

Group Assignment 2: Quality Management Plan

PJM 6135 Project Quality Management

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Group 1:

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Document review History

| Review Index | Name | Date/Time | Approval Sign-off |
|--------------|-------------------------------------|-------------------------------|-------------------|
| 1.0 | Requirement document | March 4 th , 2017 | Lu Chen |
| 2.0 | Project charter | March 15 th , 2017 | Yipeng Song |
| 3.0 | Stakeholder statement | March 21 st , 2017 | Nien-Yi Sung |
| 4.0 | The first draft of Scope statement | April 1 st , 2017 | Yipeng Song |
| 5.0 | The second draft of Scope statement | April 8 th , 2017 | Yu Wang |
| 6.0 | Cost management plan | April 11 th , 2017 | Yijun Luo |
| 7.0 | Schedule management plan | April 13 th , 2017 | Lu Chen |
| 8.0 | Communication management plan | April 14 th , 2017 | Yijun Luo |
| 9.0 | Risk management plan | April 17 th , 2017 | Yipeng Song |
| 10.0 | Master Plan | April 25 th , 2017 | Nien-Yi Sung |

Introduction

Project Overview

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Cianbro constructed three wind turbines with GE 1.5 MW in a town of Vinalhaven, located on Vinalhaven Island, Maine. To complete the project, the government must have the capability to support the Fox Island Wind. LLC with permitting, procurement, and engineering of those turbines, clear the sites, and construct the site roads. The Fox Island Wind must erect three, GE 1.5 MW wind turbines, including tower sections, nacelle, hub, and blades, install the collection and interconnect system and the SCADA and communications system. In this project, quality management is extremely important, because there are some challenges which are negative to the performance of the project directly, such as the challenge of post-construction community relation and per-development. The company estimates the cost of turbines as \$2,800 per kW within fifteen years.

Purpose of the quality management plan

The quality management plan is an important and necessary document for the project team to manage the project quality effectively, which is one part of project management plan. This document indicates the Fox Island Wind project will establish the approaches, activities, procedures, policies, and process to ensure the final deliverables of three GE 1.5 MW wind turbines, the collection and interconnect system, and the SCADA and communications system are in high quality. The project team use the quality management plan to describe how the quality should be managed in the lifecycle of the Fox Island Wind project. It shows the procedures and process of how to perform the quality plan, assurance, and controlling of the final deliverables and make an improvement.

In summary, the purpose of the quality management plan is to:

- Ensure quality is planned effectively to complete the scopes within given cost and schedule (PMI, 2013).

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- Define how quality will be managed.
- Define the definitions of the roles and responsibilities, for each member participating in the Fox Island Wind project, with required skill sets to address the complexities and risks.
- Define quality assurance activities and quality control activities
- Define acceptable quality requirements, policies and approaches

Parent organization background

Fox Island is consisted of two small islands named Vinalhaven and North Haven. These two little islands located in the Atlantic Ocean and off the mainland. The electricity for the Fox Island was initially provided by the Vinalhaven Light & Power Company, and it was mainly using diesel generators. However, there are some service problems of the supply so that islanders voted to organize a cooperative and then decided to purchase in the 1970s. Besides, islanders renamed the Fox Islands Electric Cooperative instead of Vinalhaven Light & Power Company.

After founded, the cooperative put 10K mile "submarine" electric" cable that connected North Haven to Central Maine Power Company's lines on the mainland in Rockport. In 2001, Fox Islands Electric Cooperative had a will to exploit utilizing wind energy in order to replace diesel generators because the submarine cable that was connecting the islands with the mainland, operated unreliably. After that in 2002, FIEC received a study, which purpose is to determine whether wind power is a feasible alternative. Therefore, the results of the study indicated that the wind resource is good, but not great. Though it is not a hundred percent positive, Fox Islands Electric Cooperative can continue its plan. Changes came in 2005, when the unreliable cable connecting the islands with the mainland was replaced. The cable was owned by FIEC, and it can be applied in the wind project as the integral part that can support the transfer of the electricity

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from the island to mainland when needed. In 2008, FIEC decided to pursue the project and requested the assistance for the project, then George Baker joined the plan. Currently, Fox Islands Electric Cooperative compose the largest community wind energy facility on the East Coast of the United States.

