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Implementing IPMA Standards In Managing Small-size/Non-complex Technical Projects: A Case Study Of A Photovoltaic Power Plant For A Residence

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Abstract

Two of the most common standards developed by the International Project Management Association (IPMA) are the IPMA Competence Baseline (ICB) and the project management baseline (pmb). Integrating the above two standards, as well as common project management body of knowledge and best practices, several project management text books propose handbooks and guidelines for more or less complex projects. Such handbooks are used to document all the current project contents related both to the management process and to the project results. Following a similar approach, the paper describes the development of a simple project handbook for the design and construction management of a relative small, low budget and non-complex photovoltaic power plant, presenting an actual case study of the installation of a 10 kW, roof-top, integrated photovoltaic system, for domestic use, in a residence building in the region of East Attica, Greece. At first, a brief description of the project is summarized, including general information and basic technical characteristics of the system. Next, the basic project planning documents, in the form of tables or charts, are deployed, taking into account the sequence they follow and the interrelationships between them. Finally, general conclusions regarding the whole process are stated.

Keywords

project management standards, IPMA Competence Baseline, project management baseline, project handbook, photovoltaic system

1. Introduction

Professional project management (hereafter pm) requires rigorous standards and guidelines in order to define the work of the involved personnel. Standards provide high-level description of concepts and processes that are considered to form good practice in pm. A standard is a document, issued by a recognized organization or institution, providing rules, guidelines or characteristics for the achievement of the optimum degree of order, in a given context (PMBOK, 2014). Project Management Institute (PMI) and International Project Management Association (IPMA) are two of the world's leading non-profit, professional membership, associations for pm, that develop and apply such standards in order to improve project success. (http://www.pmi.org, http://ipma.ch/about).

The aim of the present paper is to demonstrate the process of composing a simple project handbook for managing the project of the installation of a photovoltaic (PV) power plant, according to the IPMA standards. The whole procedure is described through an actual case study of the design and construction of a small, integrated PV system, for domestic exploitation.

2. Theoretical Background

IPMA founded in 1965 and now operates in six continents, spreading from Europe to Asia, Africa, the Middle East, Australia and North and South America, as a federation of 55 Member Associates. The organization aims to generate and promote professionalism in pm, lead the evolution of the pm profession and offer know-how, products and services in this field. In order to spread information about pm, IPMA provides a number of publications to be used by individuals or organizations, as general reference documents in the field of applied pm. (http://ipma.ch/about)

2.1 IPMA Standards: IPMA Competence Baseline (ICB) & project management baseline (pmb)

The most applied and wide spread IPMA Standard is the IPMA Competence Baseline (ICB), a common framework document developed in the 90s to ensure that consistent and harmonized standards are applied when handling with projects and programs. It provides the foundation for pm learning and development, as well as the official definition of the competences expected from pm professionals for their certification using the universal IPMA four-level certification system (http://ipma.ch/resources/ipma-publications). ICB, in its current third version (Version 3.0) edited in June 2006, uses the "eye of competence" as an appropriate symbol, representing the integration of all the elements of pm as seen through the eyes of the professional specialist who plans and controls a project, the project manager. Besides his indispensable technical competence, behavioral competences such as motivation and leadership are also essential, as well as dealing successfully with the organizational, economic and social context of the project. ICB groups a total of 46 pm competence elements in three ranges: the technical range, covering the pm content with 20 technical elements, the behavioral range, covering the project manager's attitudes and skills with 15 behavioral elements, and the contextual range, covering the project manager's competence in managing relations with the line management organization with 11 contextual elements (ICB, 2006). The ICB eye of competence, which represents the integration of all the above elements, as considered through the eyes of the project manager, is depicted in the following Figure 1.

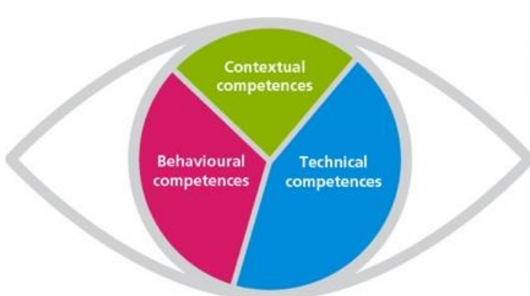

Figure 1: The Eye of Competence
(source: ICB, Version 3.0)

