

AMERICAN UNIVERSITY OF BEIRUT

OPERATIONAL VARIATIONS OF EPC DELIVERY
APPROACH OF POWER PLANT PROJECTS,
COMPARISON OF CURRENT REGIONAL EPC
CONTRACTS VERSUS FIDIC

by
VARTENIE MARDIROS ARAMALI

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submitted in partial fulfillment of the requirements
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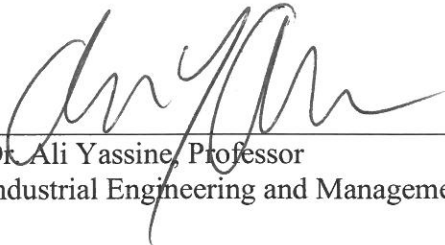
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AN ABSTRACT OF THE THESIS OF

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Title: Operational Variations of EPC Delivery Approach of Power Plant Projects,
Comparison of Current Regional EPC Contracts versus FIDIC.

The governmental electricity generation companies in MENA, rely on the expertise of foreign engineering consultants to draft their own request for proposals, in an EPC project delivery approach, for simple and combined cycle power plant projects. Through different bidding procedures, these Employers will award the project to the best local or international Contractor. The power plant EPC Contracts in MENA do not follow any standard form of Contract such as FIDIC, which represents an international contract template reflecting the best practice principles where the project risks are allocated fairly between Employer and Contractor. Benchmarking the contractual conditions of this international contract standard versus the RFPs becomes essential in judging where the RFPs stand in risk allocation.

For this purpose, this research relies on the study of five current combined cycle power plant tender documents from five major countries in MENA, representing five different Employers. The research methodology is first highlighting the practice of a current industry practitioner, a leading Contractor while addressing these tender documents. Second, it reflects a comparative analysis of the RFPs' instructions to bidders one versus the other. Third it moves to the comparison of the general and particular conditions of the RFPs between each other and versus FIDIC.

The research concludes with observations on the RFPs. First, the RFPs do not follow a typical common bidding practice for a similar project. Second, they differ in most of their instructions to bidders. Third, they carry many deviations in general and particular conditions from FIDIC that the research highlights. The outcomes highlight the risks that an EPC Contractor will encounter. Such risks include inaccurate price estimation, offer rejection, securing the bid, bid evaluation transparency, unspecified time of possession to site, stringent delay damages and overloaded milestones. Finally, the research provides guidelines for the industry practitioners to improve their competitiveness and execute future successful projects.

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ABBREVIATIONS

FIDIC: International Federation of Consulting Engineers

RFP: Request for Proposals

DB: Design-Build

DBB: Design-Bid-Build

EPC: Engineering, Procurement, Construction

EPCM: Engineering, Procurement, Construction Management

BOT: Build-Operate-Transfer

IPP: Independent Power Producer

JV: Joint Venture

EPCT: Engineering, Procurement, Construction Turnkey

DAB: Dispute Adjudication Board

*To My
Beloved Family*

CHAPTER 1

INTRODUCTION

1.1. Research Background

The power generation industry has been enormously evolved during the last century. It has gathered scientists, scholars, researchers, engineers, consultants, suppliers, Contractors, clients, lawyers, bankers, and developers in a very diverse, large and profitable engineering area. The projects of this industry are multi-disciplinary projects where mainly the civil, the mechanical, the electrical and the instrumentation & control disciplines meet together to fulfill at least the project's technical requirements and aspects. As the world is busy searching for new power sources with emphasis on the renewable ones to generate electricity, the Middle East and North Africa (MENA) region remains very rich in non-renewable resources and becomes a huge producer and consumer of fuel such as natural gas, gas oil, crude oil and others when contributing to the power industry and the current power plants. According to the World Bank, it contains approximately 57% of the world's oil sources and 41% natural gas sources (World Bank, 2010). Only lately, it has started to shift towards renewable power supply. It is estimated that MENA will invest \$35 billion in renewable energy every year by 2020 (Trade Arabia News Service, 2016). To meet power demand, whether by consuming renewable or non-renewable resources in the region, is a responsibility and challenge handled by the governments and ministries. Reference to this demand, when looking at where the world stands versus the region and according to the World Energy Outlook 2015, around 17% of world population does not have access to electricity (World Energy Outlook, 2016). Among this 17%, 8% is in Middle East and 1% is in

North Africa. Furthermore, it is estimated that the demand will increase by 7% annually in MENA up until 2020. “One of the key drivers of the surging power demand in the MENA region is due to rapid population growth,” said Anita Mathews, Director of Informa Energy Group (Middle East Electricity, 2015). On the other hand, according to MEED, the generating capacity shall increase to 400,000 MW by 2020 (Middle East Business Intelligence, 2016). Therefore new and additional power plants need to be constructed to meet this increase.

The key players for electricity providers in MENA, who are actively involved in generation, transmission and distribution of electric power are normally governmental entities. These Institutions rely on the expertise and capabilities of foreign engineering consultants to write their own specifications and tender documents for the power projects. The consulting firms actively involved in these tasks are normally from Australia, France, US, Germany, Belgium to many possible other countries.

The power industry is known to be complex and rapidly expanding as technology advances and construction industry grows. This complexity does not only require technical professionals, but also professionals who will complement each other such as contract administrators, lawyers and experts in project control, project management, construction management, quality and safety, logistics, material management, business development, economics, estimation, finance, etc. The focus of the research will be in contract administration. To execute any project, a contract agreement has to be prepared first, as a tool and guideline under which the roles, duties and obligations of each party is clearly addressed, agreed upon and signed. The Owner has to come to select the proper delivery approach for its project. Among these delivery approaches are the traditional approach, Design-Build, EPC (Engineering, Procurement Construction), Build-Operate-Transfer (BOT) and other alternative and innovative

approaches. Each has its own advantages and disadvantages. In the traditional approach, the designer is a separate entity, the general Contractor is only covering the construction and the contract is a fixed lump sum. Through bidding, after the design has fully completed, the general Contractor will be awarded for construction (Gordon, Choosing Appropriate Construction Contracting Method, 1994). In Design and Build approach, the organization will fully and only be responsible on the design and construction of the project (A. B., 2010). Engineering, Procurement and Construction approach comes to be different than the traditional and Design-Build. The Engineering, the Procurement and the Construction occur concurrently in time (Pham & Hadikusumo, 2014). Here, the Contractor is the responsible entity for all the elements of the project including design and engineering, equipment and material supply, construction, Testing and Commissioning and handing-over (Stuart, 2009). Since the power projects in the region are aimed to be fast-track, the turnkey lump-sum EPC delivery approach with overlapped engineering and construction phases is the norm, the most applicable and preferred contract model, based on knowledge and project past experiences. In this way, the Owner will simply receive the “key” and take over to operate the plant (Lalit, 2015).

These EPC Contracts in the MENA are similar in scope of work and do not follow any standard contract forms such as FIDIC. FIDIC stands for International Federation of Consulting Engineers, an organization which offers standardized contract terms and conditions that can be applied to any agreement. It is a result of human experience, knowledge acquisition and years of lessons learned to secure successful project execution and completion. It is a guide which has been formed for the benefit of owners, Contractors and engineers with respect to the best practice principles (k, Jaeger, & Sebastian, 2010). It is not specific only to power projects, but can also be used in all types of projects.

1.2. Problem Statement

Having multiple and varied consultants of different origin handling the Employer's contracts in the region, provide the possibility of having diversified contract terms and conditions to be implemented. On the other hand, it is the same key Contractor, active within the different countries, who executes the projects for the different Employers. In theory, the entities who will sign a contract agreement with each other, would prefer to rely on an International general common standardized forms of contracts acceptable worldwide for various reasons such as giving a fair distribution of risk allocation, providing less chances of disputes throughout the project, handling unexpected events and ensuring a common interpretation of clauses. In practice, The Contractor, being responsible of the whole contract as a single entity in contact with the Owner, is obliged to accept the Owner's drafted requirements and conditions as they are before and after award of the project. Whether these conditions are balanced like the standard FIDIC or not is the question. Through the clarification and deviation process during bidding stage, Contractor has the single chance to suggest a deviation, to object and/or at least to discuss the requirements set by the Owner. In this case, not understanding the background of the contract requirements, and the possible modifications to incorporate to the advantage of the Contractor will increase the risk of losses, challenges, dead-ends, and conflicts throughout the project execution. This research work does not aim to change the existing contracts, but rather to highlight and expose problematic clauses and concern areas in the contracts.

1.3. Research Objective

After collecting and studying the current RFP power plant tender documents of major countries from the MENA region, the research objective is first to compare these

sets of requirements and conditions to one another and to highlight the prevailing similarities and differences. Second, the objective is to investigate how collectively such owner-imposed conditions differ from the balanced FIDIC contract conditions, in order to acknowledge if the risks are fairly allocated between the parties.

1.4. Methodology

The research methodology is as follows:

1. Perform a thorough literature review with regards to various subjects such as contract models and EPC Contracts related to industrial, simple and combined cycle power projects, as well as data collection on the power sector in the MENA region.
2. Document the typical steps of bidding procedure followed by the Contractor, to clearly understand the overall picture of the EPC project and the Contractor's role in the process of addressing the RFP's requirements and conditions.
3. Collect, study, and compare typical RFPs from major countries in the MENA region; and highlight similarities and differences along the technical and commercial aspects.
4. Study the 1999 FIDIC contract conditions and benchmark the conditions embedded in the collected RFPs to the same.
5. Offer research conclusions, recommendations and limitations.

CHAPTER 2

LITERATURE REVIEW

This chapter represents a collection of information and data referring to both academic and non-academic resources that pertain various subjects in the Power field whether worldwide or specific to MENA region. The chapter starts with a global view of this field which is identified by the Construction and Energy sectors, and then proceeds into a specific view which is identified with a given construction power project proposals and related project related issues.

The global view is important to be noted for two reasons. First, because it provides an insight on the energy sector which is represented by the current status of the region in relation to the human population's crucial necessity for electricity. Second, because the construction sector is actually the mean and platform that invite stakeholders such as developers, lenders, contractors, engineers and others to realize and the projects to cover the population's crucial necessity for electricity. In this way, the reader can understand the relevance of power construction projects delivery today.

In addition to the discussion of these two sectors, the chapter denotes the existing project delivery approaches, after which it zooms in into the proposal stage of a given power project, which comprises of proposal preparation and bidding characteristics such as bidding method, prequalification criteria and other. Reader must note that the key project participants in the research are mainly the Employer and the Contractor, no other participant is emphasized. Finally, the chapter ends with project specific and important management issues such as project challenges, risks and other. These issues are typically faced while realizing any specific given

project.

2.1. MENA Power Field

The Power Field in the MENA region is full of investment opportunities in constructing power projects, whether of renewable or non-renewable type. These investments will cover the realization of such projects with the proper planning up since initial proposal stages up until successful project completion and operation. When it comes to the Energy sector in MENA, the exploitation and benefit of renewable resources is as equally important as the non-renewable ones. Therefore both aspects are covered in this section. The following highlights MENA's involvement and status within the power field in terms of Construction and Energy.

2.1.1. Construction & Energy Sector

Both Construction and Energy sectors are discussed separately in the following sections:

2.1.1.1 Construction Sector

The construction industry in MENA has been booming for a while. Public and private corporates spend large amounts of funds in construction projects. A close look in the recent decade shows the following situation of the regional countries. Based on Citi's MENA Projects Tracker in 2014, \$2.5 trillion dollars' worth of projects are under construction in the region. Qatar is highly active in getting prepared for FIFA World Cup 2022. Dubai is highly active in getting prepared for World Expo 2020 (The Middle East Magazine, 2014). Jeddah's one kilometer tower is under construction (Popular

Science, 2016). Egypt's construction industry has faced growth to accommodate the growing population (Azzam, E. K., & M., 1999).

The power plant construction sector goes in parallel with the infrastructure field. Timetric Construction Intelligence Center's study of 2015 shows that out of 21 countries analyzed, Saudi Arabia is the leader of Middle East and Africa in the power plant field with power projects worth \$150 billion (Power Engineering International, 2015). MENA's construction market value for power and water projects is worth around \$300 billion, while the value for civil projects is worth \$800 billion. The construction market is broken down into segments where power and water segment share a 12% of the overall market (SHUAA, 2013). On the other side, the unanticipated decline in oil prices has become the major current challenge in construction in the region. For this reason, the construction industry turned on hold in MENA with a concern of investors in the market (Writer, 2016).

MENA continues to rely on energy source exploitation in the construction industry. The following section discusses the Energy sector within the region.

2.1.1.2. Energy Sector

The Energy sector has a direct impact on a country's economy. For example, since 1970, Tunisia has experienced, via the petroleum sector, a development in finance and economy only through the exporting of oil from the country to abroad (Malgas, Gratwick, & Ant, 2011). In the same time, in a vice versa way, economy can also affect the energy sector. For example, economy provides the possibility to finance billion dollars of worth nuclear power projects, however, when it strikes, the construction of any new nuclear power projects could not be possible to implement (Barry, 2009). Not

only do the petroleum and the nuclear energy constitute the energy supply of the power sector, but also others including renewable energy sources such as sunlight, geothermal heat, wind, rain and others which play an accompanying role in power sources. Siemens AG, the global leading supplier for power generation, estimates in its technical report presented during the Power Gen Asia 2013 (the world's largest power generation exhibition and conference), that one third of the estimated 7,000 gigawatts of capacity of the world's power plants until 2030, will use renewable sources of energy, the sources mentioned above (Bierdel, Bullinger, & Hagedorn, 2013). In the Middle East and North Africa, the renewable energy investment budget reaches \$35 Billion every year by 2020 based on the International Renewable Energy Authority (IRENA) which was mentioned during the World Future Energy Summit 2016 (Trade Arabia News Service, 2016). Further discussion on renewable energy will be covered in the following sections.

