2. Input the expected module power generation per operating hour.

Module Power Generation per Operating Hour		100	kW
--	--	-----	----

3. NOTE! Total Power Generation per operating hour - worksheet calculates automatically!

Total Power Generation per Operating Hour		2000	kW
---	--	------	----

4. Input the expected plant operating hours.

Plant Operating Hours p.a.		3650	hours
----------------------------	--	------	-------

5. NOTE! The Worksheet calculates the irradiation automatically!

Irradiation (kWh)		7300000	kWh
-------------------	--	---------	-----

6. Input the expected loss on module.

Loss on Module Yield		0,50 %	
----------------------	--	--------	--

7. Input data of expected maintenance hours per annum and expected amount of guards. NOTE! Total hours fully automated!

Maintenance p.a.	52	Amount Of Guards per 8 hour shift	4
------------------	----	-----------------------------------	---

Labor Need per Module p.a.	1804	hours	Security p.a.	1752
----------------------------	------	-------	---------------	------

8. Input expected insurance costs per module per annum and maintenance (spare parts) costs per module per annum.

Insurance Cost per Module p.a.		500,00 €
Maintenance Spare Parts Cost per Module p.a.		565,00 €

THE SECOND SHEET 2 / 2

This sheet (data input sheet) is created for information related to the power plant.

9. NOTE! The total labour costs for each module shows automatically!

Labor Cost per Module p.a. 12 628,00 €

10. Input the acquisition price per Module and the total module acquisition will show automatically!

Acquisition Price per Module	70 000,00 €	
Module Acquisition	1 400 000,00 €	

11. Input the expected land acquisition and inverter costs and the total power plant costs are shown automatically below. NOTE! This is without installation costs!

Land Acquisition	500 000,00 €	
Inverter	500 000,00 €	
Total Power Plant Cost (without installation)	2 400 000,00 €	

12. Input expected salvage value for the power plant. Input the expected Installation costs! The worksheet calculates total power plant costs!

Power Plant Salvage Value	100 000,00 €	
Installation Costs	400 000,00 €	
Total Power Plant Cost	2 800 000,00 €	

13. Input the expected life cycle of the plant.

Power Plant Lifecycle / Intended Depreciation Time 25 years

14. Input the right depreciation method. 1 for straight line method or 2 for double decline method. The worksheet will calculate the depreciation for the asset automatically!

Depreciation Method
 1= STRAIGHT LINE, 2=DOUBLE DECLINE 1 choose

15. Input the predicted variable costs as a percentage of sales revenue.

NOTE! If these do not exist, leave them blank.

Variable Costs			
Administrative Costs		%	of Sales Revenue
Operating Costs		%	of Sales Revenue
Land Lease		%	of Sales Revenue
Asset Management		%	of Sales Revenue
Optional Item 1		%	of Sales Revenue
Optional Item 2		%	of Sales Revenue
Optional Item 3		%	of Sales Revenue

THE THIRD SHEET

The third sheet of the Worksheet is for the investment itself. The user inputs data about the estimated loan amount- estimated repayment percentage of the EBIT- and the estimated cost of the capital.

The sheet will show the user the annual repayments in euros. It will also show the user the expected annual interest amounts and the unpaid balance. The Worksheet will warn the user if the annual payment exceeds the predicted income - meaning the power plant cannot handle its liabilities and goes into payment default. This will make sure that unrealistic payments are not considered.

The user can estimate the payback period of a bank loan with this sheet as it shows when the whole loan has been paid back.

16. NOTE! The total expected Investment shows automatically! in the worksheet.

Investment Need Details	
Power Plant Cost	2 800 000,00 €

17. Input predicted repayment as a percentage of EBIT (earnings before interest and taxes).

Investment Details	
Repayment % of EBIT	30,00 %

18. Input the expected interest rate. Input the discount rate.

Cost of capital (interest rate)	4,00 %	Discount rate	6 %
---------------------------------	--------	---------------	-----

19. Input the total Loan amount to the sheet. The worksheet calculates real interest rate automatically.

Loan Amount	2 800 000,00 €
Real Interest Rate	-12,50 %

20. The Worksheet shows the annual loan repayments, annual interest amounts and the unpaid balance based on the data input cells.

