GPRM 521 Project Management

INDIVIDUAL ASSESSMENT

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INTRODUCTION

1.1 Theoretical overview: What is a project?

Project management can be distinguished by certain characteristics. These activities are the building blocks for a project (Nicholas *et al.*, 2017).

The following characteristics must be included to form a project:

- Goal – The project must have a distinct end-item, deliverables, results or benefits;
- Unique – This activity must be one of a kind or a different way of doing an action;
- Temporary – The goal must be completed in a certain time frame;
- Different organisation and functions - The utilisation of diverse organisations and occupations; and
- Unfamiliarity and risk – Projects are unique, and the risk will increase because of unfamiliar conditions.

Organisation completing a project will not do the same task over and over. The nature of a project is a unique and after the task is completed the project team will dissolve and carry on with their normal job activities. Time, cost and qualities are drivers for any project. Projects are only successful if a project is on time, in budget and certain quality standards is achieved (Anon).

My choice of project adheres to the characteristics of a project. In theory they have identical drivers and characteristics.

1.1.1 Characteristics

- Goal – Install a Solar system for certain client at a designated location.
- Unique – Solar installations differ from client to client, location and energy demand.
- Temporary – The installation at the customer is a one-time activity.
- Different organisation and functions – Different expertise is required for different tasks in the project.
- Unfamiliarity and risk – Topography and location is different at each site. The energy demand patterns are different for each customer.

1.1.2 Drivers for any project

- Time – The customer has an expectation of when an installation start and end
- Cost – The customer has a budget and the project must be completed in budget.

- Quality – The solar sizing, installation standard and monitoring determine the quality.

PROJECT DEFINITION OR SCOPE

Projects can only be completed successfully if the scope and the statement of work is combined to ensure a successful completion of the project. The scope and the statement are two different declarations in a project combined to complete the project (Nicholas *et al.*, 2017).

2.1 Statement of work

The statement of work (SOW) will state the elements the vendor will be responsible for. This foundation of elements is needed for the project to be completed by the vendor successfully(Nicholas *et al.*, 2017). The SOW is seen as a legal document if the project is a failure or not to specification and can be used to rectify the failed elements in a project.

The vendor will be responsible for the completed installation and commissioning of the solar system at the desire premises of the client.

2.2 Scope of work

The scope of work is an in-depth description of everything needed to complete the project successfully. The scope is a very important document detailing the information on how to complete the project by time, budget and quality.

2.2.1 Background

The project proposal combined with the estimate pricing and pre-planning measurements is essential for the customer to understand the need and budget of the project. The installation and commission are critical for the project to achieve the deliverables set out in the planning phase.

2.2.2 Project Overview

The scope of work entails sequential task that must be completed in sequence. The sequence is governed by millstone for successfully completion of the project. The project will be completed in a maximum of 120-day cycle from the acceptance of final quotation. Quality and safety of work will be assured by means of Certificate of Compliance (COC).

2.2.3 Description of service

The vendor will supply a turnkey solar plant solution for the client from start to end.

2.2.4 Deliverables

The vendor will deliver:

- Design and plan the solar plant.
- Install the solar plant
- Commission the solar plant.
- Document installation and certification.
- Train the client to monitor and operated the solar plant.

2.2.5 Task list

The scope will include the following task:

- Project proposal.
- Estimate pricing.
- Pre-planning and measurement at client premises.
- Planning and sizing of solar plant.
- Final Quotation.
- Installation of Solar plant at premises.
- Testing and commissioning of solar plant.
- Connection to electrical grid.
- Testing and commissioning of solar and electrical grid.
- Certificate of Compliance (CoC) – Solar plant.
- Certificate of Compliance (CoC) – Electrical connection.
- Connecting and setup monitor software.
- Commissioning of monitor software.
- Documentation of installation diagrams and compliancy certificates.
- Client training on operating and monitoring of solar plant.
- Optimal adjustments on solar plant configuration until end of project cycle.

2.2.6 Out of scope

The project make provision for correct sizing, installation and commissioning of a solar plant. The following is not part of the scope except when agreed explicitly in planning phases and final quotation phases of the project.

- Additional solar capacity

- Any additional electrical load not measured in pre-planning measurement phase of the project.
- Additional electrical or switching requirements not captured in pre-planning phase.
- Internet connection or any additional requirements of software not captured in the pre-planning phase for monitor software setup.

2.2.7 Payment Terms & Invoicing

The project payments and invoicing are governed by milestones.