Involvement in the energy sector is an attribute and characteristic of the MENA region. To raise and grow in economy and opportunities in the Kingdom of Saudi Arabia, one of the missions stated by the Saudi Council of Engineers is to create and invest in Energy, on top of transportation and other industries such as IT, mining and aviation. When referring to Energy by the Council, the petrochemicals, the minerals, power and water are the energy divisions (Saudi Council of Engineers, 2012). In this regard, Saudi Council of Engineers has also expressed that Aramco plans to invest \$70 billion in oil and gas sector's expansion and upgrade. The refining capacity will reach 2 million barrels, of which one million will be in Saudi Arabia's refineries. Saudi's Chairman of the Council of Economic and Development Affairs, Mohammad bin Salman bin Abdulaziz Al-Saud, announced in the Saudi Vision 2030, that government will encourage the energy sector and increase the competitiveness in the energy sector,

will double the country's production of gas, will develop and open new investment opportunities and other (Al-Saud, 2016). It is clear that the energy sector has a huge place in the Vision 2030. Parallel to this, in September 2015, Saudi Electricity Company shared a presentation on power generation projects and future expansion, where they mentioned the plan of adding 4,260 MW annually up until year 2024 through simple and combined cycle power projects (Saudi Electricity Company, 2015). Also, less than the quarter of these combined cycle power projects is under construction whereas more than the three quarters is under planning.

MENA's involvement in Energy sector is part of a worldwide transformation towards a better socio-economic situation. The continuous availability of energy resources to use to generate power within the region or within a given country is essential. The next section provides an insight on the renewable and non-renewable resources available in MENA.

2.1.1.3. Renewable Energy

The interest of MENA in renewable energy is currently increasing. Dubai welcomes the idea of producing cleaner power and strategies of efficient energy for a better sustainable future in Middle East (Middle East Electricity, 2014). Dubai Electricity and Water Authority, also called DEWA, plays a significant role in this direction. "Dubai Clean Energy Strategy aims to provide seven per cent of Dubai's energy from clean energy sources by 2020, 25 per cent by 2030 and 75 per cent by 2050," said Saeed Mohammed Al Tayer, the managing director and chief executive of DEWA (Trade Arabia News Service, 2016). It is estimated that renewable energy source will make an important influence as their costs continue to decrease while prices for oil and gas are on the high (Kees, 2007). Achieving environmental sustainability is

one of the 2030 goals of Saudi Arabia (Al-Saud, 2016). Egypt currently has allocated funds to support the renewable energy sector in the country. It is estimated that they allocate 20% of their power generation in renewable sources by year 2020 (Al Arabiya, 2016). Despite the oil reserves in Kuwait, Kuwait is interested in developing alternative sources of energy. It is part of the country's plan to generate 15% of the power supply through renewable non-oil sources by 2030 (Oxford Business Group, 2013). New projects bids were released after 2013 in Saudi Arabia, which integrate for the first time the requirement of solar technology within the project design and this technology is called ISCC, integrated solar combined cycle, which combines both renewable (solar) and non-renewable (fossil fuels) energy sources in the plant. These projects are Duba plant, followed by Waad Al Shamal plant (Reuters, 2015). Tunisia's current situation is as such that the existing capacity is 3,010MW, of which only 2% is produced using renewable energy (Malgas, Gratwick, & Ant, 2011).

In contrast to renewable sources, the primary source of energy for power plants are non-renewable.

2.1.1.4. Primary Energy Sources of Power Plants

Fuel Gas and Fuel Oil are the primary energy sources of the simple and combined cycle power plants. The major equipment of these power plants is the gas turbine(s). Fossil fuels, of which both fuel oil and natural gas, are the primary fuels that feed these gas turbines to burn and produce power. When natural gas is not available, the fuel oil takes the role and vice versa.

Globally, fossil fuels constitutes 85% of the world's energy consumption for different purposes (Kees, 2007), whereas the consumption of natural gas worldwide is set to grow 60% up to 2020. Compared to oil consumption, the natural gas consumption

is growing at a higher rate than oil. In any case, it is foreseen that the overall fossil fuel reserves are enough for the next 100 years (Petre & Al Dulaimi, 2014).

Around 57% of the world's oil reserves are located in the MENA region. The natural gas reserves of the MENA constitute 41% of the world's reserves (World Bank, 2010). Thus, a lot of activities of this region revolve highly around Energy. The fact of having a lot of resources available in the region, is reflected by a high percentage of population which has access to electricity in MENA and which is 96.2% (World Bank, 2012). There are ongoing efforts to make this number reach 100%. The generating capacity in the MENA countries will increase by 140,000MW to reach more than 400,000MW by 2020. This represents an increase of 30% on the currently existing capacity (Middle East Economic Digest, 2016).

Furthermore, in MENA, Qatar is known to be the largest producer of natural gas; however, it is not the largest consumer. Largest producer and consumer examples are KSA, UAE, Kuwait and Iran. Saudi Arabia is the leading exporter of crude oil (Mezher, Griffiths, & Abu Zahra, 2015). In Tunisia, the production of oil decreased, therefore the country turned to gas to feed the plants for power production (Malgas, Gratwick, & Ant, 2011). Gas constitutes 47% of Tunisia's fuel reserves. Algeria provides around 5% of gas to Tunisia and the latter uses almost only gas for power generation as of year 2004. STEG, Société Tunisienne de l'Electricité et Du Gas, is the only entity that buys and distributes gas in the country. UAE uses mostly gas as its energy source for power (Mezher, Griffiths, & Abu Zahra, 2015). This is similar to Bahrain. Kuwait's fuel oil is known to be high in sulfur content, an element that makes the Engineer to envisage the necessary for the protection of the gas turbine against the dangers and damage caused by sulfur.

All these mentioned resources are primary for a given power plant. They are key

parameters towards success in meeting the regional electricity demand. As a matter of fact, of the many challenges faced by the existing projects, whether during operation or during construction phase is the interruption in fuel supply. For example, in Tunisia, El Biban project faced this for a very long time which resulted in no electricity production to the areas (Malgas, Gratwick, & Ant, 2011).

Where does MENA stand in power demand? What are the causes of demand?
Who are the key companies playing major role in providing power?

2.1.2. Electricity Supply Industry

The Electricity Supply or Power Generation sector is characterized by the generation, the transmission and the distribution of power within a region. It is important to understand the size of the demand within the region and also the project investments magnitude.

It is estimated that around \$283 billion will be spent in power generation sector in MENA between 2014 and 2018 (Syndi Gate Media Inc, 2014). The demanded capacity is about 140 gigawatts by 2018 (Mezher, Griffiths, & Abu Zahra, 2015). Power generation sector's situation in MENA is expanding.

2.1.2.1. Power Demand Increase and Causes

It is estimated that the electricity demand in MENA will grow at an annual rate of 7% per year in the next ten years (Syndi Gate Media Inc, 2014). In fact, as per Siemens AG, the power demand will grow by two thirds up until 2030 (Bierdel, Bullinger, & Hagedorn, 2013). It is only in Saudi Arabia, where this rate stands at 6% (Energy Weekly News, 2011). There are several reasons why the electricity demand is

growing fast in MENA. The reasons behind the growth of demand are the increase of human population, the human progress in all industries, the growth of economy and industrialization (Mezher, Griffiths, & Abu Zahra, 2015). For these reasons, the construction of power plants to increase power generation is essential to meet MENA's demand. Yet, many countries do not have the sufficient means to meet their local power demand, such as the sub-Saharan African countries (Isaac & Eberhard, 2011). Proper power demand management is essential. It is a national duty to provide solutions to such demand. Who are the usually key elements who take such responsibility in MENA?

2.1.2.2. Key Companies

The key players who take the responsibility of electricity production in MENA, that are actively involved in the generation, transmission and distribution of electric power are many large governmental entities. Some examples of such key companies are Saudi Electricity Company (SEC) in Saudi Arabia, Dubai Electricity and Water Authority (DEWA) in Dubai, the Ministry of Electricity in Iraq, Ministry of Energy and Natural Resources of the Republic of Turkey in Turkey to many others. These Institutions rely on the expertise and capabilities of foreign engineering consultants to write their own specifications and tender documents for the power projects. The consulting firms actively involved in these tasks for MENA region are for example Worley Parsons (WP) from Australia, Bechtel from US, Parsons Brinckerhoff from US, to many others.

There are several methods through which these Companies manage to construct and deliver power generation projects. The major methods are: Design-Bid-Build (DBB), Design-Build (DB), Engineering-Procurement-Construction (EPC), Engineering-Procurement-Construction-Management (EPCM) and Build-Operate-

Transfer (BOT). They vary between each other mainly in terms of the contractual scope and role given to the various parties involved. These project delivery approaches are defined and elaborated in the next section.

2.2. Project Delivery Approaches

Project delivery approach or system is defined as “the roles and responsibilities of the parties involved in a project.” (Oyetunji & Anderson, 2006). Many researches have been conducted in search for the answer of the best and the most suitable delivery system or approach for a given project. Various theoretical approaches have been proposed to help the Employer make the right decision in this direction (Ibbs, & Chih, 2011). This decision is considered as one of the leading factors of the project’s success (Bingsheng, et al., 2015). It varies between a given project type to another and varies even between projects of the same type. However, there is no need to invent the wheel again for power projects. Although project characteristics or requirements differ from one to the other, the most common and applicable contract agreement for power plant construction between the Employer and the Contractor is in the form of EPC which stands for “Engineering, Procurement and Construction”, turnkey and lump sum (PMI, 2015). In the following sections, several delivery approaches will be discussed in short, starting with the original one, DBB and the given role of the Contractor will be highlighted.

2.2.1. DBB

The Contractor’s role in the DBB (Design-Bid-Build) contract starts in the “Build” phase of the project life cycle. This phase is the construction phase, and its role will be initiated after a process of bidding for the project construction. This is the major

difference DBB and EPC, which will be defined later (LIU Hongyong, 2010).

DBB projects' status can be seen in the report of Design-Build Institute of America, 2014, where the market share of the awarded non-residential construction projects in US under design-bid-build decreased from 67% in 2005, to 52% in 2013 (Duggan & Patel, 2014).

Florence created a comprehensive performance metrics for successful DBB projects. Factors that affect the performance metrics are prequalification of Contractor, level of construction sophistication and Contractor's past experience etc. (Yng Ling, 2004).

In an attempt of comparing DBB versus Design-Build, it was shown that DBB achieved better performance in terms of cost however not in terms of project duration, although previous studies shows the opposite (Minchin, Li, Issa, & Vargas, 2013). One previous study example is the study of Konchar and Sanvido, where they showed that the construction of DB project is 12% faster than DBB project, whereas the complete project delivery of DB is 33% faster than DBB (Konchar & Sanvido, 1998).

2.2.2. DB

By definition, according to the Design Build Institute of America, "Design-build is a method of project delivery in which one entity – the design-build team – works under a single contract with the project owner to provide design and construction services. One entity, one contract, one unified flow of work from initial concept through completion – thereby re-integrating the roles of designer and constructor" (DBIA, 2016). Different from Design-Bid-Build, DB or Design-Build type of contract, which has a long history compared to the rest of the delivery approaches, comes to put the design and the building under a single entity to accomplish.

The construction industry predicts that this delivery approach will dominate on the rest of the approaches (Al-Reshaid & Kartam, 2005). This approach has a restriction to the designer-builder by the fact that the tender documents put a limit on the design due to the presence of the initial Consultant's basic design already written (Marzouk & Elmesteckawi, 2015) even though the design-builder will be evaluated, in addition to the time and price criteria, by the design itself (Sidwell , Budiawan, & Ma, 2011). When it comes to the Employer, if the Employer has a big concern on cost over-runs then design and build delivery suits him best, providing him with a better value for money (Ndekugri & Turner, 1994).

The advantages of this delivery system are: first, it releases the Employer from design errors and accountability of design errors; second, through the prequalification process, the Employer can ensure that the design-builder is qualified for both design and construction (Perkins, 2009). Finally, the "fast-tracking" concept can be applied in this delivery system. This concept is when there will be a compression of the design and construction schedules due to the overlapping between them (Cho, Hyun, Koo, & Hong, 2010).

2.2.3. EPC

Historically, the EPC type of contract, started in Japan in the years of 1980s, and not long after was adopted in the US, until it became a useful tool for the whole world (LIU Hongyong, 2010). Typical projects awarded under EPC type are plants such as petrochemical, refinery, offshore drilling platform and power plants (Jesus A. Villanueva, 2013). By definition, it is an advanced model of a contract, where a single entity is responsible to complete all the project phases until handover to Employer (Sajjad Mubin, 2013). EPC Contracts are also referred to turnkey Contracts as it is in a

structure through which the Employer will simply receive the key to operate the plant (PMI, 2015). Theoretically, it is one of the best contract models to transfer many of the risks from Employer to Contractors (Stuart, 2009). In this way, bankers and sponsors are almost certain and confident with respect to the delivery of the EPC projects (Euromoney Institutional Investor PLC, 2006). However, if the risks are not correctly managed and mitigated, the Contractor will certainly suffer from project failures such as delays and cost over-runs (Tengfei, Wenzhe, Lei, Duffield, & Yongping , 2016). Many of the other features of this contract type versus other traditional ones, are the engagement of the Contractor in engineering, the shortening of the duration of the project and the transferring the risk of extra quantities or prices to the Contractor via the lump-sum contract. The engagement of the Contractor is not only in engineering and design management, but also up to commissioning (Ernst & Young, 2014). Broussard, Martin and Stibbs highlighted the importance of EPC contracts in electrical power projects, concluding that only a fair contract will make the Contractor achieve the time, cost and quality objectives of the project (Buddy Broussard, 2003). Furthermore, the Contractor is directly and equally responsible for the engineering, equipment procurement, shipment, erection works and commissioning.