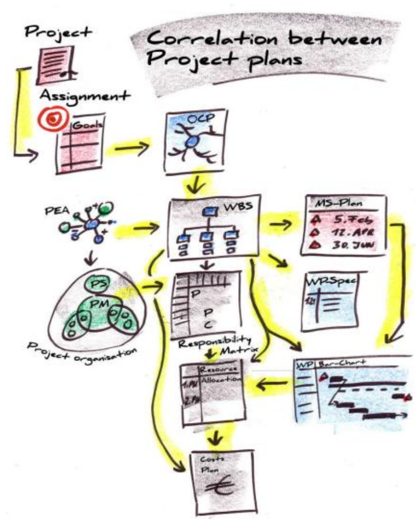

Figure 2: Project plans interconnections
(source: pmb, Version 3.0)

Project management baseline (pmb), the official standard of the Austrian pm IPMA associate (i.e. Projekt Management Austria), was first issued in 1999 and is already running its fifth update since 2009 (Version 3.0), constituting a useful manual of relevant knowledge elements, structured by definitions and process descriptions. It offers a consistently documented approach and ensures the consistent use of pm terminology, structured in three major chapters, in accordance with the three ranges of competence of the ICB Version 3.0: i) an overview of the basic methods for the pm technical competences, structured by the pm sub-processes in which they are predominantly used; ii) a selection of the key elements of behavioral competences, focusing on the social competences, which are defined as the potential of a person in a role to act in a cooperative and self-organized way and iii) ways and means of managing project-oriented organizations, describing their model and specific features and presenting the most significant key elements of the pm context competences (pmb, 2009). Pmb emphasizes in the course of planning and preparing the various project plans, illustrating the interrelationships between the central pm methods that must be considered. Figure 2, cited in the previous page, depict the basic project plans, along with their interconnections, according to pmb Version 3.0.

2.2 Project Handbooks

In the last decade, several pm text books appeared trying to incorporate standards and procedures (like ICB or pmb) in the pm context, many of them written in national IPMA associates' language (Gareis, 2006; Reyes and Almela, 2006 and Pantouvakis, 2013). Such books were meant to serve as an introduction and overview of the essential knowledge and skills required for managing projects. They also aimed at improving pm processes in organizations, as well as educating professional project managers or team members and practitioners, to achieve the IPMA´s project certification levels.

Project handbooks are created for documentation purposes and more specifically to document all the current project contents, related both to the management process and to the project results. They represent a central instrument of communication, providing systematic project description and consistent structure, which provide a clear insight into the project development (pmb, 2009). Implementing the structure of the basic IPMA standards and combining related literature, Pantouvakis (2013) attempted a pm reference "manual", the first one in Greek, demonstrating a simple project handbook through a case study of a hypothetical, non-technical, small project of a social event. The proposed handbook consists of six basic project plans (objectives, environment analysis, work breakdown structure, organization chart, milestones and budget) and organizes them, establishing their links, following the pmb (Version 3.0) approach.

3. Case Study Presentation

3.1 Project Description

Photovoltaic process is the direct conversion of sunlight to electricity and an attractive alternative to conventional sources of electricity supply. In simple words, a PV system is a complete set of interconnected components for converting sunlight into electricity power, consisting of a PV array, a balance-of-system and a load.

As stated before, the project involves the planning, design and construction of a 10 kW, roof-top, integrated, self-mounted, PV system. The PV plant was installed in a flat-roof of a single-house building of average energy requirements, in the region of East Attica, Greece, meant to be used for domestic exploitation. The project was carried out by a private technical construction company, on behalf of an individual, who was the owner and resident of the building. The general information of the project, as well as the main technical features of the basic system components, is summarized in Table 1, cited in the next page (Petridis, 2014).

Table 1: Project description

General information		Technical features	
Title	Instalation of a 10 kW, roof-top, PV system	**PV array**	42 solar modules
Owner	Individual	**PV modules**	SCHUCO MPE 235 W (60 solar cells) in the PS 04 series
Location	Single-house in East Attica Region, Greece		
Designer	ErgoDesign Technical Company	**Solar cells**	polycristalline; 16,7% cell efficiency
Contsructor	Ergo Green Energy E.E.	**Inverters**	FRONIUS IG PLUS: 120 V-3, three phase, nominal output 10.0 kW
Financing	Self funds		
Cost	≤ 20.000 €	**Mounting system**	SCHLETTER Standard, aluminium
Duration	≈ 3,5 months	**Electrical instalation**	ABB GEMINI, solar cables 6 mm^2

3.2 Project Handbook Overview

Taking into consideration the technical nature of the presented project, the proposed handbook is structured in seven basic parts, each one consisting of different project plans or charts. These are:

