



جامعة الجميع الذكية
EVERYONE'S SMART UNIVERSITY

Everyone's Smart University Project (Spring 2021)

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Section Master	Date Thursday 18/03/2021	Course Code (PMG506)
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Advanced project Management

Instructions:

- آخر موعد للتسليم هو يوم الخميس 2021-05-20 في تمام الساعة 9 مساءً.
- الإجابة متاحة باللغة الإنجليزية أو اللغة العربية مع مراعاة أن تكون المصطلحات العلمية باللغة الانجليزية.
- يتم تسليم المشروع في صيغة ملف pdf مع الالتزام نموذج الجامعة ولن تقبل أي مستندات أخرى.
- يجب مراعاة أقسام البحث الرئيسية (مقدمة Introduction، دراسات علمية سابقة Literature Review، طريقة البحث Methodology، النتائج والمناقشة Results and Discussion، وأخيراً المراجع References. وان كان هناك ملحقات Appendices يتم إضافتها)
- يجب الالتزام بـ Theme موحد كما يلي:
- حجم الخط 12.
- نوع الخط Arial.
- لون الخط أسود.
- المسافة بين الأسطر 1.5 line spacing
- عدد صفحات البحث (لا يقل عن ثلاث صفحات ولا يزيد عن ست صفحات).

Instructor's Name: ~~Eng. Amaal Aburumman~~ **Eng. Dr. Akram M. S. Ali**

Project:

You are required to document your role in administering a project. The project may be set in a business, social, sporting, or family environment but must be of a significant size and scale. If you do not have an actual project to write about you may complete the project hypothetically.

This report will be between three to six pages in length. This is a significant research project.

Your report must address ~~each~~ **ONE** of the following issues:

1. Identify and describe the purpose, scope, and objectives of the project. **Display this information using an appropriate tool.**
2. Describe how the team is given an outline of the project.
3. Describe the strategies that are going to be set up to maintain communication with the team members.
4. Describe the tools that are going to be used to monitor the goals, time frames or milestones.
5. Identify project milestones and activities. **Display this information using an appropriate tool.**
6. Create a budget and link the costs to the key milestones for a project.
7. Describe how you are going to divide tasks and resources amongst a project team. **Display this information using an appropriate tool.**
8. Briefly describe how the progress will be monitored.
9. How are current project records maintained? Who has responsibility for this? provide some recommendations on how this process could be improved.
10. Describe the current procedure for finalizing projects. Create your own procedure and identify how you will evaluate the success of the project.
11. Legislation that may affect the project including health and safety, and anti-discrimination legislation.

Best of luck...

المشروع:

مطلوب منك توثيق دورك في إدارة مشروع. قد يتم تعيين المشروع في بيئة تجارية أو اجتماعية أو رياضية أو عائلية ولكن يجب أن يكون بحجم مناسب. إذا لم يكن لديك مشروع فعلي لتكتب عنه ، فيمكنك إكمال المشروع افتراضياً. **سيكون هذا التقرير من ثلاث إلى ست صفحات .**

يجب أن يعالج تقريرك **كل** **أحد** القضايا التالية:

1. تحديد ووصف الغرض والنطاق والأهداف من المشروع. اعرض هذه المعلومات باستخدام أداة مناسبة.
2. صف كيف يتم إعطاء الفريق مخططاً تفصيلياً للمشروع.
3. وصف الاستراتيجيات التي سيتم وضعها للحفاظ على التواصل مع أعضاء الفريق.
4. صف الأدوات التي سيتم استخدامها لرصد الأهداف أو الأطر الزمنية أو المعالم.
5. تحديد معالم المشروع والأنشطة. اعرض هذه المعلومات باستخدام أداة مناسبة.
6. إنشاء موازنة وربط التكاليف بالمعالم الرئيسية للمشروع.
7. صف كيف ستقوم بتقسيم المهام والموارد بين فريق المشروع. اعرض هذه المعلومات باستخدام أداة مناسبة.
8. صف بإيجاز كيف سيتم رصد التقدم.
9. كيف يتم الاحتفاظ بسجلات المشروع الحالية؟ من المسؤول عن هذا؟ تقديم بعض التوصيات حول كيفية تحسين هذه العملية.
10. وصف الإجراء الحالي لإنهاء المشاريع. قم بإنشاء الإجراء الخاص بك وحدد كيفية تقييم نجاح المشروع.
11. التشريعات التي قد تؤثر على المشروع بما في ذلك الصحة والسلامة ، وتشريعات مكافحة التمييز.