Invoicing

- Invoices must be paid strictly in 5 working days.

Payment terms

- With the acceptance of the final quotation a 60% deposit must be made before any equipment will be ordered.
- Documentation, installation diagrams, compliancy certificates and training will commence only after the customer have paid the balance of the final invoice in full.

2.2.8 Period of Performance

- The project will be completed in a 120-day cycle from the acceptance of final quotation.
- Delays in ordering equipment and consumables will not be added to the 120-day cycle period for the project.
- Delays on invoiced payments will not be added to the 120-day cycle.

2.2.9 Expected Outcomes

The vendor will provide a turnkey solution for the customer on time and in budget.

2.2.10 Project Management

Project management principals and best practices will be utilized to successfully completed the project on time, in scope and on budget to assure a quality solution.

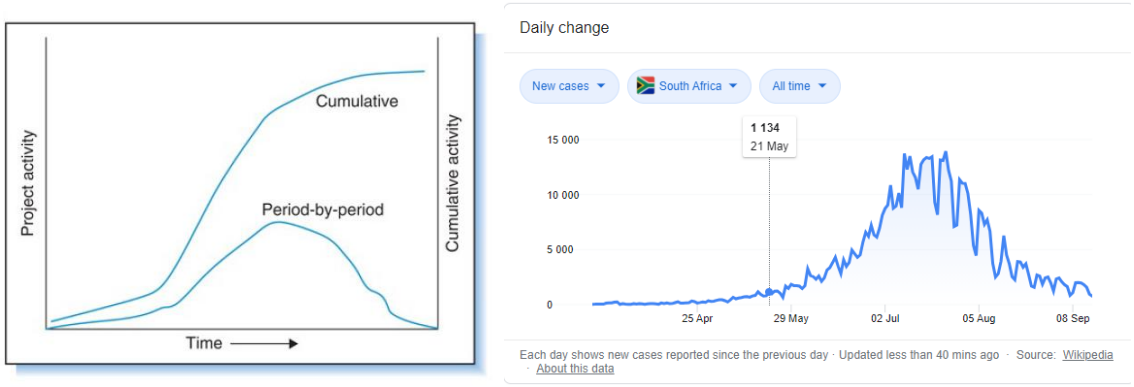
Name of Client: _____	Name of Vendor: _____
Signed: _____	Signed: _____
Date: _____	Date: _____

Table 2-1: Approval of project scope

3.1 Theoretical overview: Project life cycle.

Projects is a dynamic system and can change according to different interaction. Changes will follow a dissimilar patten (Nicholas *et al.*, 2017). This cycle is called a project life cycle. Projects have a clear start and end, activities which can include money, time or effort etc. can peak and then subside (almost like the resend COVID-19 pandemic).

Figure 3-1: Project life cycle vs COVID-19 pandemic cycle



The project life cycle slot into a wider life cylce called the systems devepment cycle. The system development cycle is represented by 4 (A-D) phase(Nicholas *et al.*, 2017).

- Conception Phase – Attemt to solve a problem
- Definition phase – detailed analysis of the system concept
- Execution phase - work specified in the project plan is put to action
- Operational phase - customer takes over to operate the system and maintain it

3.2 Project life cycle

3.2.1 Project initiation stage

3.2.1.1 Project Objectives and deliverables

- Installing turnkey environmentally friendly solar solution for a client.
- Customised to the client energy needs
- On time and on budget
- Compliance certified
- Operational system for client.

3.2.1.2 Project risks

Dependencies

- Pre-planning and measurement at client premises
- Body corporate approval for installations.
- Location of solar panels at customer

Constraints

- Capital commitment from client
- Availability of solar plant equipment
- Availability of consumable stock
- Certificate of Compliance

Establishing project scope

- The project will be completed in a 120-day cycle from the acceptance of final quotation.
- Delays in ordering equipment and consumables will not be added to the 120-day cycle period for the project.
- Timelines will be adjusted if equipment is delayed.
- Delays on invoiced payments will not be added to the 120-day cycle.

Project proposal

Pre-planning and measurement at client premise are a requirement before the final energy requirement and budget proposal is presented to the client.

3.2.2 Project planning stage

- The project will start on the 17 September 2020 and will end on the 3 December 2020.