- Part I: Project objectives definition → *Project Objectives Plan*
- Part II: Project environment analysis → *Project Environment Diagram*
- Part III: Work Breakdown Structure → *Project Work Breakdown Structure*
- Part IV: Project organization → *Project Assignment Plan, Project Organization Chart, Project Responsibility Matrix, Organization Description Plan*
- Part V: Project scheduling → *Milestones Plan, Gantt Chart*
- Part VI: Risk analysis → *Risk Assessment Table, Risk Evaluation Matrix*
- Part VII: Cost analysis → *Project Cost Plan*

3.3 Project Handbook Presentation

3.3.1 Part I: Project objectives definition

The first step in the course of the project is to define the project scope and context by setting the project's objectives. They should clarify the meaning of the project and describe the desired results at its completion, and can be broken down into main, additional and non-objectives. The project objectives are listed in the Project Objectives Plan, presented in the following Table 2.

Table 2: Project Objectives Plan

Objective type	Objective description
Main Objectives	1. Elecrical power cost reduction
	2. Contribution on carbon dioxide (CO_2) emissions reduction
	3. Potential for future full energy autonomy
Additional Objectives	1. Minimization of optical irritation from equipment installation
	2. Site's area optimization for alterate usage of the flat – roof
	3. Maximization of energy supply performance with the use of proper equipment
Non-Objectives	1. Equipment maintenance after project completion

3.3.2 Part II: Project environment analysis

The analysis of the project environment is a process of determining and evaluating the relationships and influences of various "relevant" internal and external social environments on the project. These relationships have been assessed and characterized as positive, negative or neutral, using the symbols (+), (-), or (±) respectively. Figure 3, cited in the next page, depict the Project Environment Diagram, which represents schematically the influences of the different internal and external environments on the project.

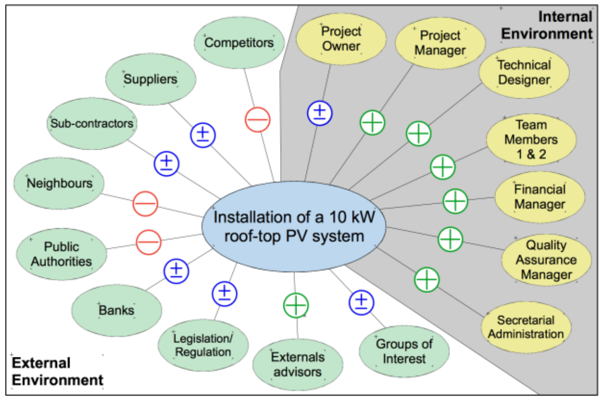

Figure 3: Project Environment Diagram

3.3.3 Part III: Work Breakdown Structure (WBS)

Work Breakdown Structure (WBS) represents a classification of all the tasks to be performed in the project into work packages that can be planed and managed, displayed as a tree diagram. The project's WBS is structured into four levels, where the first two of them represent the entire project and the main execution phases respectively, while the third and fourth one analyze the work packages in each one of the phases. In the proposed WBS, management throughout the whole project, although not constituting a separate task in the project execution, is displayed as an autonomous project phase, in order to be included and considered in the cost analysis of the project and in the formulation of the final project budget. Figure 4 presents schematically the tree diagram of the Project Work Breakdown Structure.