Repayment Details			
Financial Year	Annual Payment	Annual Interest	Unpaid Balance
	N/A	N/A	2 800 000,00 €
1	336 442 €	112 000 €	2 463 558 €
2	321 451 €	98 542 €	2 142 107 €
3	307 068 €	85 684 €	1 835 039 €

NOTE! If the repayment percentage is too high compared to the EBIT the Worksheet will warn - Payment default.

1	860 140 €	112 000 €	1 939 860 € PAYMENT DEFAULT
---	-----------	-----------	-----------------------------

THE FOURTH SHEET 1 / 3

This sheet is fully automated and it will show the user what are the expected revenues for the investment per each investment year. The sheet show how much are the expected loss on module.

Due to the fact that the estimated variable costs are estimated to be close to zero - these are not considered in the sheet. Fixed costs are also shown in the sheet. Other fixed costs can be added into the sheet if they do occur.

The sheet will calculate the EBITDA margin for every investment year. This will indicate the profitability of the core business operations.

Interest payments are seen in the sheet. The sheet will show the user the expected net income after all the expenses. The sheet will calculate the profit margin which will be used to measure the profitability of the investment.

This sheet is supported with charts to make the investment profitability evaluation more convenient.

21. The Worksheet calculates projected Income automatically. It takes loss on module into account.

Financial Year	1	2
Projected Income		
Irradiation (kWh)	7300000	7263500
Sales Price per kWh	0,14 €	0,14 €
Loss on Module Yield kWh	N/A	36500
Sales Revenue	1 022 000 €	1 016 890 €

22. The Worksheet calculates variable costs but as they have been estimated close to zero they appear zero in the worksheet. The worksheet calculates the gross profit margin automatically!

Variable Costs		
Variable Costs	0 €	0 €
Total Variable Costs	0 €	0 €
Gross Profit Margin %	100,00 %	100,00 %

23. The Worksheet calculates the fixed costs automatically, however additional fixed costs can be added into the sheet.

Fixed Costs		
Maintenance Cost (Labour)	252 560 €	252 560 €
Maintenance Cost (Spare Parts)	11 300 €	11 300 €
Insurance Costs	10 000 €	10 000 €
Other Fixed Costs	0 €	0 €
Other Fixed Costs 2	0 €	0 €
Total Fixed Costs	273 860 €	273 860 €

THE FOURTH SHEET 2 / 3

This sheet is fully automated and it will show the user what are the expected revenues for the investment per each investment year. The sheet show how much are the expected loss on module. The sheet is called budgeted Income Statement.

27. The Worksheet calculates EBITDA margin for each investment year. It calculates the depreciation as a euro amount. The worksheet shows the EBIT (earnings before interest and taxes) and shows the EBIT margin. NOTE! Everything is automatic.

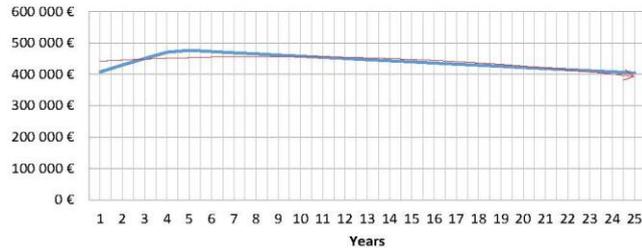
EBITDA	748 140 €	743 030 €
EBITDA Margin %	73 %	73 %
Depreciation	92 000 €	92 000 €
EBIT	656 140 €	651 030 €
EBIT Margin %	64,20 %	64,02 %

25. The Worksheet calculates interest amounts for each year. It also shows the expected tax payments and shows the predicted net income. It also shows the profit margins.

Interest	112 000 €	77 594 €
Earning Before Tax	544 140 €	573 436 €
Tax payment	136 035 €	143 359 €
Net Income	408 105 €	430 077 €
Profit margin %	39,93 %	42,29 %

26. The Budgeted Income Statement is supported with charts. These appear automatically in the sheet. The Net Income can be seen in the chart below.