There are many advantages for EPC delivery approach for the Employer. One of the major well-known advantages is the shortening of project duration, since it allows overlapping of project phases (Linh Hong Pham, 2009). Second, as previously mentioned, the risk of design errors is completely under the EPC Contractor by the fact that Contractor's role is a single point of responsibility (Jergeas & Fahmy, 2006). Other advantages include single point of accountability in delivering the project, a fixed completion project date (Malleons Stephen Jaques, 2004), better build ability, straight communication and coordination, time saving, and opportunities to profit from

Contractor's knowledge in project constructability, risk transfer to the Contractor, control of scope etc. (Baram, 2005).

2.2.4. EPCM

EPCM, an acronym which stands for “Engineering, Procurement and Construction Management”, is a modern contract model, upgraded from EPC and used rarely in power plant projects in MENA. In the EPCM contract, the Employer will have a very low level of involvement into the construction phase of the project. The full construction management responsibility is delivered to the Contractor (Stuart, 2009). An advantage of EPCM claimed by some is that it gives the possibility to control the project costs better than EPC (Mallesons Stephen Jaques, 2004).

On the other hand, Salah and Moselhi pinpointed the complexity of an EPCM project compared to any other type of projects because of risks and uncertainties (Salah & Moselhi, 2013).

2.2.5. BOT

BOT is an acronym which stands for “Build-Operate-Transfer”. It is a contract type between a government and a company that is going to finance, design, build, operate the project or the facility, manage it for a given period of time and then transfer it to the Employer (Qing Wang, Tiong, Kiong Ting, & Ashley, 1999). Usually, this process is carried out through a public-private partnership. United Nations Industrial Development Organization (UNIDO) comes to define BOT as a “a contractual agreement where the private sector constructs one of the basic facilities in the state including the process of designing, financing and carrying out the task of operating and managing construction during a specific period of time. During the operation period, the

company is entitled to the proceeds earned to recover the funds invested for expenses and maintenance.” (Mohd Noor & Yunus, 2014). In the US, according to the Design-Build Institute of America, 40% of the non-residential construction projects are under DB contracts (Eckhart, 2013).

The power plants built under such contracts are also referred to as merchant power plants, since these contracts will give the facility builder the possibility to operate the power plant during extended periods of time such as 15 years, sell the electricity during this period and after that will hand over the facility to the government at no additional cost (Asia Pacific Projects Update, 2011).

Aayushi, Mahesh and Ranjan identified that out of the ten critical success factors of the BOT, the “short-construction period” and the “selection procedure of concessionaire” are the top two success factors (Gupta, Gupta, & Agrawal, 2013). However, McCarthy and Tiong discussed the financial aspect which governs the success of the BOT project. This aspect covers requirements that the company shall negotiate with the host government, such as foreign-exchange guarantees, offshore escrow accounts, offtake agreement etc. (McCarthy & Tiong, 1991)...

2.2.6. Introduction to IPP structure

IPP stands for “Independent Power Producer”. An IPP project, is not a project delivery approach rather than a project given in a structure which offers the role of selling power to the Independent Power Producer. The IPP entity will sell power most of the times to the Government for a given period of time such as 20 years. Some power plants are IPP projects in MENA. IPPs operate under Build Own Operate format after a Power Purchase Agreement (Malgas, Gratwick, & Ant, 2011). IPP projects are used extensively in Qatar. As well as in Africa, where such private investment is encouraged

(Isaac & Eberhard, 2011). The Sub-Saharan countries contain 126 IPP projects of worth \$25.6 billion (World Bank, 2016). 20% of the power plants in 2004 in Tunisia were IPPs where Rades II was the first IPP project ever which started in 1996, whereas Al-Biban was the second (Malgas, Gratwick, & Ant, 2011).

An IPP project can also be constructed by a Contractor as an EPC project under the condition of a schedule completion time and performance guarantees, then is transmitted back to the Owner after one or two years of warranty period (Gopinath & Krishnaswamy, 1996).

The IPP structure has been introduced due to the fact that currently MENA is highly involved in IPP power projects.

2.3. Request for Proposals (RFP)

When the key companies, called as Employers, would like to realize and construct power projects, they issue the project's Request for Proposals or RFP documents, also called tender documents, inviting the Contractors to enter into a bidding procedure, through which the selected Contractor will be awarded. Contractors need to pass through this bidding procedure with the goal of submitting a proposal which covers technical and commercial aspects such as Bill of Materials and Prices. How do Contractors prepare their proposal and what are the main characteristics of the bidding procedure?

2.3.1. Proposal Preparation

Right after the issuance of the RFP documents, Contractors begin to prepare their proposal according to the RFP requirements. The Contractors spend their efforts in

the preparations hoping their proposal will be satisfactory to the Employer. This preparation process is introduced in the next section.

2.3.1.1. Proposal Process

The Power Plant proposal preparation of the bidder, i.e., Contractor is a long procedure with the target of achieving the project award at the end. In this research, the focus is on competitive sealed-bid tendering process, where the lowest bidder will win the project whether it is under DBB, EPC or other types of project delivery approach. This system was mostly used in public construction projects during the 20th century (Perkins, 2009). In two words, this is called competitive tendering, a principle with which Owners will receive the best market price of the project (Kees, 2007).

One of the usual bidder goals in proposal or offer preparation is to save costs. This means to decrease the project budget by propositions which suggest changes to the Owner's RFP specifications and requirements. Such changes can include material specification, site general layout, equipment size, removal of equipment, improved schedule and other (Gopinath & Krishnaswamy, 1996). These changes are submitted under a list of exceptions with the proposal. If there is any exception to any tender requirement, it means that the Contractor noticed that the requirement is not favorable and is risk-bearing and therefore he excluded the cost of that requirement (Hassanein & Afify, 2007). However, while preparing the proposal, the bidder needs to get acquainted with the specifications and arrange the team to the tasks with the goal to reduce the number of exceptions (XU, LIN, & XU, 2014).

In the beginning, the Employer will announce a new tender which calls qualified local or international Contractors to bid for the new project. (XU, LIN, & XU, 2014).

Qualifications will be elaborated in other sections.

It is important to note that the bid will be submitted under one bidder name, however bidder can be represented in a Joint Venture or a Consortium structure formed by two parties. Such JVs are usually formed for projects which are big in size and complex and the parties will share expenses, risks and knowledge (Lenehan, 2002).

Pricing is one of the major phases in the proposal preparation. Amr and Hala discussed the importance of risk identification which will enable the Contractor to put an appropriate mark-up price for the proposal (Hassanein & Afify, 2007).

The Employer, from the other side, has also its own preparatory procedures. Such procedures include tender preparation, project feasibility study, assignment of the project manager, drafting the EPC tender or contract requirements, the selection of the best offer, negotiations with the winning bidder, awarding the best EPC etc. (DDI & Bleyl, 2007). The Employer will also analyze the exceptions that the Contractor submitted and determine if they are acceptable or need to be further clarified before project award. The result will be whether the Employer accepts the exceptions or enforces the Contractor to follow the original requirement (Hassanein & Afify, 2007).

2.3.2. Bidding for EPC Projects

As mentioned earlier, the process of bidding for EPC projects has various characteristics. These characteristics are the prequalification criteria, the bid evaluation criteria, bidding method, bidding strategy and objectives, tender specifications, deviations and value engineering.

2.3.2.1. Prequalification Criteria

The prequalification is part of the first processes that an Employer would perform in order to distinguish between the EPC Contractors who can best meet its demands (Al-Reshaid & Kartam, 2005). It is a way to limit the competition to only few selected Contractors who will be allowed to bid (Organization for Security and co-operation in Europe, 2004) Tender prequalification requirements of this process differ from one tender to another. Furthermore, selecting the right EPC Contractor is a prerequisite for successful construction projects (El-Abbasy, Zayed, Ahmed, Alzraiee, & Abouhamad, 2013). Such requirements include one or more of the following:

- a) Contractor's huge experience in construction, project management and operation & maintenance of power plants (Malgas, Gratwick, & Ant, 2011). More specifically, for example, submittal of proof documents that show the Contractor has successfully executed at least three power plants of similar nature (Hassanein & Afify, 2007). Or, a list of previous projects containing information such as name, location and size awarded within the last five years (Wang, Tiong, Ting, Chew, & Ashley, 1998).
- b) Contractor's experience in project financing and capacity to finance (Malgas, Gratwick, & Ant, 2011).
- c) Contractor's reputation (Al-Reshaid & Kartam, 2005).

Further Employer specific requirements may also be there. Therefore such requirements have the power to short-list the bidders by removing the unwanted ones. (Gopinath & Krishnaswamy, 1996).

2.3.2.2. Bid Evaluation Criteria

Evaluation criteria means the basis on which the Employer will select and

announce the best Contractor for project award. Evaluation approaches or models differ from one Employer to the other depending on criteria that can provide a high value with the best profit (Bierdel, Bullinger, & Hagedorn, 2013). Such evaluation approaches can be one or more of the following:

- a) The lowest price (LIU Hongyong, 2010): where the bid will be judged if it satisfies all the Employer's requirements at the lowest price in the market. This method has been criticized to be cause of major issues in the delivery approach (Ruparathna & Hewage, 2014). However, for power projects, the lowest price is not enough. Whereas if it is an IPP project, what matters is the selling price per MWh of electricity (Malgas, Gratwick, & Ant, 2011).
- b) A more comprehensive evaluation (LIU Hongyong, 2010): where the criteria of the best technical proposal along with the commercial proposal are evaluated.
- c) Shortest construction duration (Shen & Song, 1998).
- d) Criteria for performance, i.e., best power output in MW (Sidwell , Budiawan, & Ma, 2011).

Therefore criteria can include design, project duration, guarantees and other depending on Employer. These criteria will be graded along with weights and the one with the highest score will win the project.

Although, in 2010 it was judged that the most used evaluation method worldwide is the lowest price (LIU Hongyong, 2010), new methods have been arisen in early 2000s and since then they have included the one of more of the following methods:

- e) Evaluation method based on lifetime or life cycle cost, which incorporates the concept of the present value of future costs and value of money over time (LCC) (Bierdel, Bullinger, & Hagedorn, 2013).

- f) Financial evaluation methods that include as further inputs the LTSA price (Long Term Service Agreement), annual guaranteed availability factors, fuel price, operation and maintenance cost, etc. (Khalaf & Redhab, 2002).

Finally, some researches emphasized on the fact that the tender documents must contain a clear method on how the selection will be performed rather than obscure (Organization for Security and co-operation in Europe, 2004). Also, that Employer is obliged to treat equally and fairly all the bidders while evaluation (Sidwell , Budiawan, & Ma, 2011).

2.3.2.3. Bidding Method

There are two bidding methods. The first is the competitive tendering method, a largely used method in construction industry. The second is open tendering method (Shen & Song, 1998). Open tender is when any interested Contractor can participate without any restrictions. Other method is “Negotiation Tender”, which is when the Employer selects and communicates to specific Contractors with negotiations (Mohamad, Hamdan, Othman, & Noor, 2010). Furthermore, same bidding method can be carried in one envelope or two envelope methods. Under two-envelope system, first the technical proposal will be submitted to the Employer, once successfully evaluated and Contractor being judged as responsive, the second envelope which contains the price will be opened and evaluated. Under one envelope system, both mentioned envelopes will be submitted at once and evaluated together (Hassanein & Afify, 2007). Of course, the prequalification criteria information of the Contractor, discussed earlier, is part of the first envelope (Perkins, 2009).

2.3.2.4. Bidding Strategy and Objectives

Iyer discussed the importance of developing a winning bidding strategy in the beginning of proposal preparation, in addition to an execution plan (Iyer, 2013). The strategy of bidding of Contractors can include price reduction and value engineering, which will be discussed later (LIU Hongyong, 2010). Aminah established a competitive bidding strategy model mainly for civil projects, where the Contractor will be able to select the appropriate project margin based on more than 90 factors (Fayek, 1998).

For a competitive bidding strategy, as a first step, it is important to clearly know the objectives of bidding (Friedman, 1956). The objectives can be one or more of the following:

- 1) Winning the project (Fayek, 1998), while maximizing profit & minimizing losses (Friedman, 1956).
- 2) Minimizing profits of the competitors (Friedman, 1956).
- 3) Winning with a loss to stay in the market and keep operating (Friedman, 1956).
- 4) Gaining experience in a new location (Fayek, 1998).