مع تمنياتي بالتوفيق..

Grid-Connected Rooftop Photovoltaic Systems Project in the Residential Sector of the Kingdom of Saudi Arabia

1. Introduction:

The Kingdom of Saudi Arabia (KSA) has a fast-growing building sector driven by factors like burgeoning population, economic and infrastructure development and modernization. Buildings, owing to their energy intensive operation, are imposing significant energy, environmental and economic burdens for the country. To overcome these challenges and improve the sustainability levels in the building and energy sectors, it has been decided to develop 9500 MWs of renewable energy projects by 2023. Given the annual solar radiation level of over 2200 kWh/m², solar energy is expected to play the predominant role in achieving this target. Traditionally, KSA's emphasis has been to pursue large-scale energy projects. Globally, however, small scale and building related projects have significantly contributed to the rapid growth of solar energy. This paper explores the potential for rooftop solar photovoltaic (PV) in KSA's residential sector. Taking into account appropriate PV design considerations and local building construction and cultural practices, it calculates the power generation potential for 13 major cities. It is found that a total of 51 TWh of electricity can be annually generated from these cities, accounting for 30% of the total domestic demand [1]. Solar photovoltaics (PV) are the most widely deployed solar electric technology in the world today. Fueled by light, solar cells operate near ambient temperature, with no moving parts, and they enable generation at any scale: A 10-square-meter (m²) PV array is in theory no less efficient per unit area than a 10-squarekilometer (km²) array. This contrasts with other generation pathways, such as thermal generators or wind turbines, which lose efficiency with reduced scale [2].

1.2 Scope:

Under the project "Building an Enabling Environment for Sustainable Development in Saudi Arabia", the scope of the consultancy entails:

- Solar PV for basic energy needs and productive uses such as solar home systems (could be standalone or connected), solar battery charging stations (SBCS); solar

mini-grid (could be alternating or direct currents (AD/DC)), or solar (and other renewable energy technologies (RET)) hybrids.

- The analysis will be limited to capacities relevant to the size of the typical off-grid communities. This probably implies capacities well below 100 kW.

1.3 Project Purpose:

1.3.1 Problem Statement:

Saudi Arabia is approximately 98% dependent on oil to meet its energy needs, including electricity production. The continued rise of electricity demand in Saudi Arabia means that power generation must expand. Conventional generation is a major cause of environmental pollution and negatively impacts human health through greenhouse gas emissions. It is therefore essential that an alternative method of generation is found that preserves the environment and health and would support existing conventional generation during peak hours. Saudi Arabia is geographically suitable because it is located in the so-called sunbelt, which has led it to become one of the largest solar energy producers. Solar energy is a serious competitor to conventional generation when the indirect costs of fossil fuels are included [3]. Thus, processing sunlight via photovoltaic cells is an important method of generating clean energy. This article proves that the cost of solar energy will be less than the cost of fossil fuel energy if the cost of environmental and health damages is taken into account.

1.3.2 Mission statement:

The objective of the proposed project is to increase the use of grid-connected photovoltaic (PV) systems as a sustainable means of generating electricity in selected main cities and smaller areas of the Cities, with a focus on small-scale producers who are already connected to the national electricity grid ,The project is designed to transform an energy sector that today is almost 100% dependent on fossil fuels into one where solar PV and other RETs provide a significant percentage of national energy production going forward.