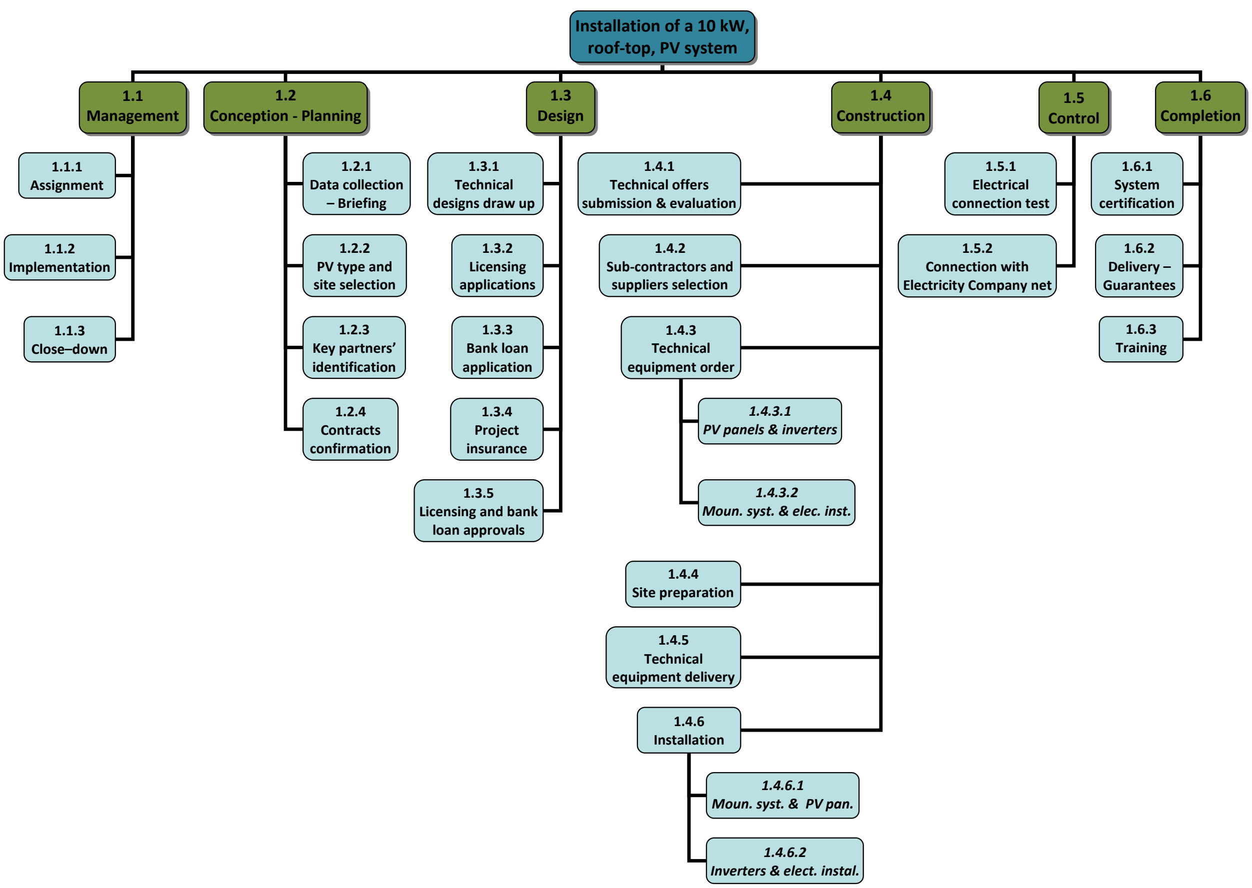

Figure 4: Project Work Breakdown Structure

3.3.4 Part IV: Project organization

In the project start, the Project Assignment Plan is the formal opening document of the project that states the basic information about the object, duration, cost, main phases and the various team parts involved (Gareis, 2006), presented in the following Figure 5. The organizational form that is being applied in the presented project is the pure project organization, with a core project team and three separate sub-teams, where the project manager has formal authority over the project team members and other contributors. The Project Organization Chart illustrates the project roles, their interrelationships and the project communication channels, depicted in the following Figure 6.

PROJECT ASSIGNMENT PLAN	
Project Opening Session Company office	**Project Start Date** 31/7/2014
Project Closing Session Project site	**Project Closing Date** 15/11/2014
Project Object Design and construction of a 10 kW, roof-top, PV system, in a residence in East Attica	**Project Non-Object** PV system maintenance
Project Phases Management Conseption - Planning Design Constuction Control Completion	**Project Budget (€)** **19.000 €**
Project Owner XXXXXXXXXXXXXXXXX	**Project Manager** XXXXXXXXXXXXXXXX
Project Team	
Secretarial Administration	XXXXXXXXXXXXXXXXX
Technical Designer	XXXXXXXXXXXXXXXXX
Quality Assurance Manager	XXXXXXXXXXXXXXXXX
Financial Manager	XXXXXXXXXXXXXXXXX
Project Team Member 1	XXXXXXXXXXXXXXXXX
Project Team Member 2	XXXXXXXXXXXXXXXXX