Parent organization quality policy

Fox Islands Electric Cooperative (FIEC) is going to provide sustainable electric power service with safe, clean and sustainable for the Atlantic Ocean off the coast of Maine and 80 miles' northeast of Portland. The management system monitors the service adopt the ISO 9001:2000 certification to analyze the quality performance by quality assurance and quality control. The aim of FIEC is to provide customers with good services, which means we will:

1. The first thing is to meet customer's satisfaction, FIEC will follow these requirements:
Safe, clean and sustainable to achieve the aim of the company.
2. Continuously develop and improve our products, services and systems to ensure all products meet the expectations and needs of you our customer.
3. Each employee should follow good communication during the whole project, it will improve the efficiency and advance the quality.

Team members' roles and responsibilities

| 4. Name | Role | Responsibility |
|---------------------|-----------------|---|
| Fox Island Wind LLC | Project Sponsor | <ul style="list-style-type: none">• Provide financial support for the whole project |

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| | | |
|--------------|---------------------------|---|
| George Baker | Project manager | <ul style="list-style-type: none"> • Quality monitoring and coaching • Be responsible for the whole project |
| Dave Folce | Team lead | <ul style="list-style-type: none"> • Audit the quality team's internal performance |
| Yipeng Song | Quality coordinator | <ul style="list-style-type: none"> • Monitor the implementation of quality management throughout the project and support all levels of project management |
| Yijun Luo | Quality manager | <ul style="list-style-type: none"> • In charge of the whole quality management process • Be responsible for test preparation and execution activities |
| Nien-Yi Sung | Project manager assistant | <ul style="list-style-type: none"> • Assist project manager with daily work • Be responsible for the communication in the team |
| Lu Chen | Technical manager | <ul style="list-style-type: none"> • Be responsible for all technical issue • Take actions to satisfy stakeholders' |

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| | | |
|---------------------------------|------------|--|
| | | requirements |
| Yu Wang | Consultant | <ul style="list-style-type: none"> • Be responsible for relevant laws and regulations consultancy |
| Test team | Testers | <ul style="list-style-type: none"> • Validate the test basis • Design and develop test scripts • Report and diagnose defects |
| GE& other equipment contractors | Contractor | <ul style="list-style-type: none"> • Modify the gearboxes and generators of the turbines to ensure the overall effectiveness of the turbines while maintaining lower sound level. |
| Diversified Communications | Investor | <ul style="list-style-type: none"> • a privately-held, family-owned business committee \$4.3 million subject to an agreed-upon target rate of return. |

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Quality Metrics

Customer requirements

1. No pollution. The new wind turbine must obey the environmental quality standards published by local government. (C1)
2. No noise. The noise made by three wind turbines must be lower than 60 dB in the daytime and 50bD at night. (C2)
3. Available cost. The cost of electricity produced by wind turbine must be 10% lower than the average cost of electricity. (C3)
4. Safe distance from inhabited area. The distance from the residential conductions to the wind turbines must more than 2 kilometers. (C4)
5. Optimize energy performance. The electronical power provided by the new wind turbines must be stable enough. (C5)
6. Absolute safety. The project team must keep the residents' safety. (C6)

Technical requirement

1. Type of wind turbine. The project team must have the capability to select an optimize type of wind turbine: horizontal axis wind turbines or vertical wind turbines. (T1)
2. Protective device. The project team must have the capability to protect the wind turbines from damages to the transmission system, power system, control system. (T2)
3. Tolerance. The wind farm must continue to operate between minimum and maximum voltage limits, and continue to operate between minimum and maximum frequency limits. (T3)
4. Control of active power. The active power provided by the wind turbines have the capability to reduce the output at any moment by pitching the blades. (T4)
5. Control of and voltage and reactive power. Díaz Gonzá, Martínez Rojas, and & Gomis Bellmunt (2010) indicated that STATCOM system is a static synchronous generator operated as a static compensator connected in parallel whose output current (inductive or

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capacitive) can be controlled independently of the AC system voltage (P.2). The project

team must have the capability to use the STATCOM system. (T5)

6. Geographical location. The project team must select a proper geographical location where has enough wind. (T6)
7. Rated power. The rated power must be more than 7,000 kW. (T7)
8. Annual yield. The annual yield must be approximal to 20,000,000 kWh. (T8).