2. literature review:

Saudi Arabia's Electricity & Cogeneration Regulatory Authority has published new rules for distributed-generation solar installations which it is anticipated will encourage electricity consumers to install PV systems under the country's net billing regime. The new provisions, which should apply to PV systems ranging in size from 1 kW to 2 MW and to all kinds of energy consumer, will come into effect when the Saudi Electricity Company (SEC) will release additional rules on the scheme's procedures. The framework establishes Saudi power distributors will have to provide assistance to consumers willing to install solar, by providing the information needed for feasibility studies and to apply for grid connection. Power companies will also have to raise awareness of the benefits of rooftop solar and report annually on progress in the market segment. Saudi Arabia made a first attempt to introduce net metering for small scale solar in August 2017, but a draft regulation prepared at the time was never adopted. The kingdom had 334 MW of solar generation capacity at the end of last year, according to the International Renewable Energy Agency. Large solar projects supplied most of that figure, with the lion's share represented by the 300 MW Sakaka solar plant which came online in November. [4]

3. METHODOLOGY:

Considered one of the most critical roles in the PV system design and installation process, project management ensures the system delivery in the best desired timeline, quality, and budget. This role involves attention to details and coordination between different teams in terms of what steps to take next in the process. Project management tackles the methodology required for planning, scheduling, and managing resources including manpower and materials. In order for a project manager (PM) to be able to achieve that task, he/she should be qualified to prepare a plan that meets the requirements as specified in the contract with the PV system owners. The PM is usually a person who fully

understand the technical aspects of PV projects, which include procurement, planning, scheduling, engineering, integration, and commissioning.

- Project Development Phases

Electric solar projects go through certain stages to be fully completed. This includes the following phases:

1. Project initiation
2. Project planning and design
3. Project installation
4. Project monitoring
5. Project completion

Figure 1 illustrates an example of the workflow for a small residential/commercial PV system. The complete PV system process usually follows this order: prospective customer, site evaluation, proposal preparation, contract signed, design and engineering, permitting and plan review (utility and The National Electrical Code (NEC), installation, inspection, monitoring and commissioning, owner's manual.

- Work begins as soon as a new customer shows an interest in installing a PV system. Begin by giving the team an outline of the project A team of analysts begins by preparing a simple sketch and some calculations to estimate the size of the solar system and prepare a proposal.

Once the proposal is created and discussed with the customer, the company representative will conduct a brief survey to gather more information about the site, which is required to start the initial engineering design. After that, the project will be entered into the project's pipeline and directed to the engineering department for the initial design. My role in the project is to oversee all design and engineering progress in each potential PV system and then ensure the right coordination between the internal departments.

- The first step in the design is to generate the three-dimensional model that matches the actual site dimensions. This preliminary design will then be sent back to the customer for any feedback or changes that he/she sees are essential for the PV system in terms of location selection, aesthetics, and finances. Once the customer approves the preliminary design and he/she signs the contract, the engineering team

will finalize the structural and electrical diagrams and required calculations after a follow-up visit for final site evaluation, where more detailed information is gathered. These designs will be reviewed by other engineers to ensure design adherence to local and national engineering codes (NEC article 690 and any other local AHJ), such as an independent engineering firm, and then sent to the utility and AHJ for permitting and interconnection. Upon acceptance of the design by the utility engineering department, the project will enter the last stage in the engineering department, which is construction documents preparation and installation.

- While following up on the permit to be issued, I must coordinate with the procurement team to ensure system component availability and also when these materials should be delivered to the site to be installed by the PV installers at a prescheduled time agreed upon by the customer. As can be seen, logistics coordination is essential for optimal performance of the teams and to guarantee timely delivery of the system.
- The system also be monitored remotely to ensure the real system meets production expectations through the Internet profile for the particular system, as illustrated in Figure 1. The system also be monitored for any technical problems within the operation that may appear during the entire lifespan of the system.[\[5\]](#)