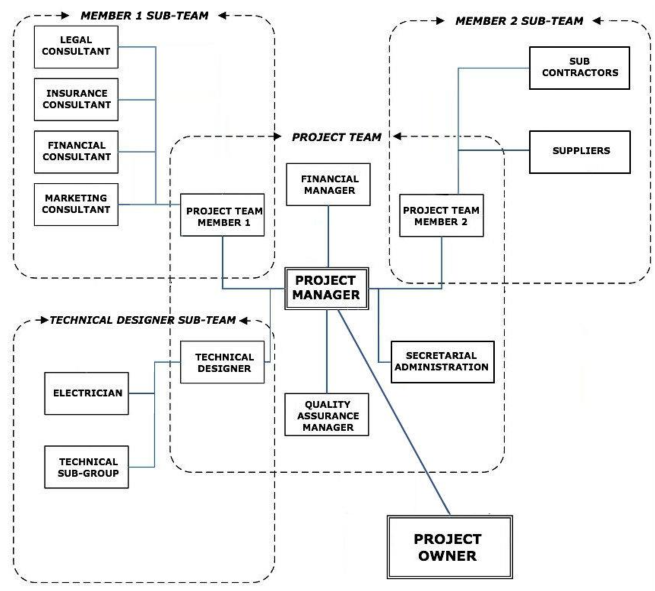

Figure 5: Project Assignment Plan **Figure 6: Project Organization Chart**

The Project Responsibility Matrix is a matrix table used to provide clarity for all the project team members, concerning their expected level of involvement in the project. In this matrix, every project team member who is responsible for planning and ensuring that a task is executed properly, or other team members who are involved in some way in the activity, are identified (Lock, 2013). The designation of the role of a project team member within the matrix is illustrated using the technique with the acronym RACI. In this approach, the responsible team member for an activity is indicated with an **"R"** and for cross-functional activities other team members contributing on the activity are indicated with a **"C".** Activities requiring approval of one or more of the team members are indicated with an **"A"** and for those team members who need to be informed that an activity has been completed, the indication is marked with an **"I".** On the other hand, the Organization Description Plan is a detailed table that summarizes the main responsibilities of the involved project team members, in each one of the project phases they play a substantial role (Lock, 2013). Tables 3 and 4, both cited in the next page, present the Project Responsibility Matrix and the Organization Description Plan, respectively.

3.3.5 Part V: Project scheduling

Milestones' planning, determining the project deadlines, and bar charts are the most common scheduling methods in pm, for either the different project phases, or the individual work packages. Milestones' planning is the crudest planning method, with the work packages of the WBS being used as the basis. In the presented project, four milestones were selected in critical work packages for the project process: i) 1.2.4, ii) 1.3.5, iii) 1.4.5 and iv) 1.5.2. The Critical Path and the project completion time were determined with the construction of the Gantt bar chart, using the Ms Project 2007 software. A plot of the detailed Gantt chart, presenting phases and work packages duration, milestones (rhombus), critical activities (red bars) and slack (green lines) of non-critical activities, is depicted in Figure 7, cited in the next page.

WBS CODE/PHASE	WBS CODE/WORK PACKAGE	Project Manager	Technical Designer	Quality Assurance Manager	Financial Manager	Project Team Member 1	Project Team Member 2
1.1/Management	1.1.1/Assignment	R					
	1.1.2/Implementation	R	C				
	1.1.3/Close – down	R		C			
1.2/Conception-Planning	1.2.1/Data collection – Briefing	I	R				
	1.2.2/PV type and site selection	A	R				
	1.2.3/Key partners identification	R	C				
	1.2.4/Contracts confirmation	R					
1.3/Design	1.3.1/Technical designs draw up	I	R	C			
	1.3.2/Licensing applications	I	R			C	
	1.3.3/Bank loan application	I			A	R	
	1.3.4/Project insurance	I			A	R	
	1.3.5/Licensing and bank loan approvals	I	R		A	C	
1.4/Construction	1.4.1/Technical offers submission & evaluation	R					C
	1.4.2/Sub-contractors and suppliers selection	R					C
	1.4.3/Technical equipment order						
	1.4.3.1/PV panels & inverters	A		C			R
	1.4.3.2/Mounting system & electrical installation	A		C			R
	1.4.4/Site preparation	I	R				
	1.4.5/Technical equipment delivery	I		C	A		R
	1.4.6/Installation						
	1.4.6.1/Moynting system and PV panels	I	R				C
	1.4.6.2/Inverters & electrical installation	I	R				C
1.5/Control	1.5.1/Electrical connection test	I		R			C
	1.5.2/Connection with Electrical Company net	I		R			C
1.6/Completion	1.6.1/System certification	I		R			
	1.6.2/Delivery – Guarantees	R		C			
	1.6.3/Training	I	C				R
Abriviations:							
R: Responsible	A: Approval	I: Informed		C: Contribute			