2.3.2.5. Specifications and Content of RFPs

The tender documents constitute the specifications and requirements of the Employer's Request for Proposal (RFP) package. The Employer either prepares them in-house or hires expert consultants to draft them. In this way, the bidders' offers will be unified upon one similar perception (Gopinath & Krishnaswamy, 1996). After award, the specifications will become part of the main contract between the Contractor and the Employer, where there is the clear definition of each party's scope, responsibilities and obligations (El-adaway, Fawzy, Allard, & Runnels, Change Order Provisions under National and International Standard Forms of Contract, 2016). The instructions to

bidder and the contractual terms and conditions are part of the tender documents as well (Organization for Security and co-operation in Europe, 2004). There is no unique documentation for RFPs, each project will have its own documentation (Shen & Song, 1998). In addition to the above, the content of the RFP documentation could be summarized as per the following points (DDI & Bleyl, 2007):

- a) Preliminary site data and field investigations, which are not yet complete and have to be completed by bidder (Gopinath & Krishnaswamy, 1996)
- b) Detailed evaluation criteria.
- c) Scope of work
- d) General Contractor's Responsibilities (laws, project management, safety, schedule, drawings, spare parts, training, O&M and other)
- e) Contractual Relationship Between General Contractor and Sub-Contractors
- f) Technical specifications (mechanical, electrical, instrumentation and control and civil) (Khalaf & Redhab, 2002)
- g) Design criteria (Perkins, 2009)
- h) Performance guarantees (Asia Pacific Projects Update, 2011)
- i) Contractual terms and conditions such as liquidated damages, force majeure etc. (Asia Pacific Projects Update, 2011)

2.2.2.6. Deviations from Contract

Deviations or changes from Contract can happen in two ways: either by the Employer or by the Contractor. Ibbs found out in his study, that around 40% of the construction projects undergo more than 10% of change, by measurement of project initial cost vs final cost (Ibbs, 2012). Deviating from Contract is a normal habit in the construction industry of every Contractor and Employer. Islam discussed the contractual

provisions to take in order to control changes while understanding the rights and duties of each party related to the change event (El-adaway, Fawzy, Allard, & Runnels, Change Order Provisions under National and International Standard Forms of Contract, 2016).

2.2.2.7. Value Engineering

Many of the RFPs allows room for value engineering during the bidding stage. The concept of value engineering (created by the Engineer Myers in the 1950s) is governed by three major parameters: function, cost and value. The objective is to increase the value by increasing the function and/or decreasing the cost (LIU Hongyong, 2010). This allows room for innovative and alternative suggestions of the Contractor which will have a competitive added-value during bidding (Sidwell , Budiawan, & Ma, 2011).

2.4. Key Project Participants

The key entities handling the project in this research are the Employer and the Contractor. The main focus of the research is these entities and their relationship between each other. These participants are introduced next.

2.4.1. Employer & Employer's Consultant

In general, the Employer for power projects is the Government who will hire the Consultant, also called Engineer, to prepare, administer and manage the bidding process from the beginning. The role of the Employer together with the Consultant is as significant as the role of Contractor. It includes feasibility studies, preliminary design,

preparation of EPC tender specifications (Gopinath & Krishnaswamy, 1996), decision of evaluation criteria, preparation of time schedule, selection of the best bidder (DDI & Bleyl, 2007) etc. Further specific roles are for example providing the Contractor with the fuel data which will feed the Gas Turbines and other necessary inputs that Contractor needs to operate the plant (Buddy Broussard, 2003). This information is essential for the Contractor's proposal preparation.

2.4.2. Contractor

The EPC Contractor has the responsibility of Engineering, Procurement and Construction. Contractor does not only construct the power plant, but also has to meet the performance guarantees that he submits in the proposal (Buddy Broussard, 2003). This Contractor will have to be prequalified as per Employer's prequalification criteria in order to be able to bid for the project.

In order to understand the essence of the relationship between the Employer/Consultant with the Contractor, the risk allocation between them is familiarized next.

2.4.3. Risk Transfer/Allocation between Project Participant

The Contract's specifications and conditions will reflect the relationship of the Employer to the risks and specifically how much he is capable to accept certain risks versus the Contractor (Smith & Bohn, 1999). Stuart suggested the examination of risk allocation by two questions, if there were cost impacts, who pays them? If there were delays, who pays the associated liquidated damages? (Stuart, 2009). Christopher advised a fair balanced risk allocation in order to decrease risk related project price contingencies (Gordon, Choosing appropriate construction contracting method, 1994).

Short and clear sentences will provide transparency of the contract's risk allocation (Raj, Hillig, & Hughes, 2009). In the turnkey contracts, the risks are moved from Contractor to the Employer only with the latter's acceptance (Spiess & Felding, 2008). There are standard contracts, where the risks are allocated equally between the Contractor and Employer, FIDIC, defined next, is one example.

2.5. FIDIC (1999, Silver Book)

2.5.1. FIDIC

FIDIC is an organization and represents a French name for "Fédération Internationale des Ingénieurs-Conseils", or International Federation of Consulting Engineers, an entity that issued standardized contract forms that reflect the market conditions covering the Employer's needs (Sajjad Mubin, 2013). It was founded in 1913 by the countries of France, Belgium and Switzerland (El-Adaway *et al.*, 2016; Glover, 2007).

The Contract conditions specifically for EPC Turnkey type of projects are represented in a standardized form in FIDIC's Silver Book issued in 1999, which the Employer can use to be the main agreement without any amendments with the Contractor for power plant projects. It is judged to be a great model which allows giving a sense of confidence to Employers while transferring all risks to the Contractor in comparison to any other model (Stuart, 2009). Understanding the FIDIC Conditions of Contract allows the Employers and Contractors to minimize cost and time over-runs and avoids clashes and conflicts as much as possible (Jaeger and Hok, 2010).

The Turnkey EPC Conditions, posted in this Silver book, are not the first standardized model which was issued by FIDIC. It was added on top of the first edition of standard contract (Red Book) published in 1957, the second in 1963, the third in

1977 and the fourth in 1987 (El-Adaway *et al.*, 2016; Azzam *et al.*, 1999), others such as International General Rules of Agreement (IGRA) published in 1979, the White Book (Client/Consultant Model Services Agreement) published in 1990, a newer edition of Red Book published in 1999 and other (Raj *et al.*, 2009). The first edition was known in Middle East as the “English Contract” (Azzam *et al.*, 1999). It is also good to note that the very first editions of FIDIC’s Red Books contained the word “International” in titles, until the fourth where it was removed in order to show that it can be used both in local and international projects (Azzam *et al.*, 1999).

On top of the above and even though a standard, FIDIC’s Silver book has been criticized for many reasons. First, it is criticized to be representing an unfair allocation of risks between Employer and Contractor in the advantage of the Employer (Henchie, 2001). And second, for being impractical and very general to be implemented by the project staff (Spiess & Felding, 2008). Finally, FIDIC is not the only standard contract form, there are many other standardized contracts.

2.5.2. Other Standard Contracts

FIDIC is not the only organization that worked on standardizing Contract forms. Many standard contracts were published by others such as AIA (Institute of Architects), Consensus Docs, EJCDC (Engineers Joint Contract Documents Committee), the World Bank, JTC (Joint Contracts Tribunal), NEC (New Engineering Contract) (El-Adaway *et al.*, 2016), German BOB/B to many others. A study by Raj and Jan-Bertam pinpointed some differences between the Standard contracts, for example, JCT has a mediation clause, whereas VOB/B has clauses which provide dispute resolution by other means than mediation (Raj *et al.*, 2009). The research is only focused on the FIDIC.

2.6. Management Issues

Despite the use of standardized contracts and improved bidding processes, the project participants face project challenges, project risks, delays and other organizational issues gathered and represented as management issues.

2.6.1. Project Challenges

Although the bidding process will be ended by an expected clear understanding of the project participants to the contract or agreement terms, facing project challenges is inevitable despite all the previous efforts towards successful projects. Examples of such challenges are many. The interruption of fuel supply is a common issue that Employers or Contractors face with a direct impact of the plant's operation and revenues (Isaac and Eberhard, 2011). Some challenges are related to site such as delays in land acquisition and environmental clearances (Ernst and Young, 2014). Some challenges are related to project planning and implementing stages such as weakness in management, corruption, governance, poor project planning and others which will lead to time and cost over-runs (Ernst and Young, 2014). Some other challenges are market related such as high prices of fuel (Bierdel *et al.*, 2013). Others are contract related such as "no damage for delay" or "liquidated damages" clauses (Lords, 2006) and lack of understanding the contractual issues (Azzam *et al.*, 1999). Linh mention in her article a summary of three major issues an EPC Contractor will face: plant availability and material supply, failure in meeting the Employer's requirements and changes to these requirements and finally the Contractor's faults (Pham and Hadikusumo, 2009). Islam and his colleagues emphasized on challenges resulting from change-order provisions in Contracts and the importance of understanding the clauses in the event of changes (Azzam *et al.*, 1999).

At the end, not responding properly the challenges faced will result into increased cost of project, project delays and poor quality in construction (Ernst and Sohn Verlag, 2014). Therefore, all items raising the risks of project challenges shall be mitigated by the right risk management and contractual terms.

2.6.2. Risks and Risk Management

Literature Review has shown many studies and interest in the area of risks and risk management, whether for projects in general or specifically for EPC projects. Hassanein and Afify identified risks as “Any factor that can affect project performance in a significant and uncertain way is a source of risk” (Hassanein and Afify, 2007). Currency deviations and devaluation are examples of such projects risks for Employers (Isaac and Eberhard, 2011).

Risk Management procedure has three stages. The first is risk identification; the second is risk analysis and third is the risk responding phase (Project Management Institute, 2007). Tang added a fourth stage which is risk monitoring (Tang, Duffield and M. You, 2006). When it comes to the EPC projects, the EPC Contractor’s cost estimation shall consider a room for project or country risk related costs (Iyer, 2013). In this way, the EPC Contractor will include the proper price mark-up in the final project price during bidding stage (Hassanein and Afify, 2007). The EPC project Contracts carry risks of force majeure, defaults, operational and maintenance and other that should be taken into account (Buddy Broussard, 2003). Contract risk is defined as any element which will create distance between the party and doing the required service or quality criteria ((El-Adaway *et al.*, 2016). Mubin classified the EPC project risks into seven categorizations: engineering, proposal, project management, procurement and contractual, quality, health and safety, human resource and finance and audit (Sajjad

Mubin, 2013). On the other hand, some consider that organizational risks are more important than technology related risks and they include the loss of the experienced employees for example (Trade Fair Group Publications Ltd, 2001).

Chengie emphasized on the importance of risk management since the bidding stage. He mentioned risks related to political and economic situations, payment reputation of Employer, risks of the competitors and accordingly develop a winning strategy (XU *et al.*, 2014).

Finally, risk management is a very important part of both bidding and execution stages (Kees, 2007). Sometimes it is even a tender requirement where the bidder should perform risk assessment and incorporate in prices (XU *et al.*, 2014). Failing in risk management will result into project delays and cost over-runs (Mills, 2001). More specifically, it will affect the delivery of project in terms of time, cost and quality (Osipova, 2015).

2.6.3. Delay Issues and Liquidated Damages

There are a lot of causes for delays, such as issues related to acquisition of site land (Isaac and Eberhard, 2011). A good understanding of the EPC job can solve delay issues. Linh discussed in details the EPC business model and causes of project delays from early preparation phases, passing through engineering, procurement and construction phases. Such causes include poor feasibility study, lack of experience of the Employer, unclear contract conditions including payment terms, unclear design specifications, delays in permits etc. (Pham and Hadikusumo, 2009). Wafa and her colleagues summarized reasons behind delays in power plant project schedules during execution phase into nine types of deviations: the first three are related to permits, the second three are related to change-orders, the seventh reason is Sub-Contractor delays

of erection due to poor labor performance, the eighth is errors in tests and the ninth is delays of performance test due to Employer (Alsakini, Wikstrom and Kiiras, 2004). Daniel and Mohan not only identified but also classified the delay reasons of construction projects based on the role of the entity (Employer, Consultant, Client...) and also type of projects. The results of their study on the countries of Hong Kong, Saudi Arabia and Nigeria show that the main delay reasons are weak site management, unexpected conditions of soil, slow decision making and work variations or changes (Chan and Kumaraswamy, 1997).

Delays, in case caused by Contractor, are directly linked to liquidate damages clauses in the Contract which lead to high expenses as cost over-runs (Trade Fair Group Publications Ltd, 2001).

2.6.4. Cash Flow

The Cash flow of the EPC project could be improved by several ways such as reducing construction and commissioning time and cost, decreased taxes, equipment price depreciation, discount rates and others (Bierdel *et al.*, 2013). Not only is improving the cash flow a main concern, but also maintaining a good cash flow by selecting good Employers and educating the staff to complete the required services (Lords, 2006).

2.6.5. Standardization

Creating standardized power plant models in terms of type and size is a business method used by EPC Contractors and a way to acquire competency. In this way the Contractor will be able to reduce costs and improve schedule. Other models of standardization can include standardized specifications, drawings, DCS configuration

etc. (Trade Fair Group Publications Ltd, 2001). Dr. James discussed standardizing processes and activities to improve performance (Harrington, 1991).

2.6.6. Lessons Learned

Lessons, whether recorded or not, are part of the knowledge acquired by an organization. In 1990, Senge, known as the Learning Organization Guru, mentioned “Over the past two years, business academics and senior managers have begun talking about the notion of the learning organization.” (Senge, 1990). Although the concept of lessons learned already had started with the US Army 20 years back, in 1970s, when they started to capture them to learn both from the good and the bad results that they had achieved (Trainor, Brazil and Lindbe, 2008). In EPC projects, Employers request demonstration of lessons learned from the EPC Contractors (Carrillo, 2005). Wolfgang categorized the lessons into two: those due to conditions not related to Contractor and those due to Contractor and concluded that consequences of such conditions result into bad quality, high costs and delays (Ernst and Sohn Verlag, 2014).