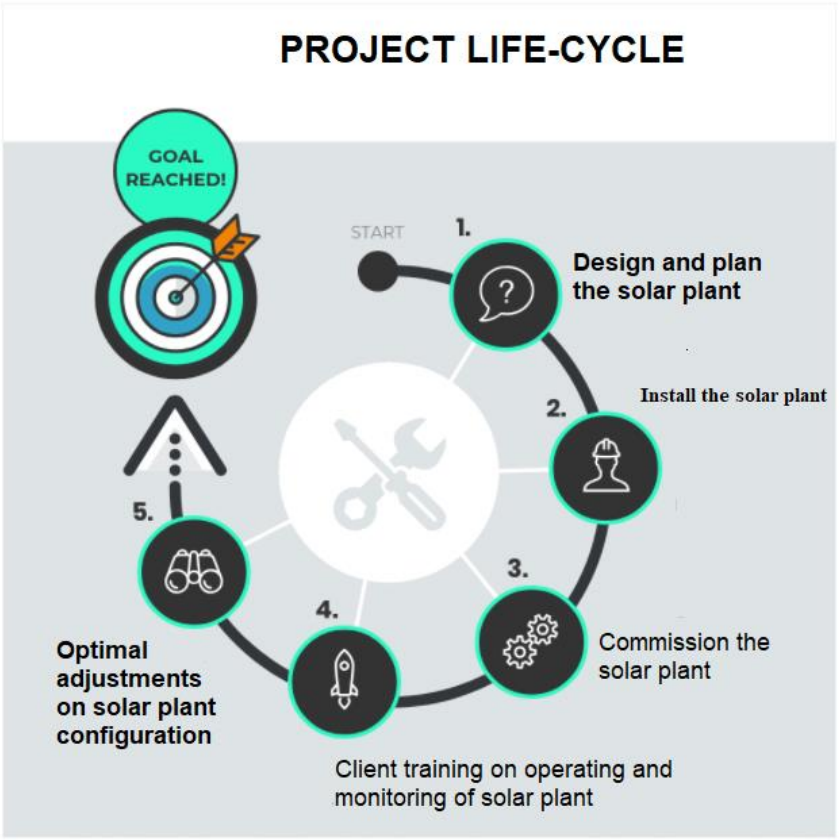
- Please note delays with stock and consumables can extend the project time lines.
- Additional requirements added after final quotation can delay the project.

Milestones

Milestones are broken up into phases. Every phase must be accomplished before the next phase of the project can begin.

- Phase 1 Planning and sizing – 22 days
- Phase 2 Installation of Solar plant at premises -19 Days
- Phase 3 Certification and Monitoring – 20 Days
- Phase 4 Training and operationalising of system - 15 Days

Figure 3-2: Project life cycle



4.1 Theoretical overview: Stakeholders and Team

Stakeholders is anyone with an interest or investment in a project. The main stakeholders are normally buyers, clients or owners or more formally system customer.

Contractors is more the hands-on people who will put the project together. The more formal reverence in the book (Nicholas *et al.*, 2017) system contractor

Customers is normally the person or organisation paying for the project.

Staff or a person who is going to operate the project deliverables is called the user.

4.2 Project: Stakeholders and Team

The solar installation is n planed and projectized. The compellability and order of events for the installation have many roll players and must be combined to ensure a successful project.

The following stakeholders is of importance for the project.

- Customer or project sponsor
- Solar plant Contractor
- Electrical contractor
- Solar plant planer
- Solar plant supplier
- Operationalise training team.
- Project manager

The project manager will engage with the customer and will manage the overall project with relevant contractor or venders. Basically, will act on the behalf of the customer to schedule and track relevant milestones to complete the project on time and on budget with quality assured throw-out the project.

5.1 Theoretical overview: Work Breakdown Structure

The Work Breakdown Structure (WBS) is developed to establish a common understanding of project scope. It is a hierarchical description of the work that must be done to complete the deliverables of a project. Each descending level in the WBS represents an increasingly detailed description of the project deliverables.

The WBS is used to safeguard that all activities are recognized and clearly demarcated. All activities must be accounted for in this process (Nicholas *et al.*, 2017).

5.2 Project: Work Breakdown Structure

Work Breakdown Structure Table

Provide basic information about the project including: Project Title – The proper name used to identify this project; Project Reference / ID - The unique reference or ID for the project; Project Manager - the person with responsibility for the successful delivery of the project to time cost and quality. Project Sponsor - the person ultimately accountable for the success of the project. Prepared by – The person(s) preparing this document; Date/Control Number – The date the plan is finalized and the change or configuration item control number assigned.