Relationship between customer requirements and technical requirements

| | T1 | T2 | T3 | T4 | T5 | T6 | T7 | T8 |
|----|----|----|----|----|----|----|----|----|
| C1 | | | | | | 4 | | |
| C2 | | | | | | 6 | | |
| C3 | 4 | | | | | | 2 | 2 |
| C4 | 2 | | | | | 9 | | |
| C5 | | 2 | 2 | 4 | 4 | | 10 | 9 |
| C6 | | 4 | | | | 5 | | |

Quality improvement plan

Overview

Quality improvement plan aims to provide a better performance and deliver good quality products and services, which can not only give the organization a chance to enhance its interior connection but develop its external relationship. What is more, by applying quality improvement plan, the organization would have a better understanding for its weaknesses and advantages while executing the project. Whereas, quality improvement plan also can help the organization figure out the required processes that would have the huge impact on the company's future strategies if there is no detail-planned. For FIEC, maintain wind-generated electricity as well as improve the recent quality to seek for a higher customer satisfaction is the critical issue. The plan for the FIEC is an overall management for all apartments, that they need to dedicate in the processes and undertake to coordinate the resources and tasks to reach the goal of improvement.

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Quality Improvement Statement & Goals

The model is to ensure the foundation of the improvement, which includes the aim and measures :

Aim: FIEC tries to accomplish for reducing electric price and provide sustainable energy offering, also it will need to control the noise pollution. To reach a goal of creating a cleaner environment with the effective wind power, FIEC expects to offer better deliverables and generate fewer issues.

Measures: From the survey conducted which made by FIEC to its customers, we can understand that customers are worried about a financial challenge and the influence of the place they live. Therefore, the change that the organization is planned to make can be identified as the improvement that the customers need in the future.

Tools for the goal

To accomplish the goal FIEC should of the improvement from both internal and external to the company. Therefore, statistical tools will be highly used to meet the goals of the organization.

Following is established by the aims of the module above that indicates the necessary aspects for the improvement goal.

First, the company should establish measurement and reporting system, which is used to smooth the processes and provide an efficiency working environment. Measurement and reporting system can help to evaluate and compare the quality and performance and figure out the greater outcome. For the project, the measurement can have a huge influence on the financial aspect. Project manager and the team should establish the standard which highly relied on data collection from previous project experience and organization's expectation. Based on the data

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collection and applied those data in the control chart, the analysis team can figure out the stable of the variables, if the results are out of control, it would be a time to check errors and look for enhancement.

Second, quality education and training in the internal company is required for a better performance and well understanding to both employers and employees. Also, the training and education requirements can base on the method of conducting the survey from the employees in the company. The technical-generated job is relied on the professional knowledge, ensure while executing the project, each employer and employees can understand the quality control information and do the improvement when needed are what the organization should seek for.

Third, the supplier quality improvement which is the guarantee of the construction is essential for the project as well. An evaluation form should be established with the standard which is followed the government regulations and industry's standard. To the noise pollution, the quality of the construction can be the critical part.

The last one is the customer satisfaction. Customer satisfaction can be a key to judge whether the improvement plan is completed or not. Firstly, conducting the survey in every stable period to make sure what the customer need and whether there are changes from time to time. Second, analyze the feedback from customers and recheck the strategies from these data. Third, hold meetings to emphasize the focus from the organization to the customers in the island, meanwhile, boost the communication with each other within the issue of the project and find more support and trust in the project.