CHAPTER 3

HOW EPC CONTRACTOR ADDRESSES RFP'S TERMS OF REFERENCES

In order to understand how the EPC Contractor will address the RFP's (Request for Proposal) terms of references, it is important to provide an overall picture of the Contractor's perception, role and objective first and then move into the details of how to address. In this research and in this section, only generalities will be covered rather than specific details. Furthermore, since the research study is from the perspective of the Contractor, the term "Client" in the upcoming sections will mean "Employer".

This chapter along with the following chapters are results of the researcher's five year career experience as a mechanical engineer in one of the largest leading EPC Contracting firms in MENA. The company is specialized in power projects along with other large industrial projects. The researcher has been exposed to the engineering phase of billions of dollars of worth combined cycle power projects through the engineering management role, the procurement phase through coordination for material supply and payments, the construction phase through construction management and finally proposals, preparation and closure of bids and proposal management to tenders of more than ten large Employers in MENA.

The overall picture of the Contractor's perception is illustrated through the role of the proposal team involved in bid preparation, the Contractor's involvement in the proposal activities, the bid objectives, the Employer's identity; After acknowledging these aspects, three stages of addressing the RFP terms of references have been recorded.

3.1. The Role and Importance of the EPC Proposal Team

The subject proposal team is constituted by the proposal manager, mechanical engineers, electrical engineers, civil engineers and instrumentation and control engineers together with other relevant staff. From the perspective of the EPC Contractor, this team who will work on the bid preparation, in an EPC Contracting business, is extremely essential due to the fact that it creates and maintains a future and continuity for the Company. Thus, each and every function played by the members of the proposal team is extremely important, in order not to overprice or underprice any item, which will affect the overall competition and the benefit of big opportunities of the Company in the market. Not only mispricing, but also misinterpretation of the competition, of the RFP's terms of references, documents or misreading the scope, or missing important clauses would affect the firm's competitiveness as well. The misinterpretation is not only applicable to pricing, but also to schedule, risks and other contractual complications, which are as important as pricing if not properly considered and understood. Poor analysis of the mentioned items would commit the Company to losing situations. The importance of the Proposals goes beyond the pre-bid stage and towards the project award, the engineering, the procurement and the construction stages as it is the basis of the upcoming project phases.

First, the proposals start with an invitation to bid by the Client to Contractor or while Contractor searching for an announcement in the market for the subject bid and applying interest to bid. This step is followed by the start of the proposal preparation activities, after which the bid will be submitted (technical and commercial) and negotiated. In case awarded the project, the proposal itself along with the RFP documents will become a Contract, between Client and Contractor, which is a commitment and an opportunity for the Company in the same time. According to the

best practices, the proposal team members will be assigned to roles covering the stages beyond the pre-bid, to undertake the project and execute until completion, since the team would have had acquired the best project knowledge, know-how and had done the best study of the project before award. Finally, proposals are not pure paper work or pure pricing but contain both and more aspects that go beyond pricing, which will be explained in next section.

It is worth to note that usually, the period between the start and the end of the bidding stage in MENA region for power plant projects is in the range of an average of three months minimum. This stage can be prolonged when major addendum to specifications are considered, such as change of plant size, change of plant type, etc. and some periods can even reach a duration of one year and sometimes one and a half year. Some other reasons of prolonging or insisting on a short period of the bidding is the Client's need of power and the Client's financial status and sources. Remember how short this period is versus the Engineering, the Procurement and the Construction stages that will follow which would normally take around one to two years for engineering and procurement, whereas execution takes from two to four years. Therefore, this period is very critical and any decisions at this stage will affect the overall project execution success. It is also important to mention that the Contractor can be representing a single entity, a Joint Venture with another entity, or a Consortium. This will be explained in Section 4.2.1.

3.2. Beyond Pricing

The main elements of the proposals, in the power plant projects are two: power output in MW and price. Pricing is building up of the selling price of the project which would include many elements such as prices of the direct cost, cost of engineering, cost

of material supply, cost of labor, cost of construction, cost of testing and commissioning, cost of project management etc. plus some contingency, overheads and mark-up as an in-house main activity. However, based on a thorough market study, the history of prices in the market (previous historical data), the study of the competition and the performance of the competitors, the Contractor can build a sort of estimated target price of the project. For example, when it comes to MENA, if other bidders are Korean, a very tough competition would be expected based on the advanced competencies of the Korean Contractors. In case, there are no international Contractors who are bidding but only local then the competition is expected to be reasonable due to the large local experience of the Contractor just in case. The knowledge of the Client is also important. Further studies are required when the local EPC Contractor would enter into new markets in new countries: elements to be considered would include the knowledge of the country's laws and regulations, labor laws, the knowledge of the Client, reputation of the Client, the corruption, bribery and others. All this knowledge has to be up-front before any pricing activity starts.

Beyond pricing is the technical aspect of the Proposals such as the technical complexity of the project, execution plan and constructability. For example, quantifying a long fuel pipeline or cable brings along its own complexities such as complicated design, whether congested constraints exist, whether unexpected obstructions exist etc. Other examples include access to site, installation provisions and in-land transportation. A Site Visit can be of huge support to tackle these issues, since RFPs oblige the Bidder to completely get familiarized with site conditions without any liability on the Client. Although these aspects are beyond pricing, if not studied and considered properly, they would affect the price during project execution. For example, Egypt is known to build power plants within the busy residential areas and problems can arise if proper access

and major equipment transportation measures are not considered, if far-field noise is not considered etc.

3.3. Objective of the Contractor

There could be various corporate objectives for the Company while bidding for new projects. In this research, it is assumed that the main objective of the bidding stage and the efforts put is to win the project. On top of this objective, another important objective has to exist in parallel, which is having a minimal of difference between the second bidder in the project results. So simply bidding the project is not enough. Normally, when the results of the bids are posted, if there are minimal differences between the results of the first, second and the third bidders, it means the project price is the right price. However if there is a huge gap between the first and the second bidders, then this creates uncertainties and doubts.

3.4. Clients Identity

While addressing the RFP's terms of reference, The EPC Contractor shall have a good knowledge of the Clients. Each Client of the MENA region has his own unique identity. Identity means how the specifications are written and how they end up being imposed on the Contractors. For example, Dubai Electricity and Water Association (DEWA) is known to be very strict in imposing the specifications without any flexible negotiations. However, DEWA is also known to be very well-planned with reasonable and flexible project time-line, from the bidding stage to the end of construction unlike Saudi Electricity Company (SEC) who is always in a rush in bidding and project execution due to the rush needs of power. In Yemen, the Client is very pleasant and flexible in terms of dealing with the Contractor and imposing the specifications. In this

way, addressing the RFP's terms of reference can lead Contractors to deviate from the terms and suggest alternatives rather than strictly following the terms of reference.

On the other hand, the identity of the Client can encourage or discourage Contractors and even suppliers and Sub-Contractors from working for the project. This subject identity means the good or the bad financial reputation and credibility of the Client. For example, SEC is very known to be financially committed to all the payments due to Contractors. In Egypt, the financial security of the Clients discourages the Contractors' willingness to bid participation.

Three stages of the Contractor's addressing RFP's terms of references have been identified and recorded. These are explained in the following.

3.5. Addressing RFP's Terms of References-1st Stage

The most and first important task while addressing the RFP's terms of references is the careful and attentive reading of all the clauses of the tender documents during the short given time of the bidding stage. Reading is the major and first activity during the preparation. The ultimate purpose of the 1st stage in addressing the RFP's terms of references can be summarized in the following:

- Reading carefully the specifications. Not paying attention to one important word can lead to over-run costs and financial embarrassments during execution.
- Reading the specifications of all disciplines. Many times, Clients impose specifications to the mechanical discipline under the electrical sections of the tenders.
- Paying attention to missing specifications. Sometimes Clients do not mention detailed specification of a material selection for example, and

during execution, they would get into debates with Contractor discussing the choice or type of material claiming that these were not specified. Thus, lack of information should be dealt with carefulness.

- Paying attention to discrepancies or contradictions in specifications.
- Being up-to-date and flexible enough while addressing major addendum of the RFP documents issued by the Client.
- Being fast to do and complete all the required activities of bid preparation. Sometimes and exceptionally some Clients give only one week to the EPC Contractor to submit their bids.
- Understanding clearly the requirements. Sometimes requirements are vague or unclear. During the bidding stage, there will be the possibility to raise queries or questions to the Client with respect to the RFP. Any doubts shall be cleared in this stage. Any unclear specifications shall be addressed in this way. Remember that many times Contractor and Client can go to arbitration to debate their own interpretation of the Contract specifications. Thus, it is best to know any uncertainties and avoid any misinterpretations at this stage before it gets harder to resolve in the future in terms of disputes, claims and even courts.

3.6. Addressing RFP's Terms of Reference-2nd Stage

After the first stage which is summarized as reading, addressing the RFP's terms of reference incorporates additional activities that the Contractor need to perform in order to submit a competitive technical and commercial bid, in addition to the first basic stage of reading. The technical know-how, the knowledge, the lessons learned and the long experience of the Engineers in power plants will create a very competent bid. The

major items are the technical optimization of the power plant, conceptual design and value engineering which will directly affect the project cost. Such examples can be condenser design parameters, turbine inlet gas temperature, heat transfer area of heat recovery steam generator etc. However this shall not lead omitting or deviating from any specification clauses rather than remaining fully in compliance with the scope and within the Client's exact requirements, since compliance to Contract is the basis of a successful project. The optimization parameters can also cover the improvement of the power output and the efficiency of the power plant, as well as reducing the price in parallel and as much as possible. Each MW has its own cost therefore maximizing the generated power output at high efficiency is not the ultimate and single goal rather than finding out the trade-off point versus plant cost in parallel.

Each Client will evaluate the bid in his own way and this will be further shown in the following chapters. It is important to note that optimization does not end during the bidding stage, it can continue even after-award to further save costs and maximize profits.

Value Engineering will help the Contractor add value through intelligent solutions in design while reducing the price versus the rest of the competitors. It can be related to decreasing equipment size or developing a compact and optimized site general arrangement etc. And this would have a direct impact on price. Reading and understanding correctly the specifications in the first stage is a prerequisite to value engineering. Another aspect is not repeating the same mistakes or blindly repeating the same solutions of previous bids to the current bid where requirements differ.

Sometimes, for example, changing site conditions will create a need for a completely new approach.

Another activity that can be added here is the preparation of list of changes, also

called deviations. Deviations have been discussed in literature review section. Not all Clients allow for deviations. Sometimes there would be abnormal Client requirements and it would be very essential to take deviations in this regard.

3.7. Addressing RFP's Terms of Reference-3rd Stage

The 3rd stage of addressing the RFP's terms of references is the major document bid submittal to Client which is the price schedule in a typical format shared by him part of RFP. Any small mistake, such as incorrectly multiplying unit rates will be a major risk. Sometimes, the schedule is a combination of thirty to forty pages of spreadsheets. Usually, prices will be spread and divided per blocks or areas, such as one simple cycle block, electrical substation etc. and also per BOP which is balance of plant (the plant feeding utilities to the power block). Therefore the proposal team addresses the bid requirements through the preparation of this price schedule which will result into a final single price for the Turnkey Lump Sum EPC project.

All these stages were put together in a sequential way to acknowledge the key considerations to take while addressing the RFP's terms of references.

In the following chapter (chapter 4), the research will get into the main study topic which is, after introducing the RFP's main documents, the comparison between the collected five major typical RFPs of MENA region that correspond to five different leading and highly active regional Clients, which will be called as Employers. These Clients are from United Arab Emirates, Saudi Arabia, Yemen, Kuwait and Egypt. In addition to that, it is relevant to mention that a complete given RFP vary from 300 pages to more than 2,000 pages. This comparison will highlight the similarities as well as the differences between the given five RFPs.

CHAPTER 4

COMPARISON OF RFPS

4.1. Introduction (Main Sections of RFPS)

Normally and generally, all of the RFPS, regardless to which Employer they belong to, are constituted by three main and basic common sections:

- The first section is the instructions to bidders, also called instructions to tenderers. This document can be either discussing commercial and technical instructions in a one given document, or can be provided as separate documents for technical and commercial. This is a document which provides guidelines with regards to the aspects of the bid/offer preparations and procedures. The importance of this section rises in the fact that offer can be rejected in case the Bidder does not fully follow the instructions given in this section.
- The second section of the RFP document is the contractual general and particular terms and conditions which will be discussed in chapter 5. Such terms and conditions include for example terms of payment of the Client which will result into the project's cash-flow, warranty terms, termination terms, liquidated damages and many other terms and conditions.
- The third section of the RFP document is the scope of work and specifications which form the technical aspect of the project, and which include detailed technical specifications for the mechanical, electrical, Instrument and civil disciplines, along with attached technical drawings and diagrams as necessary.

4.2. Comparison

The Comparison in this chapter will cover the first section of the RFP document, which is, as mentioned, the instruction to bidders of the RFPs. The second section, general and particular conditions, is covered in chapter 5, whereas the third section, scope of work and technical specifications, is not covered at all, since the comparison of the study does not include any assessment on a technical engineering level. It is important to note, that unlike FIDIC, the RFPs do not follow any given logical sequence of topics. The topics are scattered around the RFP document, which means that the same topic could be discussed in different places within the RFP without showing any references to each other, a fact which is not similar to FIDIC.