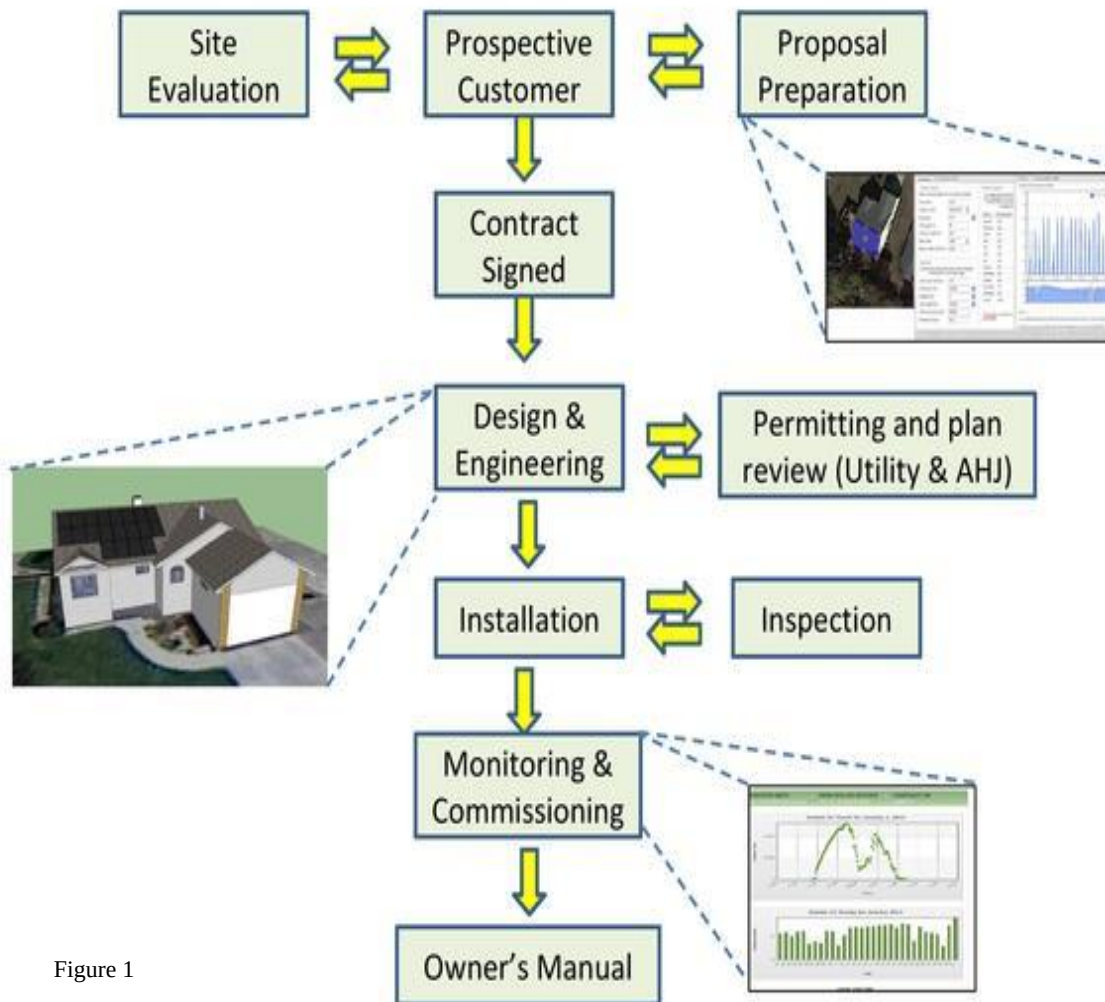


Figure 1

- Planning is instrumental in meeting project deadlines, and many projects fail due to poor planning. First and foremost, as I am a project manager, I will define the project's scope and determine available resources, then realistically set time estimates and evaluate the team's or teams' capabilities. Then I will create a clear and concise plan to both execute the project and monitor its progress. Projects are naturally unpredictable, adjustments along the way as needed before the project reaches its final stages.
- Define Activities is the process of identifying and documenting the specific actions to be performed to produce the project deliverables. The key benefit of this process is

that it decomposes work packages into schedule activities that provide a basis for estimating, scheduling, executing, monitoring, and controlling the project work. This process is performed throughout the project. The inputs, tools and techniques, and outputs of this process are depicted in Figure 2 depicts the data flow diagram of the process.[6]