Project Title:	**Solar plant Instalation for customer**	**Project Reference / ID:**	**9/11/2020**
Project Manager:	**Lappies Labuschagne**	**Project Sponsor:**	**Mr Jano de Lange**
Prepared by:	**PGDIP Student**	**Date / Control Number:**	9/11/2020

Element Number	WBS Elements Activity, Task, or Sub-Task Name	Definition of Activity or Task (Description)	Responsible Person or Group	Estimated (E) or Actual (A) Cost (Cross reference to budget)	Project Phase (Cross reference to schedule)
The unique reference ID for the activity or task.	*Enter the name or title of the Task, Sub-task, Activity or Deliverable.*	*Provide a brief description of this Activity, Task or Sub-Task.*	*Enter the person or group who are responsible*	*Enter the estimate or actual cost of the activity or task or add a cross reference to the budget.*	*Provide the name or number of the Project phase that this activity falls into.*
1	Pre-planning and measurement at client premises	Site inspection	Team 1,2,3,4	No Cost	1
2	Planning and sizing of solar plant	Planning Phase	Team1	No Cost	1
3	Final Quotation	Budget	Team 1	No Cost	1
4	Order stock from suppler	Procurement	Team 1&2	R120 000	1
5	Order consumables	Procurement	Team 1&2	R14 000	2
5	Installation of Solar plant at premises	Installation	Team 2	No Cost	2
7	Testing and commissioning of solar plant	Quality assurance	Team 3	No Cost	2
8	Connection to electrical grid	Electrical connection	Team 4	R7 200	2
9	Testing and commissioning of solar and electrical	Quality assurance	Team 3&4	R1 500	3
10	Certificate of Compliance (CoC) – Solar plant	Compliance	Team 5	R1 500	3
11	Certificate of Compliance (CoC) – Electrical connection	Compliance	Team 6	R1 500	3
12	Connecting and setup monitor software	Installation	Team 7	R1 000	4
13	Commissioning of monitor software.	Quality assurance	Team 1	No Cost	4
14	Documentation of installation diagrams and compliancy certificates	Quality assurance	Team 1	No Cost	4

6.1 Theoretical overview: Responsibility Assignment Matrix

A Responsibility Assignment Matrix (RAM) describes the participation by various organizations, people and roles in completing tasks or deliverables for a project.

Four categories are present in this framework.

- Responsible: The person who execute the task or complete the deliverables
- Accountable: The person who make sure the task is completed correctly and meets specifications.
- Consulted: Support for the responsible person working on task can be help, expert advice.
- Informed: information about the project must be made available to stake holders.

6.2 Project: Responsibility Assignment Matrix

PGDIP Solar Projects

Residential Solar Plant for Client

	ROLES	Sponsor	PGDIP Manager	Planer	Admin	Project Manager	Solar Team	Electrical Team	Trainer	Commissioning Team	COC Solar	COC Electrical
	Deliverable or Task	**Status**	**Sponsor / Leadershi**				**Project Team**				**Other Resource**	
	Phase 1											
	Pre-planning		A	A	R		I	R	R			
	Planning and sizing of solar plant				A		I					
	Final Quotation		I	I		A	I					
	Phase 2											
	Installation Solar Panels		I	I		I	I	R				
	Connecting electrical cables to plantroom							C	R			
	Install Inverters and electrical equipment							R	C			
	Testing and commissioning of solar plant		I				i	R	C			
	Connection to electrical grid							C	R			
	Testing and commissioning of solar and electrical		I	I	I	I	I	C	R			
	Phase 3											
	Certificate of Compliance (CoC) - Solar plant								C			R	C
	Certificate of Compliance (CoC) - Electrical connection.								C			C	R
	Connecting and setup monitor software							R					
	Phase 4 Training and operationalising of system		I	I	II	I	I		R				
	Phase 4											
	Documentation of installation						A	A					C
	Training customer to monitor system.			I				A			A		C
	Training customer to operate plant.			I				A			A		C
	Handover of documentation & Sign off		A	A	I	I	A						
	Insert new rows above this one												

D	Driver	Assists those who are responsible for a task.
R	Responsible	Assigned to complete the task or deliverable.
A	Accountable	Has final decision-making authority and accountability for completion. Only 1 per task.
S	Support	Provides support during implementation.
C	Consulted	An adviser, stakeholder, or subject matter expert who is consulted before a decision or acti
I	Informed	Must be informed after a decision or action.