Table 3: Project Responsibility Matrix

PROJECT TEAM MEMBER	WBS CODE/ PHASE	MAIN RESPONSIBILITIES
PROJECT MANAGER	1.1 Management	Prepares the project handbook
		Assigns roles to the project team members and coordinates their action
	1.2 Conseption - Planning	Approves the PV type and the installation site
		Tracks down the potential partners for the project (sub-contr., suppliers)
		Edits and signs the final contract with the project owner
	1.4 Construction	Evaluates the technical offers from sub-contractors and suppliers
		Selects the sub-contractors and suppliers for the project execution
		Authorizes the materials and technical equipments order
	1.6 Completion	Delivers the PV system with the accompanying guarantees to the project owner
TECHNICAL DESIGNER	1.2 Conseption - Planning	Gathers all the technical data and information for the PV system
		Selects the PV type and the proper site for the installation
	1.3 Design	Prepares the technical designs
		Prepares and submits the applications for the necessary licensing
		Receives and checks the final system's licensings
	1.4 Construction	Supervises the preparation of the site and gives final approval for the system installation
		Supervises the proper implementation of the technical design during the installation of the technical equipment
QUALITY ASSURANCE MANAGER	1.4 Construction	Sets the quality specifications for materials and technical components
		Keeps record of the quality certifications of the equipments
	1.5 Control	Supervises and checks the final trial of the PV system
		Supervises the procedure of the system connection with the Electricity Company net
	1.6 Completion	Authorizes the certification of the entire PV system
FINANCIAL MANAGER	1.3 Design	Edits the application for the bank loan
		Approves the terms and conditions of the project insurance program
		Approves the terms and conditions of the bank loan
	1.4 Construction	Authorizes the payments fot the delivered materials and equipments
MEMBER 1 SUB TEAM	1.3 Design	Gathers all the necessary documents and certificates for the bank loan application submission
		Handles the necessary documentation for the project insurance
		Keeps up with the progress of the licensing approvals
MEMBER 2 SUB - TEAM	1.4 Construction	Carries out the orders of the materials and the technical equipment
		Checks and receives the delivered materials and technical equipment
		Supervises the instalation of the technical equipment
	1.5 Control	Performs the trials for the PV system operation
		Submits the application and the necessary certificates for the connection with the Electricity Company net
	1.6 Completion	Demonstrates the functions of the PV system to the project owner
SECRET. ADMIN.	All Phases	Keeps and clasifies all the project records, contracts and documents
		Supports all the project sub-teams and members

Table 4: Organization Description Plan

3.3.6 Part VI: Risk analysis

The risk analysis process comprises the stages of risk identification, risk assessment and risk evaluation. Risk assessment is defined as the likelihood of various events occurring, combined with the impact of these events on the project, mainly on time and cost increase, and can be reported in a Risk Assessment Table. Due to space limitation, the Risk Assessment Table of the project, presented in Table 5 in the next page, reports only a number of the identified project risks. Risk evaluation is conducted by comparing the risks assessed with a tolerable risk level, presented in the Risk Evaluation Matrix. If the expected risk value is greater than the tolerable level of risk, then preventive risk response measures must be taken. Table 6, cited also in the next page, presents the Risk Evaluation Matrix of the project.