The main focus of this chapter will be the comparison of the major topics in terms of the following and of the five RFPs:

- Eligible Bidders
- Bidding Procedure & Diagram
- Offer Rejection
- Approved or Nominated Vendor & Sub-Contractor List
- Deviations/Clarifications
- Localization policy
- Bid Evaluation

4.2.1. Eligible Bidders

The Eligible Bidder is the Bidder who is allowed to bid for the project, as judged by the Employer. Eligibility criteria are completely prepared by the Employer and are summarized in the following table (Table 4.1) after having a thorough review of such requirements in all the RFPs. Table 4.1 provides a clear image and allows the reader to

see the comparison of one RFP versus the other when it comes to eligibility. The table is followed by a discussion and conclusion.

Table 4.1. Eligible Bidders

Eligible Bidders				
RFP1	RFP2	RFP3	RFP4	RFP5
Those under Client approved Contractor List	-	Those accepted by Client	Those prequalified Contractors	-
Single, Consortium or Joint Venture	Single, Consortium or Joint Venture	Single or Joint Venture (No Consortium)	Single or Joint Venture (Consortium not specified)	Single, Consortium or Joint Venture
-	Past experience in similar scope of work and plant size	Similar scope of work and plant size in the last 10 years, Certificates from end-user	Similar scope of work and plant size in the last 5 years, Certificates from end-user	Similar scope of work and plant size in the last 5 years
5 year experience of all equipment	3 year experience of major equipment	2 year experience of major equipment	None	10 year experience of major equipment
-	-	Evidence of capability to be submitted as a prequalifying document	Evidence of capability to be submitted as a prequalifying document	Evidence of capability to be submitted as a prequalifying document
Tenderer who submits or participates in more than one Tender will be disqualified	Tenderer who submits or participates in more than one Tender will be disqualified.	not specified	Only one Tender may be submitted by each Tenderer,	not specified
-	Submittal of guarantee statement from the Manufacturer of the equipment that the Bidder is duly authorized to supply that item in the country and that the Manufacturer guarantees the performance of the equipment in the favor of the Employer	-	-	-
-	net assets not less than 22 Musd in the last 2 years	net assets not less than 80 Musd	-	-
-	Submission of financial statements of the last 2 years	Submission of financial statements of the last 5 years	Submission of financial statements of the last 5 years	Submission of financial statements of the last 5 years

As per Table 4.1 and reference to RFP1's "Those under Client approved Contractor List" cell, RFP1 has its own special way in dealing with the eligibility of Contractors. Regardless of any given project, the Bidder must have an up-to-date qualification application and profile at the Employer's Company as an ongoing process. The application covers all prequalification documents. Only those prequalified Contractors will be approached and invited by the Employer for bidding a specific given project. The Contractors are subject to stay or be removed from the prequalified list of Contractors depending on their current reputation and situation of previous or current projects with the Employer. Therefore, such criteria or requirements are not part of the given RFP rather than dealt separately. As it can be seen, the only specific RFP related eligibility requirement for RFP1 has to do with the project itself, which is a proven successful previous experience of 5 years of operation of any type of equipment which will be used in the Plant. Any other requirement is not specified since dealt separately.

When it comes to RFP4, it is mentioned that only prequalified Contractors are eligible bidders and these prequalification requirements are mentioned within RFP itself. RFP2 and 5 do not provide any such pre-requisite criteria of being eligible Bidder rather than any bidder can bid as long as the eligibility requirements mentioned within the RFP itself is satisfied. RFP3 simply mentions as a general clause that any bidder must first be accepted by the Employer in order to be able to bid, without sharing any further or specific criteria.

RFP1, 2 and 5 do not mind if the bidder is bidding on its own or represented as a group in a Joint Venture or Consortium structure or agreement with another bidder. It is important to note that a contractual Joint Venture is when two or more companies cooperate to become as a one entity to bid and execute a project and they share the project responsibilities, the revenues and expenses jointly. A contractual Consortium

agreement is also a cooperation agreement between one or more entities, who have separate responsibilities and bear separate losses. It is surprising to see that RFP3 mentions clearly that Consortium agreement is not allowed. A legal perspective can justify possible reasons behind such a requirement. RFP4 allows a Joint Venture, however has not specified or mentioned in any Clause the existence of a Consortium.

One of the most important criteria of eligibility is the requirement of the Contractor's previous experience in a similar scope and size of a Plant. A lot of bidders are unable to bid when it comes to this requirement. RFP4 is an exception where such requirement does not exist. RFP5 is the most stringent as it requires a ten years of previous experience for major equipment, next is RFP1 with a five years of previous experience for all equipment, whereas RFP2 & 3 are much less stringent with a two or three years of previous experience requirement for major equipment. In RFP3, 4 and 5, Bidder must submit any document which proves having a capability of constructing such project.

RFP1, 2 and 4 contain an interesting Clause. This clause forbids any Bidder to submit more than one bid for the project. Such clause is not used at all in RFPs 3 and 5, although it seems to be such an important requirement. Although not mentioned in document, it is of a common practice and sense for the industry participants.

Submitting financial statements of the Bidder is a must in all RFPs. Some RFPs such as 2 and 3 go further into details and specifies that any bidder having net assets of less than 22 Musd (RFP2) or 80 Musd (RFP3) is not allowed to participate. Finally, it is only RFP2 which provides a form to be filled and signed by equipment manufacturers, a form through which the manufacturer authorizes the Contractor to supply the subject equipment in the project country and also guarantees the performance of the equipment in the favor of the Employer.

It can be concluded that all of the RFPs are very concerned with eligibility of bidders and have covered a lot of requirements in their Clauses to allow only the right Bidder to bid for their project. Almost all of the RFPs share similar requirements when it comes to eligibility. These requirements are, first an accepted or prequalified status of the Bidder in front of the Employer, second, one or more Bidders submitting the same bid together through a specified agreement between them, third, a previous experience in similar scope and finally a requirement of financial statement submission. The differences, specifically, lie in how stringent the requirement is when it comes to the years of previous experience needed, or the amount of Contractor's net assets within a financial statement. Furthermore, RFPs 2 to 5 allow new Contractors to bid for the project as long as they satisfy the eligibility requirements, however RFP1 does not welcome a new Contractor to bid for an announced project except if pre-qualified before even buying a given Tender/RFP. The eligibility requirement on one hand assures the Employers of putting the project in good hands, on the other hand, rejects welcoming new-comers, new Contractors rising towards growth in the power field without having enough experience. Finally, the criticality of the eligibility comes from the fact that offer will be rejected by any non-eligible Contractor.

4.2.2. Bidding Procedure and Diagram

A Bidding Procedure represents the process followed by all eligible Bidders while bidding for a given project. The goal at the end of the procedure is to get awarded the project. The procedure and its details differ from one RFP to another. In order to understand the procedure of each RFP, an RFP specific diagram containing a timeline for each RFP is formed in order to visualize the steps, the similarities and the differences. These diagrams are posted in figures 4.1 to 4.5 per RFP. To read these

diagrams, the reader has to note that all activities posted on top of the figure's horizontal base line are covered by the Employer, whereas those mentioned below the base line are covered by the Contractor (the Bidder). The activities put inside the dashed boxes represent those activities which will be completed in the presence of both the Employer and the Contractor (the Bidder).