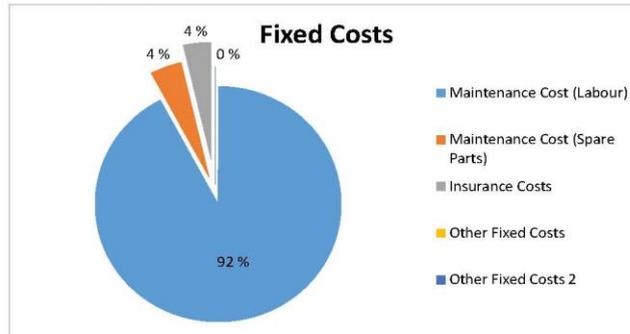
NET INCOME



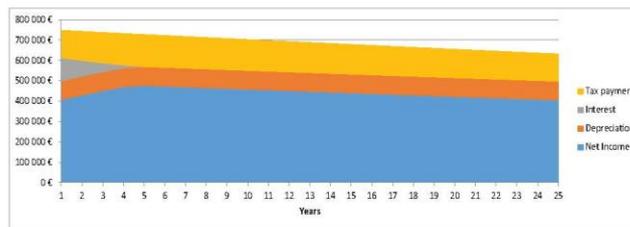
THE FOURTH SHEET 3 / 3

This sheet is fully automated and it will show the user what are the expected revenues for the investment per each investment year. The sheet show how much are the expected loss on module. The sheet is called budgeted Income Statement.

27. The expected fixed costs can be seen in the chart below.



28. The relationships between different Income statement items can be seen in the chart below. NOTE! These change when the data input sheets are changed.



THE FIFTH SHEET 1 / 2

This sheet will show the user the estimated cash in - and outflows of the investment years. This is very important sheet because it measures the company's liquidity.

The estimated cash flows have been divided into 3 different categories; operating activities, investment activities and financing activities.

The sheet shows the net cash flow of the investment for each year.

The sheet shows the cumulative cash flow.

Discounted cash flow is shown in the worksheet as well as free cash flow. These two are very crucial when evaluating cash flows.

The worksheet calculates net present value, Internal rate of return, debt- service coverage ratio and return on investment. These are fully automated.

29. The Cash Flow Statement shows cash in- and outflows from operating activities.

Financial Year	NOW	1
Operating Activities		
EBIT	0 €	656 140 €
Depreciation	0 €	92 000 €
Tax payments	0 €	136 035 €
Net Cash from Operations	0 €	612 105 €

30. The Cash Flow Statement shows automatically the Investing activities, however if some investing activities take place in the future the user can use the yellow cells - at this point they do not exist (expect the initial investment itself).

Investing Activities		
Purchase of Plant & Eqp.	2 800 000 €	0 €
Net Cash from Investing	-2 800 000 €	0 €

31. The Worksheet shows cash in- and outflows from financing activities. The user can use the yellow cells if needed. Everything else is automatic in this sheet.

Financing Activities		
Proceeds from exercise of share options		0 €
Interest Paid		0 €
Proceeds from Loans		2 800 000 €
Repayment of Loans		0 €
Dividends Paid		0 €
Grants Received		0 €
Net Cash from Financing		2 800 000 €

THE FIFTH SHEET 2 / 2

This sheet will show the user the estimated cash in - and outflows of the investment years. This is very important sheet because it measures the company's liquidity.

The estimated cash flows have been divided into 3 different categories; operating activities, investment activities and financing activities.

32. The Worksheet calculates the net cash flow from all operations. It also calculates the cumulative cash flow and free cash flow.

Net Cash Flow	0 €
Cumulative Cash Flow	0 €
Discounted Cash Flow	
Free Cash Flow	-2.800.000 €

33. The Worksheet calculates automatically the net present value for the investment as well as the internal rate of return.

Net Present Value (NPV)	4 049 480 €
Internal Rate of Return (IRR)	20,36 %

34. Debt- service coverage ratio, return on investment and discounted return on investment are all shown in the worksheet to measure the investment.

Debt service coverage ratio (DSCR)	1,95
Return on investment (ROI)	265 %
Discount rate	6 %
Discounted Return on investment	64 %