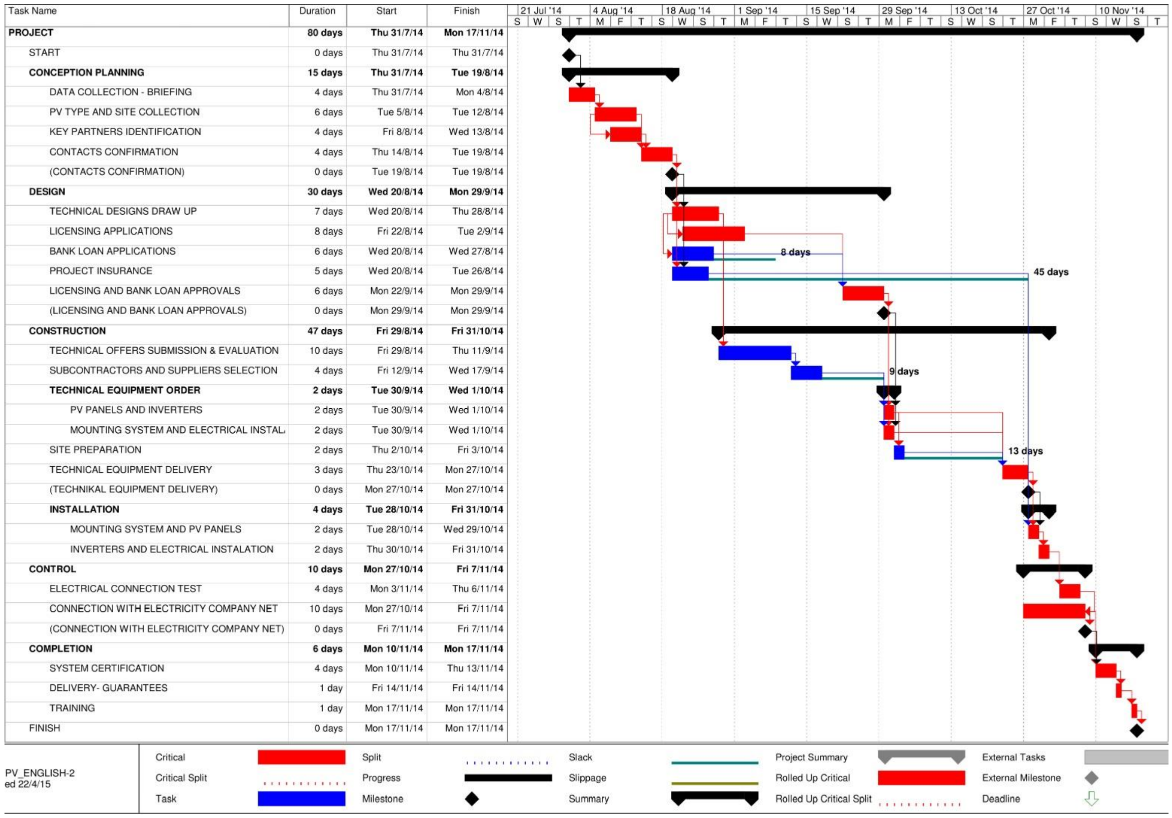

Figure 7: Detailed Project Gantt Chart

WBS CODE/ PHASE	RISK CODE	RISK DESCRIPTION	PROBABILITY (P)	CONSEQUEN (C)	EXPOSURE (P*C)	RESPONSE
1.1/ Management	R_2	Poor project management	10%	0,80	0,08	F_3
	R_4	Taxation and legislation restrictions	50%	0,40	0,20	F_4
	R_5	Poor risk management	30%	0,80	0,24	F_3
1.2/Conception Planning	R_8	Inappropriate data collection	30%	0,40	0,12	F_1
	R_9	Deficient partners identification	10%	0,80	0,08	F_1
1.3/Design	R_{11}	Late licencing approvals	50%	0,40	0,20	F_4
1.4/ Construction	R_{12}	Natural hazards/disasters	10%	0,40	0,04	F_2
	R_{15}	Delay on equipment delivery	30%	0,40	0,12	F_1
	R_{16}	Labour accident	10%	0,40	0,04	F_1
	R_{17}	Reactions from neighbors or inhabitants	10%	0,20	0,02	F_1
1.5/ Control	R_{18}	Late authorization from Electricity Company and connection with the net	50%	0,40	0,20	F_4

Response actions annotation			
F_1: Risk elimination with precaution measures	F_2: Risk diversion and shifting to other parts	F_3: Mitigation of risk likelihoood/consequence	F_4: Risk acception undertaking cost

Table 5: Risk Assessment Table

PROBABILITY (P) \ CONSEQUENCE (C)	VERY LOW (0,05)	LOW (0,1)	MEDIUM (0,2)	HIGH (0,4)	VERY HIGH (0,8)
VERY HIGH (90%)					
HIGH (70%)		R_3			
MEDIUM (50%)				R_4 R_{11} R_{18}	
LOW (30%)				R_8 R_{15}	R_5
VERY LOW (10%)		R_7	R_1 R_6 R_{10} R_{17}	R_{12} R_{13} R_{14} R_{16}	R_2 R_9
	RISK EXPOSURE (P*C)				
	LOW EXPOSURE		MEDIUM EXPOSURE		HIGH EXPOSURE

Table 6: Risk Evaluation Matrix

3.3.7 Part VII: Cost analysis

Project Cost Plans are used to record and document project costs and to provide a clear overview of their development. The objects of consideration in cost planning are the work packages of the WBS. The structure of the Project Cost Plan should match the structure of the WBS in order to make integrated project planning and integrated project controlling possible. Basic types of project costs are usually differentiated according to functional criteria (such as personnel costs, material costs, equipment costs, administrative and sales costs, costs for minimizing risks) and according to activity, as fixed or variable costs (PMBOK, 2014). Table 7, cited in the next page, reports the analytical Project Cost Plan.