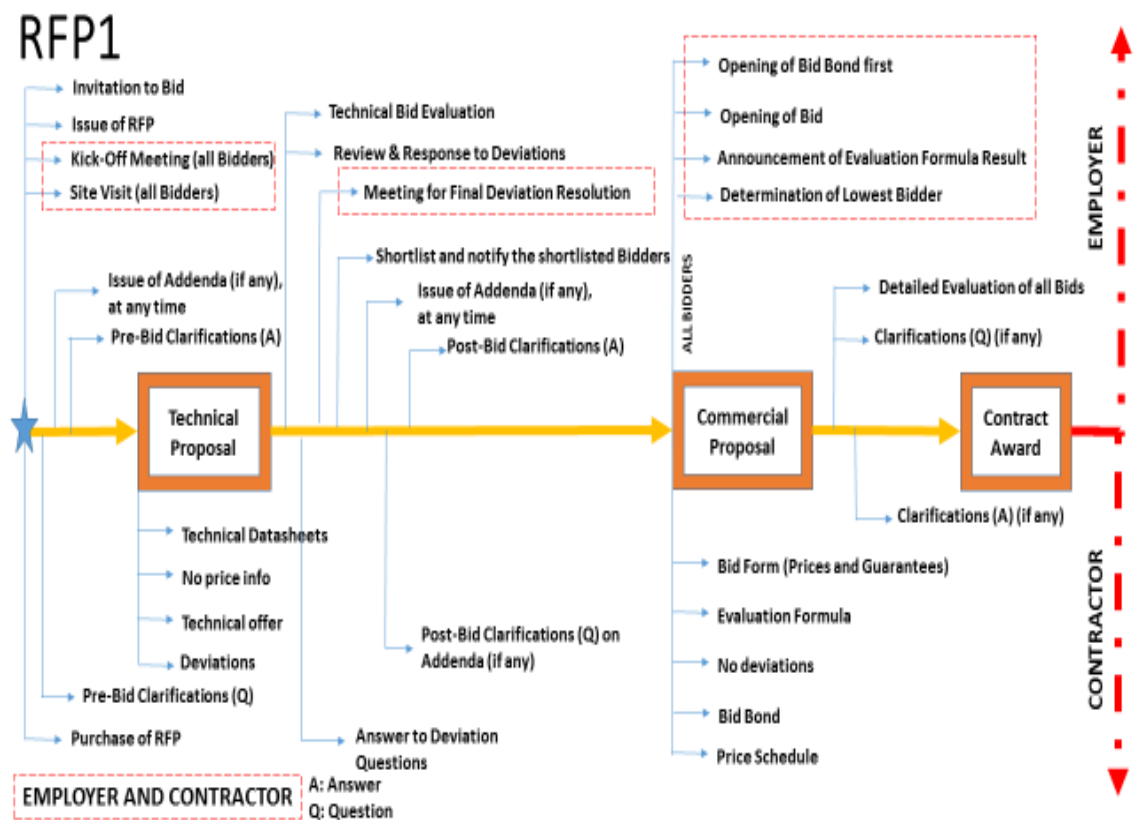


Fig. 4.1. Bidding Diagram-RFP1

RFP2

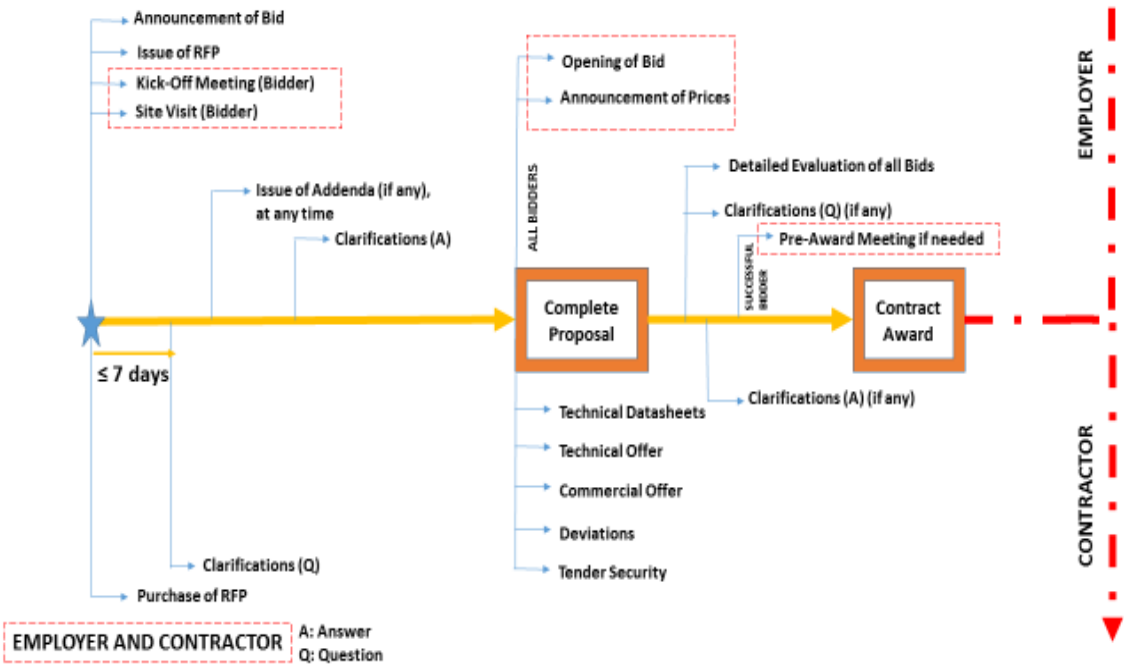


Fig. 4.2. Bidding Diagram-RFP2

RFP3

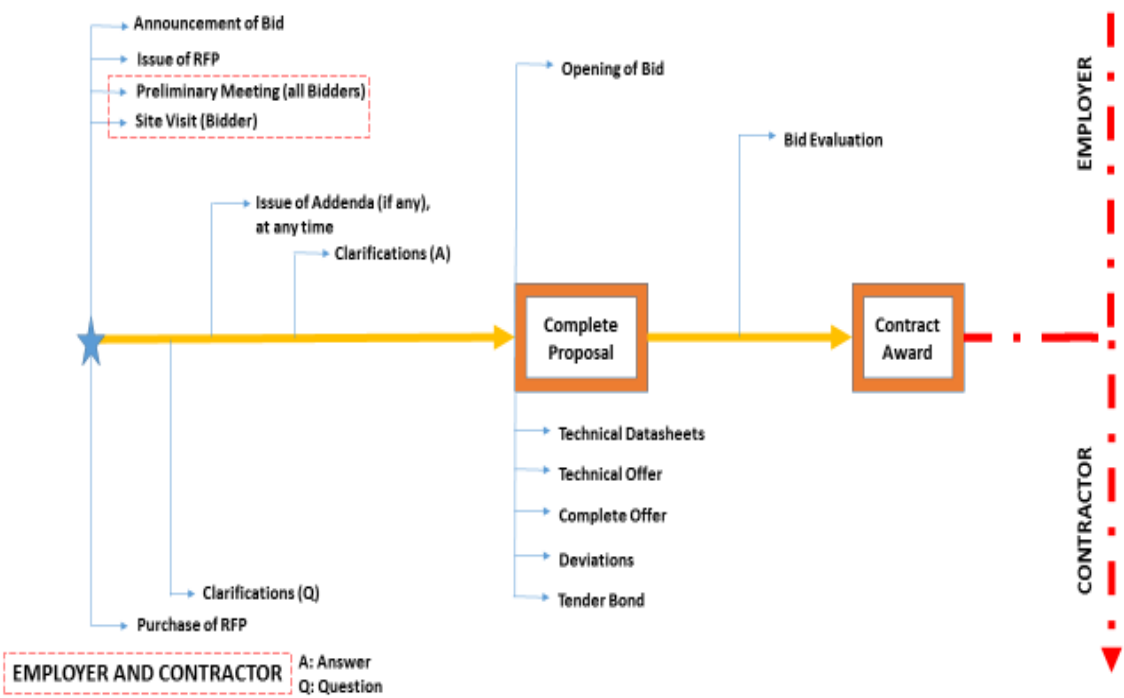


Fig. 4.3. Bidding Diagram-RFP3

RFP4

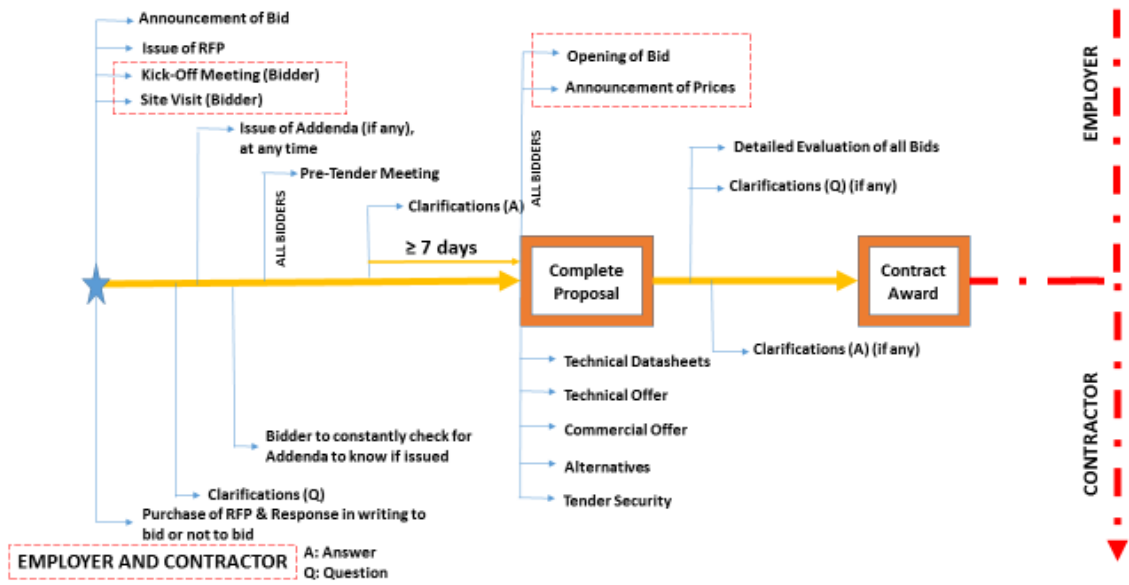


Fig. 4.4. Bidding Diagram-RFP4

RFP5

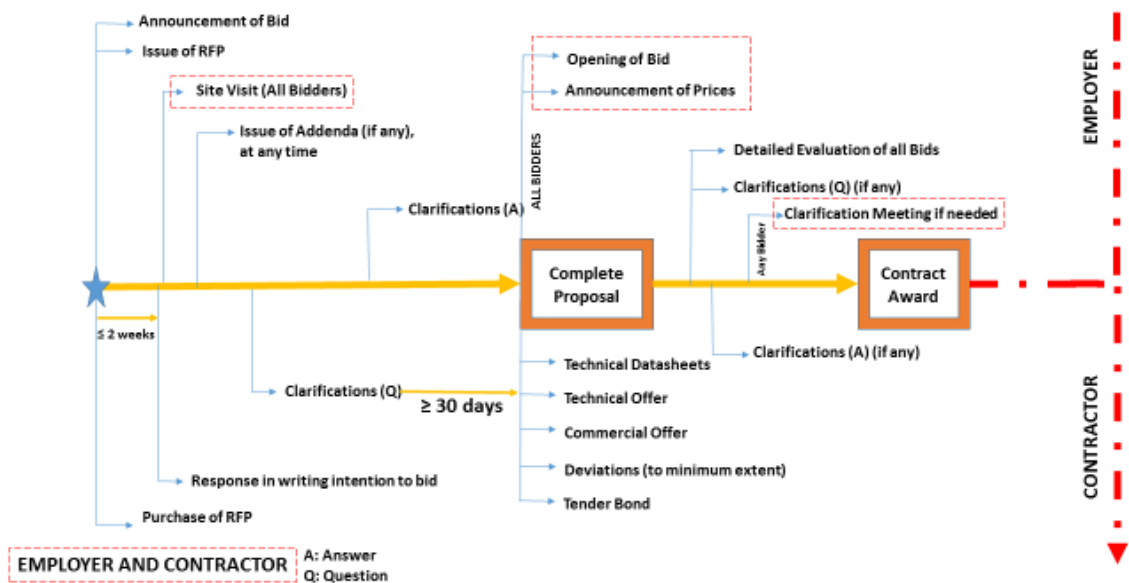


Fig. 4.5. Bidding Diagram-RFP5

Figure 4.1's procedure completely differs from the rest of the figures in terms that it is a two-envelope tender submission procedure: the two envelopes are the technical and the commercial offers submitted respectively in consecutive stages. In this

figure, it is shown that RFP1 starts with invitation to the Eligible Bidders to bid for the project and the issuance of the RFP. It will be followed by a Kick-Off meeting and a site visit in the presence of all the Bidders simultaneously. At any time between the issue of RFP and the Technical Proposal submission, the Employer has the right to issue any addenda to the RFPs, while allowing also room for clarification/questions by Bidder to be asked and responded. These clarifications are called pre-bid clarifications since they are asked before the technical proposal submittal. It is important to note that the answers of these clarifications will be sent and shown to all Bidders. Technical evaluation of each Bidder offer is followed next which includes also evaluation of the deviation list. The answers to the deviations provided by each Bidder will be sent to each Bidder separately without being distributed to all. Additionally, each Bidder individually will be meeting with the Employer to cover a final resolution for each Bidder submitted deviation. Only those short-listed Bidders will continue to the second stage which is the submission of the Commercial Proposal. Finally, the commercial bids will be opened in the presence of all Bidders and the lowest Bidder will be determined accordingly. This Bidder will be awarded.

Figures 4.2 to 4.5 show the bidding procedures which are much more simplified than Figure 4.1, as they represent a one-envelope tender submission procedure. They all share differences between each other. First of all, figures 4.2 and 4.4 are similar in terms that they start with a kick-off meeting individually with one Bidder at a time and an individual site visit by each Bidder. Second, Figure 4.3 shows a preliminary meeting which is with all the Bidders simultaneously, however the site visit is individual per Bidder. Third, Figure 4.4's preliminary meeting is individual per Bidder whereas the Site Visit is for all Bidders simultaneously. Fourth, only the procedures of figures 4.4 and 4.5 oblige the Bidder to respond in writing to express intention to bid. Finally, the

bidding procedures of all RFPs allow clarifications or questions to be asked before Proposal Submission and the issue of Addenda by Employer at any time. The differences lie in the fact that first, in Figure 4.2, the Bidder has the right to send clarifications only in seven days maximum from the time of the issuance of RFP. Second, referring to Figure 4.5, the questions need to be asked at any time before 30 days from the Bid Submission Date. Third, the responses to clarifications will be done in Figure 4.4 maximum before seven days from the Bid Submission date. Finally, the rest of RFPs do not specify any such time driven condition.

When it comes to the opening of the Bids, all of the figures 4.1 to 4.5, show that the Bids will be opened in the presence of all Bidders except for Figure 4.3, where the Bidder will come and submit the bid and leave the Employer's premises. With respect to Bid results, as shown in figures, the results to some extent will be announced to all, except in Figure 4.3, as no information is mentioned within the RFP regarding the announcement of the results. In this figure, Employer will proceed a further detailed evaluation of the Bidders Proposals and results, and will request for any clarifications if needed until Contract Award.

The following can be concluded by the above comparative analysis with regards to the Bidding Procedure of RFPs:

- RFP1 allows complete transparency with regards to the Bid Results. The Bid will be opened in the presence of all Bidders, the evaluation formula result which will be discussed later, will be clearly announced to everyone, the determination of the lowest Bidder will directly be known.
- RFPs 2, 4 and 5 allow partial transparency with regards to the Bid Results. The Employer will surely open the Bids in the presence of all Bidders, however only the Prices will be announced rather than the evaluation

formula result (explained later). Therefore, the lowest in Price is not necessarily awarded, and further information other than the announced Prices related to the lowest Bidder is not possible to know.

- There is null transparency in RFP3. The Bids will not be opened in the presence of all the Bidders and the Bid Results will not be necessarily announced. By experience, only the Prices may be announced after an unknown duration of time after Bid Submission.
- With regards to clarifications, many of clarifications can be subject to price increase or decrease of the project. Therefore, the quick and prompt Employer's answers to them are really important. None of the RFPs specify any time driven condition on this, except RFP4 where the Employer will respond to all clarifications at least one week prior to the Bid Submission Date. As per experience and also since no such condition exists in the rest of the RFPs, the Employer has the right to respond even before one day to the Bid Submission Date which will not be of the advantage of the Bidder at all, since his Proposal is subject to changes due to the responses.
- RFP5 is very severe when it comes to the submission of clarifications. It allows the submission before one month from the Bid Submission Date only.
- RFP5 is very stringent also with regards to meeting with Employer. It does not allow any such meeting except during the Site Visit which will happen in the presence of all Bidders.

4.2.3. Offer Rejection

The Employers have incorporated many clauses in their RFPs which discuss the proposal or offer rejection of the Bidders. Offers can be rejected in various scenarios.

These scenarios vary from one RFP to the other. The following Table 4.2 summarizes these scenarios and represents the comparison between all the RFPs.

Table 4.2. Offer Rejection

Offer Rejection				
RFP1	RFP2	RFP3	RFP4	RFP5
-	-	-	-	Failure to sign and submit intention to bid at the beginning
-	-	-	-	Modifying any terms in Employer's forms, datasheets and price schedule
-	In case offer validity is shorter than Employer's validity period	-	In case offer validity is shorter than Employer's validity period	In case offer validity is shorter than Employer's validity period
If tender bond is not submitted	If tender bond is not submitted	If tender bond is not submitted	If tender bond is not submitted	If tender bond is not submitted
-	-	-	-	If tender bond value is lower than Employer's requested value
-	-	-	Late tender submission	Late tender submission
-	-	-	If plant capacity is not as requested by Tender	-
-	-	Non-conformance with project time schedule	-	-
If Project Price is different than lump sum and is not fixed	If Project Price is subject to escalations	-	-	-
Influencing in evaluation, examination and award process of Employer	Influencing in evaluation, examination and award process of Employer	-	Influencing in evaluation, examination and award process of Employer	Influencing in evaluation, examination and award process of Employer
-	-	If price schedule is not complete	-	-
Non-compliance to approved vendor list	-	Non-compliance to approved vendor list	-	-
If bidder is not eligible and qualified	If bidder is not eligible and qualified	If bidder is not eligible and qualified	If bidder is not eligible and qualified	If bidder is not eligible and qualified
If bidder gets into exclusivity agreement with major equipment supplier	-	-	-	-
Employer can reject the offer at any time and without any reason	Employer can reject the offer at any time and without any reason	-	Employer can reject the offer at any time and without any reason	Employer can reject the offer at any time and without any reason
Alternative offers are rejected	-	-	If offer deviates from requirements, unless it is an alternative offer to the initial fully compliant offer	-
If Bidder offers employment or employ any Employer employee	-	-	-	-
-	-	If offer contains arithmetic errors which exceed five percent (5%)	-	-
-	-	If offer contains erasure, deletion or alteration	If offer contains omissions, erasures, alterations, additions, items not called for, or irregularities	If offer contains interlineations, erasures or overwriting

As shown in Table 4.2, all of the RFPs agree that the Offer will be directly rejected if the Bid Bond is missing from the submitted Proposal, as well as if the Offer is submitted by a non-eligible or non-qualified Bidder. Two other common scenarios between all of the RFPs, except for RFP3, are first, the scenario where the Bidder would influence in any way the evaluation of its offer and the project award process carried by the Employer. Second, the Employer has the right to reject any Offer at any time without having any reason.