7.1 Theoretical overview: Schedule of work

Project scheduling is one of the most important tasks in a project. Different scheduling methods exists like PERT, CPM, CCPM and PDM. According to the author “The PDM method accounts

for a variety of relationships between project activities to better reflect the realities of project work" (Nicholas *et al.*, 2017). Project scheduling is a trial and error activity and project manager spend a considerable time on this activity. The author makes the statement "Gantt chart is good for communicating the project schedule, however as a planning tool it is limited because it does not explicitly show the impact of delaying activities or shifting resources on the overall project" (Nicholas *et al.*, 2017). The network-base I the most widely use method to schedule and plan a project.

7.2 Project: Responsibility Assignment Matrix

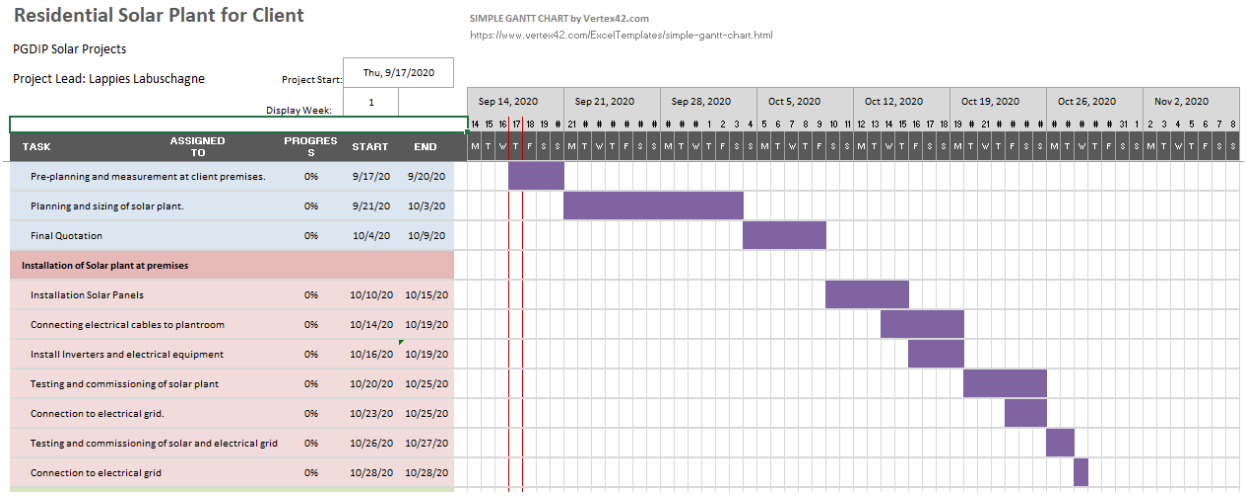


Table 7-1: Tasks and timeline 1 and 2

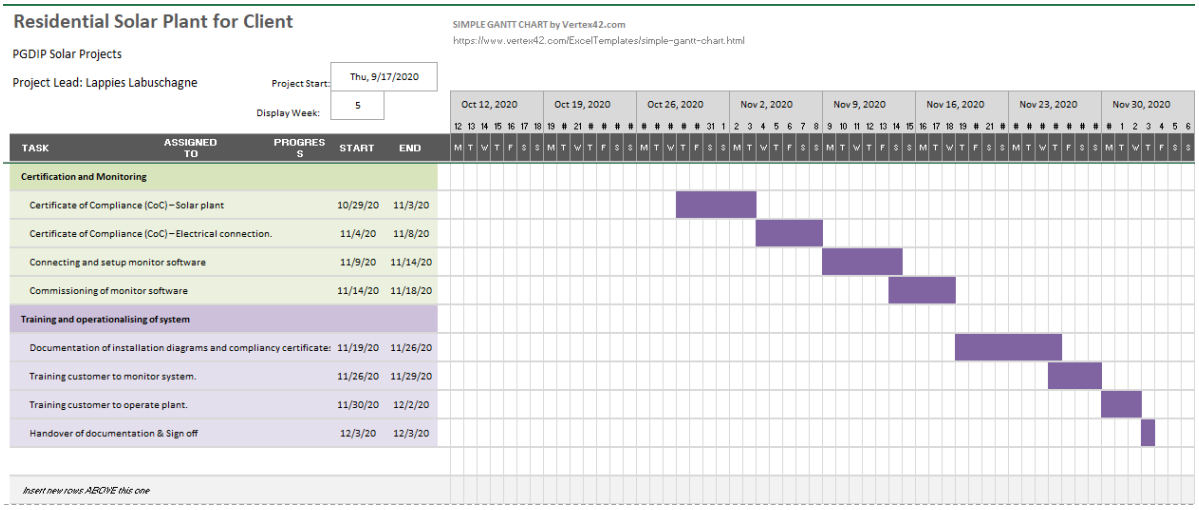


Table 7-2: Tasks and timeline 2 of 2

The project scheduling plan has been put in a graphical representation called a Gantt chart. This will help to communicate the project for all stakeholders to better understand the project scheduling and plan for implementation.