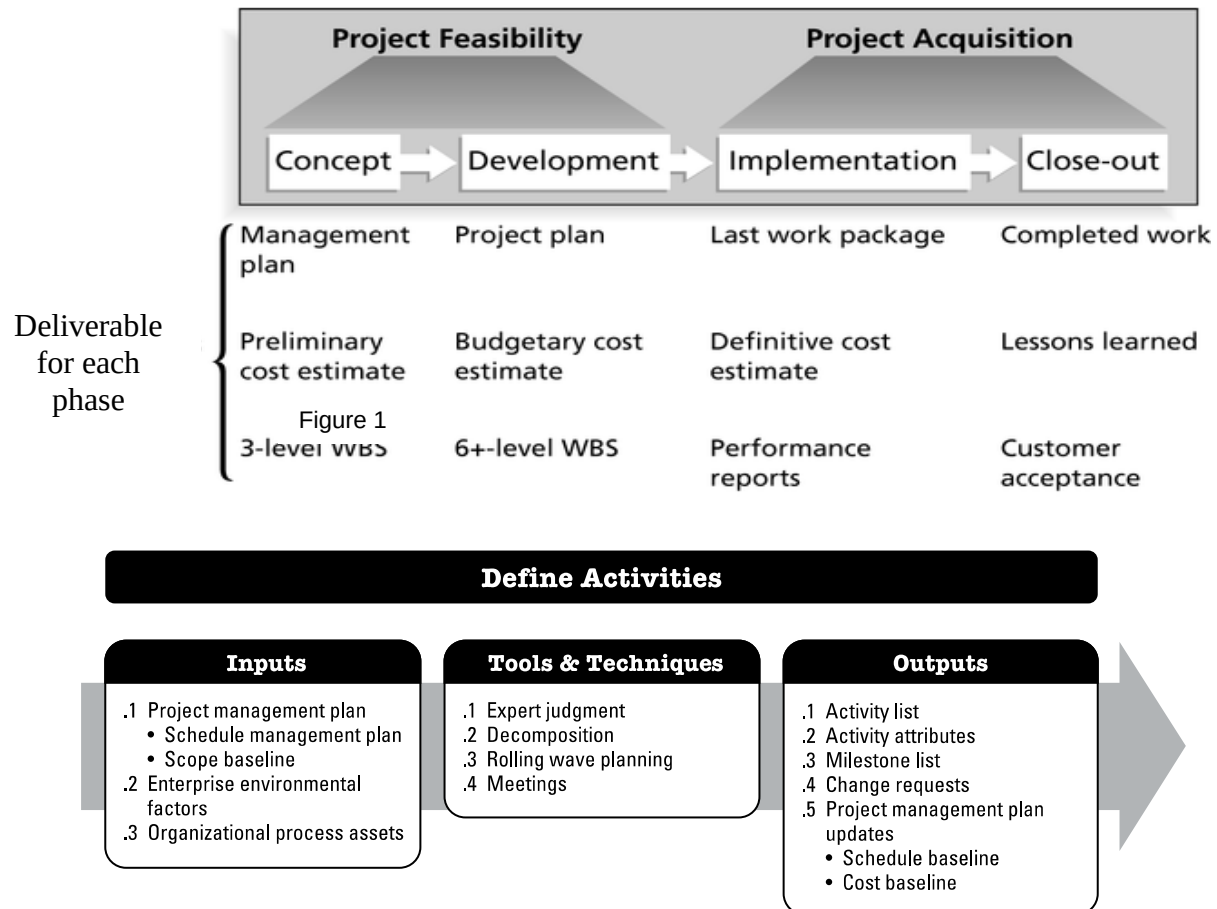


Figure 2 Define Activities: Inputs, Tools & Techniques, and Outputs

Table 1: Project Manager's Planning Checklist

Project Management Planning		CEO	LEG	BOD	MKT	IT	FIN	PM
☐	Develop Engineering Design and System Configuration Plan							
☐	Develop the Siting Options Document							
☐	Ensure the following planning documents have been submitted to CEO for review/approval:							
	☐ Value Proposition Document							
	☐ Engineering Design and System Configuration Plan							
	☐ Siting Options Document							
	☐ Recommendation of Community Solar Business and Financial Model							
	☐ Marketing and Communications Plan							
	☐ Information Technology System Integration Plan							
	☐ Financial Plan							
	☐ Risk Mitigation Plan							
☐	Consolidate and produce community solar business case that includes the following:							
	.. Strategic rationale							
	.. Program goals, overall value proposition, and success factors							
	.. Proposed scope, scale, and technology infrastructure							
	.. Proposed software strategy							
	.. Proposed financing strategy							
	.. Proposed marketing strategy							
	.. Consumer value proposition, pricing, participation, and care							
	.. Regulatory and legal overview							
	.. Next steps							