Table 7: Project Cost Plan

W.B.S. CODE	PHASE	WORK PACKAGE	MEASURE UNIT	QUANTITY	COST/UNIT (€)	SUBTOTAL (€)
1.1	Management	Assignment				
		Project Manager	HOURS	2,0	25,00	**50,00**
		Project Team	HOURS	2,0	20,00	**40,00**
		Implementation				
		Project Manager	HOURS	4,0	25,00	**100,00**
		Project Team	HOURS	4,0	20,00	**80,00**
		Close – down				
		Project Manager	HOURS	5,0	25,00	**125,00**
		Project Team	HOURS	5,0	20,00	**100,00**
	PHASE TOTAL (€)					**495,00**
1.2	Conception – Planning	Data collection – Briefing	HOURS	3,0	25,00	**75,00**
		PV type and site selection	HOURS	3,0	25,00	**75,00**
		Key partners' appointment	HOURS	2,0	25,00	**50,00**
		Contracts confirmation	HOURS	2,0	12,50	**25,00**
	PHASE TOTAL (€)					**225,00**
1.3	Design	Technical designs draw up	DAYS	2,0	200,00	**400,00**
		Licensing applications	HOURS	6,0	12,50	**75,00**
		Bank loan application	HOURS	8,0	12,50	**100,00**
		Project insurance	kWATT	10,0	15,00	**150,00**
		Licensing and bank loan approvals	DAYS	1,0	100,00	**100,00**
	PHASE TOTAL (€)					**825,00**
1.4	Construction	Technical offers submission & evaluation	DAYS	0,5	100,00	**50,00**
		Sub-contractors and suppliers selection	HOURS	0,5	480,00	**240,00**
		Technical equipment order				
		PV panels & inverters	WATT	10.000,0	0,93	**9.300,00**
		Mounting system & electrical installation	WATT	10.000,0	0,20	**2.000,00**
		Site preparation	DAYS	1,0	200,00	**200,00**
		Technical equipment delivery	WATT	10.000,0	0,07	**650,00**
		Installation				
		Mounting system & PV panels	WATT	10.000,0	0,05	**500,00**
		Inverters & electrical installation	WATT	10.000,0	0,02	**200,00**
	PHASE TOTAL (€)					**13.140,00**
1.5	Control	Electrical connection test	DAYS	0,5	250,00	**125,00**
		Connection with Electricity Company net	DAYS	0,5	250,00	**125,00**
	PHASE TOTAL (€)					**250,00**
1.6	Completion	System certification	HOURS	6,0	25,00	**150,00**
		Delivery – Guarantees	HOURS	2,5	25,00	**62,50**
		Training	HOURS	1,0	12,50	**12,50**
	PHASE TOTAL (€)					**225,00**
	OVERALL TOTAL (€)					**15.160,00**
	V.A.T. (€)					**3.486,80**
	OVERALL TOTAL + V.A.T. (€)					**18.646,80**

4. Conclusions

Standards, if consistently applied, help organizations to achieve professional excellence or projects to be successfully completed. The same applies for technical projects too, even for small-size or non-complex ones. Significant benefits from the implementation of such standards, like the ones developed by IPMA, and the adoption of the use of a project handbook, can come up both for the project owner (better cost control, on time completion) as well as for the project constructor (improved project organization, increased customer satisfaction, greater flexibility in execution, standardization of risk management).

5. References

A Guide to the Project Management Body of Knowledge (PMBOK® Guide) (2013). 5th Edition, PMI

Gareis, R. (2006). *Happy Projects! (in German)*, 3rd Edition, Manz'sche Verlags.

ICB – IPMA Competence Baseline, Version 3.0 (2006). Nijkerk: IPMA

Lock, D. (2013). *Project Management*, 10th Edition, Gower Publishing Limited, U.K.

Pantouvakis, J.P. (2013). *Project Management with IPMA standards (in Greek)*, Athens.

Petridis, D.P. (2014). *Design and construction of an integrated photovoltaic system into a residence, with the IPMA management method (in Greek)* (M.Sc. Thesis). Hellenic Open University, Patra, Greece.

Project management baseline, Version 3.0 (2009).Wien: Projekt Management Austria

Reyes, J. and Almela J. M. (2006). *Processes in Projects and Project Management Competences (in Spanish).* Confirmation of revised paper submitted