8.1 Theoretical overview: Cost Estimation

The project planning process is the driver for the cost estimation. Accuracy is cost estimates is of importance to derive the real budget for the project. Cost have the tendency to escalate over time. “Clear requirements and work task, employing skilled estimators being realistic in estimating, and anticipating escalation causes such as inflation all help to minimize escalation” (Nicholas *et al.*, 2017) pointed out by the author. Cost estimation become budget after contingency reserves have been added. Propper funding for a project is derived form the cost estimation cycle in the project. Projects bring risks, and risks bring unexpected costs.

8.2 Project: Cost Estimation

Statistical Cost estimation modelling will be used to form the baseline for cost. All cost is subjected to change according to customer (Project sponsor) energy requirements, installation requirements and home location requirements for this project.

PROJECT COST ESTIMATION

Project ID	Project Stages	Solar items	Avg required quantity	Average labor cost	Average labor hrs	Total cost per unit
1.1	Pre-planning and measurement at client premises.	R0.00	4	R350.00	0	R0.00
1.2	Planning and sizing of solar plant.	R0.00	16	R500.00	0	R0.00
1.3	Hardware Quatation	R60 000.00	2	R0.00	0	R120 000.00
	PHASE # 1 TOTAL	**R60 000.00**	**22**	**R850.00**	**0**	**R120 000.00**
2.1	Installation of Solar plant at premises.	R350.00	24	R10.00	2.3	R8 431.00
2.2	Connecting electrical cables to plantroom	R500.00	8	R10.00	2.3	R4 031.00
2.3	Install Inverters and electrical equipment	R500.00	16	R10.00	2.3	R8 031.00
2.4	Testing and commissioning of solar plant	R500.00	4	R10.00	2.3	R2 031.00
2.5	Connection to electrical grid.	R500.00	8	R10.00	2.3	R4 031.00
2.6	Testing and commissioning of solar and electrical grid	R500.00	2	R10.00	2.3	R1 031.00
	PHASE # 2 TOTAL	**R15 650.00**	**62**	**R60.00**	**13.8**	**R27 586.00**
3.1	Monitoring	R250.00	1	R12.00	2.6	R290.20
3.2	Commissioning	R250.00	4	R12.00	2.6	R1 040.20
	PHASE # 3 TOTAL	**R15 650.00**	**5**	**R24.00**	**5.2**	**R1 330.40**
4.1	Monitoring Training	R250.00	1	R12.00	2.6	R290.20
4.2	Training customer to operate plant.	R300.00	2	R12.00	2.6	R640.20
	PHASE # 4 TOTAL	**R15 650.00**	**3**	**R24.00**	**5.2**	**R930.40**
	TOTAL	R75 650.00	92	R168.00	24.2	**R148 516.40**

Table 8-1: Project cost estimation

The cost estimates from Project ID 1.1 – 1.2 is a free service for a new customer. We know how hard it to understand the basics and to get all the thermology and numbers together.

PGDIP Solar Projects has worked hard to give correct estimate budget. Budget is one of the most underrated sections in a project.

CONCLUSION

Project management is enormous. After the theoretical overview I have concluded that project managers need a wide variety of different skills. These skills would include planning, scheduling, budgeting and leadership and the list can go on and on. I am very excited about my new toolset gained and this knowledge will go straight into my toolbox of managerial tools. The knowledge gain is critical and is a resilience factor to accomplish difficult tasks and will give me the competitive edge over another manager who have not gained the insight on project management.

I have installed a solar system at my house during levels 5 - 3, and in retrospect this project management toolset was missing. I therefore have projectized a real world problem into my assignment, and I can assure you this have changed my mind completely.

“Those who plan do better than those who do not plan, even though they rarely stick to their plan.” – Winston Churchill

REFERENCE LIST

Anon. What is a project? https://www.apm.org.uk/resources/what-is-project-management/ Date of access: 15 September 2020.
Nicholas, J.M., Steyn, H. & Nicholas, J.M. 2017. Project management for engineering, business and technology. 5th ed.: Routledge.