Quality Assurance

| | |
|-----------------|--|
| Project Process | Ensure the quality of Fox Islands Wind |
|-----------------|--|

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| | Project |
|----------------------------|---|
| Process Quality Standards | <ul style="list-style-type: none"> • The project should be environmental-friendly, the wind generators will not disturb islanders' life and pollute the environment. • The wind generators will not create much noise. • The project aims to provide enough electricity for islanders in business and daily life. • The wind generators should be safe without any potential dangers. |
| Stakeholder Expectations | <ul style="list-style-type: none"> • The Fox Islands Wind Project is potent to replace the diesel generator and satisfy the need of islanders in business and daily life. |
| Quality Assurance Activity | <ul style="list-style-type: none"> • Enhance the communication among islanders, the FIEC, and the government. • Improved wind turbines efficiency and reduce power dissipation. • Build the wind generators as far away from residential areas as possible to solve the noise problem. • Keep inspecting the facilities routinely. |
| Quality assurance tool | <ul style="list-style-type: none"> • Quality Audits |

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| Schedule | <ul style="list-style-type: none">The project quality assurance and improvement will maintain in 5 years (2017-2022) |
| Who is Responsible | <ul style="list-style-type: none">The project manager and the project team. |

Quality Control

Quality control is the process of inspecting products to ensure that they meet the required quality standards. Some tools and techniques can be adopted in the quality control, including Cost-Benefit Analysis, Control Charts, Statistical Sampling, Benchmarking and etc. In this project, the quality control activities which listed in the following table should be applied.

Quality Control Activities

| Requirement | Quality Control Activity | Responsible Party |
|-------------------------------------|--|--------------------------------|
| facilitate the process of project | Communicate with GE and reduce the waiting time for turbines. The deliver data of turbines is the summer of 2009. | EOS Ventures, Baker and GE |
| facilitate the process of project | Provide enough information to resident about the project, and prepare them for the process so the construction of the site would not be impeded by residential and civil conflict. | The construction and PR team |
| Keep noise pollution to the minimum | Consult residents to finish survey about the sounds levels. | Concerned neighbors, and Baker |

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| | | |
|--|--|---|
| Keep noise pollution to the minimum | Modify the gearboxes and generators of the turbines to ensure the overall effectiveness of the turbines while maintaining lower sound level. | Baker, GE and other equipment contractor. |
| Run cost and feasibility analysis | Take advantages of the collapse in commodity prices and curb the inventory cost in 2009. | Baker and the acquisition team. |
| Curb the initial investment | Authorize a tax equity investor to sell the production tax credits to cut down the initial investment | Baker, project team and tax equity investor |
| Legally circumventing extra payment | Utilize the accelerated depreciation to postpone tax payments. | Baker and FIW |
| Raise capital | Meet with the Rural Utilities Service (RUS) and get a long-term but low interest rate loan. | Baker, RUS and FIW. |
| Enhance the legitimacy and security of project | Cooperate with bridge financing from National Rural Utilities Cooperative Finance Corporate (CFC) to cover the cost of construction | Baker, CFC and FIW. |

Scope stakeholders and external cooperatives are connected in the quality control activities. Their responsibilities are the deal-breaker of changing management plan, and the most important business requirements is to maintain environmental influences on the local community and residents. If the residents, for instance, suffer from the noise pollution caused by the operation of turbines, Baker and the project team need to reconsider the terms of management plan. Another crucial business requirement is to ensure the economic viability, reducing the existing electricity prices. If it's necessary, Baker and the project team should not hesitate to

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make changes of the management plan since the project sponsors and other involved stakeholders would be more than happy to approve such alternatives. Once selected, the changed management plans are ought to be implemented while the project team evaluate the performance of new management plan.

Reference

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- ITM.(2015). *Quality assurance*. Retrieved from <http://www.itmlimited.com/quality-assurance/>
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- Savage, H., Kennedy, J., Fox, B., & Flynn, D. (2008, September). Managing variability of wind energy with heating load control. In *Universities Power Engineering Conference, 2008. UPEC 2008. 43rd International* (pp. 1-5). IEEE.

Appendix: Project quality management plan approval

The undersigned acknowledge they have reviewed the Fox Islands wind Project (A) Project Quality Management Plan and agree with the approach it presents. Changes to this Project Quality Management Plan will be coordinated with and approved by the understanding or their designated representatives.

Signature: _____ Date: _____

Print Name: _____

Title: _____

Role: _____

Signature: _____ Date: _____

Print Name: _____

Title: _____

Role: _____

Signature: _____ Date: _____

Print Name: _____

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Title: _____

Role: _____

Signature: _____ Date: _____

Print Name: _____

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