- Many programs require a full-time Project Manager during the planning of the community solar program (CSP) as well as during the procurement and construction phases. In planning, the primary, my role is to collect material from internal staff or contracted resources to create the business case to be provided for the CEO for approval.

Business Case Contribution and Planning Overview:

- The business case itself will be compiled, with contributions from internal staff or external consultants. The approach used in this document uses two phases in the business case development process. The first phase centers on the exploration of

options (business models, software needs, marketing tactics), with suggested approaches for CEO approval. The second phase integrates the selected program structures into a single integrated program plan for Board approval.

- The end result of this business case methodology will enable with CEO to characterize the entire CSP.

A suggested outline includes the following:

- 1- Strategic rationale
- 2- Program goals, overall value proposition, and success factors
- 3- Proposed scope, scale, and technology infrastructure.
- 4- Proposed software strategy.
- 5- Proposed financing strategy.
- 6- Proposed marketing strategy.
- 7- Pricing, member-consumers participation, and member-consumers care.
- 8- Regulatory and legal overview.
- 9- Next steps.

Before finalizing the business case, i need to oversee the development of the following documents by various staff for CEO review and approval:

- Value Proposition Document (Marketing Manager).
- Engineering Design and System Configuration Plan (Project Manager).
- Siting Options Document (Project Manager).
- Marketing and Communications Plan (Marketing Manager).
- Information Technology System Integration Plan (IT Manager).
- Risk Mitigation Plan (Staff).
- Recommendation of CSP Model (Business and Finance Manager and staff).

Business Case Planning Documents

The overall goal of the Project Manager is to coordinate with the CEO, Marketing Manager, Business and Finance Manager, and IT Manager in the planning phase to develop and deliver to the CEO the following 7 documents:

1. Value Proposition Document (Marketing Manager)
2. Engineering Design and System Configuration Plan (Project Manager)
3. Siting Options Document (Project Manager)
4. Recommendation of Community Solar Business and Financing Model (Business and Finance Manager and staff)
5. Marketing and Communications Plan (Marketing Manager)
6. Information Technology System Integration Plan (IT Manager)
7. Risk Mitigation Plan (Staff)

The information contained within these documents will enable the CEO to decide on the best course of action and develop the business case for Board approval. The individual

planning documents will provide a roadmap for the successful implementation of the program.[7]

4. Result:

The project schedule is an output of a schedule model that presents linked activities with planned dates, durations, milestones, and resources. At a minimum, the project schedule includes a planned start date and planned finish date for each activity. If resource planning is done at an early stage, the project schedule remains preliminary until resource assignments have been confirmed and scheduled start and finish dates are established. Although a project schedule model can be presented in tabular form, it is more often presented graphically, using one or more of the following formats:

- Bar charts
- Milestone charts
- Project schedule network diagrams

5. CONCLUSIONS

Rooftop solar PV systems offer an attractive option for future development. While using a roof space introduces some degree of complexity to a project, there are also technical and commercial benefits. Commercial benefits for developers include avoidance of land costs, offsetting electricity consumed on site at a higher value than exporting, and the opportunity for an onsite grid connection point.

Consenting timeframes and costs for the project may be reduced due to avoidance of land impact. There are also educational, marketing, and entrepreneurial opportunities introduced by implementing renewable energy at the point of use as well as local job demand.

It is paramount that qualified professionals carry out design work, particularly with regard to structural assessments and energy yield. Waterproofing is an important design and installation consideration for rooftop systems. It is important to avoid negative impacts on roof longevity and existing warranties and insurance. A number of project financing structures and metering arrangements are available which can help to support the business case for rooftop solar PV installation.[8]

6. References

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