Table 4.2 discusses also offer validity, offer submission, alternative offers, offer arithmetic errors, approved vendor list and omissions. Offer validity shall be as per RFP requirements for RFPs 2, 4 and 5 otherwise offer will be rejected. Any late Offer submission for RFPs 4 and 5 leads to Offer rejection. Alternative Offers are not accepted by RFP1. The rest of the RFPs do not specify any such criteria, except for RFP4 where alternative Offer is allowed. If arithmetic errors in the price schedule exceed 5% for RFP3, Offer will be rejected. Approved vendor list will be discussed later, any selected vendor which is not within the RFP approved vendor list will lead to Offer rejection for RFPs 1 and 3. RFPs 1 and 2 insist that the Offered Price shall be lump sum and fixed, otherwise the Offer will be rejected. Offer will be rejected in RFP3, 4 and 5 if it contains erasures, omissions and other as specified in Table.

The above constitutes scenarios which are repeated in at least two RFPs. The following cases are mentioned only in a single RFP:

- As per Figure 4.5, Bidder has to submit its intention to bid within two weeks from the issuance of the RFP. Otherwise Offer will be rejected.
- Any modifications of Employer's forms, datasheets and prices will lead to Offer rejection in RFP5.
- RFP4 does not accept any power plant Offer not complying with the plant

capacity requested.

- The project time schedule is of importance in RFP3. Non-conformance with it will lead to Offer rejection.
- If price schedule submitted by Bidder is incomplete, Offer is rejected in RFP3.
- Two other interesting requirements are there in RFP1: First, that any one-way or two-way exclusivity agreement with major equipment supplier for the Project is not accepted. Second, Bidder cannot employ any of the Employer's employees.

As a conclusion, most of the scenarios discussed in the RFPs are of common practice and sense. The only stringent requirement is RFP1's exclusivity agreement rejection between Bidder and major equipment manufacturer. Normally, it is of a common practice for the major equipment manufacturers to approach and request from Bidders such agreements. This would lead into different strategies for manufacturers when dealing with RFP1. Actually, it is for the Bidder's advantage when there is no exclusivity agreement, in such case, the Bidder will be open to negotiate better prices and other terms and conditions again with all the manufacturers after project award without any exceptions. As per Table 4.2, RFP5 contains the largest number of clauses or requirements related to Offer rejection with 10 scenarios, whereas RFP2 contains the lowest number of requirements. The remaining RFPs are in between. The large number of important requirements in RFP5, compared to others, show how sensitive the latter is while tackling the topic of Offer rejection.

4.2.4. Approved or Nominated Vendor and Sub-Contractor List

The Approved or Nominated Vendor and Sub-Contractor List is a list either

created by the Employer or the Bidder, which incorporates the names of the potential and qualified vendors and Sub-Contractors who will either supply material or execute the Works for the given project. How each RFP addresses such list is expressed in the following Table 4.3:

Table 4.3. Approved Vendor/Sub-Contractor List

Approved Vendor/Sub-contractor List				
RFP1	RFP2	RFP3	RFP4	RFP5
Vendor List				
Attached to Tender	Attached to Tender	Attached to Tender	Not attached to Tender	Not attached to Tender
covering all systems	covering only major equipment	covering only major equipment	-	-
Contractor may suggest other vendor, given that vendor will be subject to Employer's approval and qualification criteria. The approval and qualification must be before technical proposal submission	Contractor shall strictly follow the approved vendor list	Contractor may suggest other vendor, given that vendor will be subject to Employer's approval and qualification criteria. The approval and qualification must be before technical proposal submission	Bidder shall suggest vendor list which will be subject to Employer's review	Bidder shall suggest vendor list which will be subject to Employer's review. However bidder shall suggest only one vendor for each major equipment
Sub-contractor List				
Attached to Tender	Attached to Tender	Attached to Tender	Not attached to Tender	Not attached to Tender
Contractor may suggest other sub-contractor, given that subcontractor will be subject to Employer's approval and qualification criteria. The approval and qualification must be before technical proposal submission	Bidder shall suggest sub-contractor list which will be subject to Employer's review	Contractor may suggest other sub-contractor, given that subcontractor will be subject to Employer's approval and qualification criteria. The approval and qualification must be before technical proposal submission	Bidder shall suggest sub-contractor list which will be subject to Employer's review	Bidder shall suggest sub-contractor list which will be subject to Employer's review

Table 4.3 shows that RFPs 1, 2 and 3 contain a List of Vendors prepared by the Employer. RFP1 covers all vendors for all systems and equipment, whereas RFPs 2 and 3 cover only the vendors of major equipment. RFP2 does not allow Bidder to use any other vendors for major equipment than those from the list. It is not the case with RFP1 and 3, where Bidder may suggest other vendors however subject to Employer's approval and qualification process. RFP4 and 5 give room to the Bidder to create its own Vendor List. However the major difference for RFP5 with the rest is that Bidder before award can suggest only one Vendor for major equipment and will be bound to this Vendor after-award.

When it comes to Sub-Contractor list, the Employer has suggested a list of Sub-Contractors only in RFPs 1, 2 and 3. All of the RFPs agree that Bidder can suggest a new Sub-Contractor subject to Employer's review and approval.

In conclusion, all of the RFPs show similar approach and are clear when it comes to Vendor and Sub-Contractor list. The most stringent requirement is by RFP1, where the approval and qualification of any new vendor shall be done prior to the Technical Proposal submission. By experience, the qualification process is hard and takes time between any Employer and Vendor and in case a Contractor proceeds with a Vendor which was not yet added to the approved Vendor List, the Contractor will be facing a lot of problems with the Employer during project execution. It is best to select from the beginning an approved Vendor. Finally, as RFPs 4 & 5 contain no attached Vendor List to RFP, it shows how open they are in giving unlimited possibilities to an eligible bidder to suggest vendors accordingly, although this constitutes a risk area for the Employer while securing a successful project with qualified entities working for it such as Vendors or Sub-contractors.

4.2.5. Deviations/Clarifications

Clarifications are questions that arise by the Bidder after reading and reviewing the RFP tender documents. These clarifications are part of the Bidding Procedures discussed earlier and shown in figures 4.1 to 4.5. On the other hand, deviations are part of the Proposal submitted by the Bidder. Deviations are items or clauses which deviate from the RFP requirements. The following Table 4.4 summarizes the Clauses related to Deviations and Clarifications in all RFPs:

Table 4.4. Deviations/Clarifications

RFP1	RFP2	RFP3	RFP4	RFP5
Deviations				
Bidder has the right to submit a list of deviations in the Employer given format. Any other deviations mentioned anywhere other than in this list will not be considered	Bidder has the right to submit a list of deviations in the Employer given format	Bidder has the right to submit a list of deviations in the Employer given format	Bidder has the right to submit deviations in the form of alternative offers to the basic tender requirements	Bidder has the right to submit a list of deviations only to a minimum extent
-	In case the deviation is not a material deviation and it results in an unfair advantage to the Bidder, the Employer will evaluate and adjust the Bidder's Bid Price accordingly			
Clarifications				
Bidder has the right to submit a list of clarifications in cases such as 1) omission 2) discrepancy in Tender Documents 3) bidder has questions or doubts as to the true meaning of any part of the Tender Documents	Bidder has the right to submit a list of clarifications	Bidder has the right to submit a list of clarifications in cases such as 1) questions 2) ambiguity	Bidder has the right to submit a list of clarifications	Bidder has the right to submit a list of clarifications in cases such as 1) omission 2) bidder has questions on any part of the Tender Documents 3) correction of any ambiguity 4) error in Tender Documents

As per Table 4.4, all of the RFPs allow to some extent to the Bidder to deviate from the Employer's requirements. However it is only in RFP5, that only minor deviations are accepted. By experience, if the number of deviations is high, Employer after Proposal Submission will contact the Bidder to remove completely or partially the deviations without leading to any price impact. Such scenario is very difficult to face, as usually removing deviations will lead to price increase, therefore sometimes leading to a rank change in bid results. RFP2 deals with deviations differently. In RFP2, the Employer will deal with the deviations of all Bidders by adjusting their prices to have an equal and fair evaluation. RFP4 forces Bidder to submit one Offer not having any deviations and one alternative Offer which will contain deviations with their price impact. When it comes to clarifications, all of the RFPs equally allow clarification questions to be submitted during the Proposal Procedure as shown earlier in figures 4.1 to 4.5.

In conclusion, clarifications are allowed in all RFPs. With regards to deviations, all of the RFPs allow submission of deviating clauses except for RFP5, which shows a very strict approach in this manner; As a matter of fact, unlike the rest of the RFPs, it allows only a small room for minor deviations.

4.2.6. Localization Policy

Localization policy refers to any policy mentioned within the RFP which forces and encourages the use of local material and also encourages the creation of job opportunities to local employees and labor. The following Table 4.5 summarizes the different requirements of localization policy within the five RFPs:

Table 4.5. Localization Policy

Localization policy				
RFP1	RFP2	RFP3	RFP4	RFP5
Policy encouraging growth and job creation in the country	no such policy	Bidder shall abide by the rule of the Ministry of Commerce which discusses the purchase of materials or machines or goods required for the Contract from National Products or Products of National Origin	Bidders are encouraged to maximize the use of local material, supplies and contractors	RFP has not implicitly specified any localization policy
Long term goal: all the components of the Plant shall be manufactured locally		otherwise a penalty shall be due by an amount of 20% from the purchased prices	Bidder shall make efforts to utilize local contractors for work corresponding with their level of competence	Bidder must comply with the country laws with respect to localization
RFP has listed some equipment, components and services that he bidder must purchase locally		Contractor shall give priority for national goods and local contractors		

As shown in Table 4.5, RFP1 has listed some of the equipment and bulk material which needs to be strictly purchased locally, and has explicitly expressed the future goal which is for the country to manufacture all equipment and materials needed for power plant locally. Only RFP2 has completely omitted mentioning such localization policies. On the other hand, RFP5 has not implicitly mentioned any policy in RFP except that Bidder has to follow the laws of the Country, so it is the Bidder's responsibility to find out if there is any such country law which enforces a localization policy. As shown in Table 4.5, RFP3 uses the word "shall" while enforcing the localization policy to the Contractor, however RFP4 leaves a freedom and uses less enforcing term such as "are encouraged to", or "shall make effort" which does not

guarantee that Contractor must abide by a localization policy.

It can be concluded that all RFPs give priority to their own national products while sharing requirements for such similar goal except for RFP2. The most stringent requirement is by RFP3, where for any materials, goods or products purchased from abroad rather than from the local market, Bidder has to pay a penalty of 20% of the price of the material. The requirements of localization policy have been very clear to the Contractors in all the RFPs.

4.2.7. Bid Evaluation and Contract Award

The Bid Evaluation and Contract Award processes differ from one RFP to the other. In order to describe and visualize them in an easy way, the following process diagrams have been formed and posted in figures 4.6 to 4.10, covering all aspects related to evaluation and contract award per each RFP, noting that only eligible Bidders will proceed through such processes; the eligibility of Bidders was already covered in section 4.2.1:

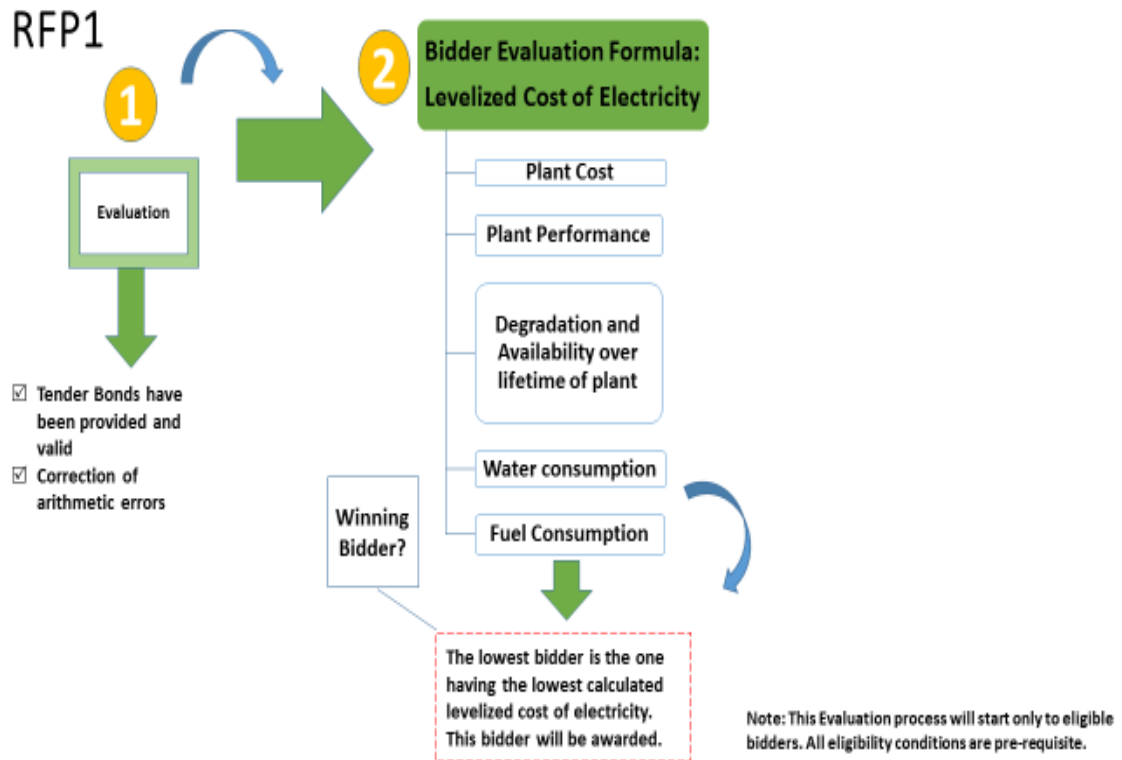


Fig. 4.6. Bid Evaluation-RFP1

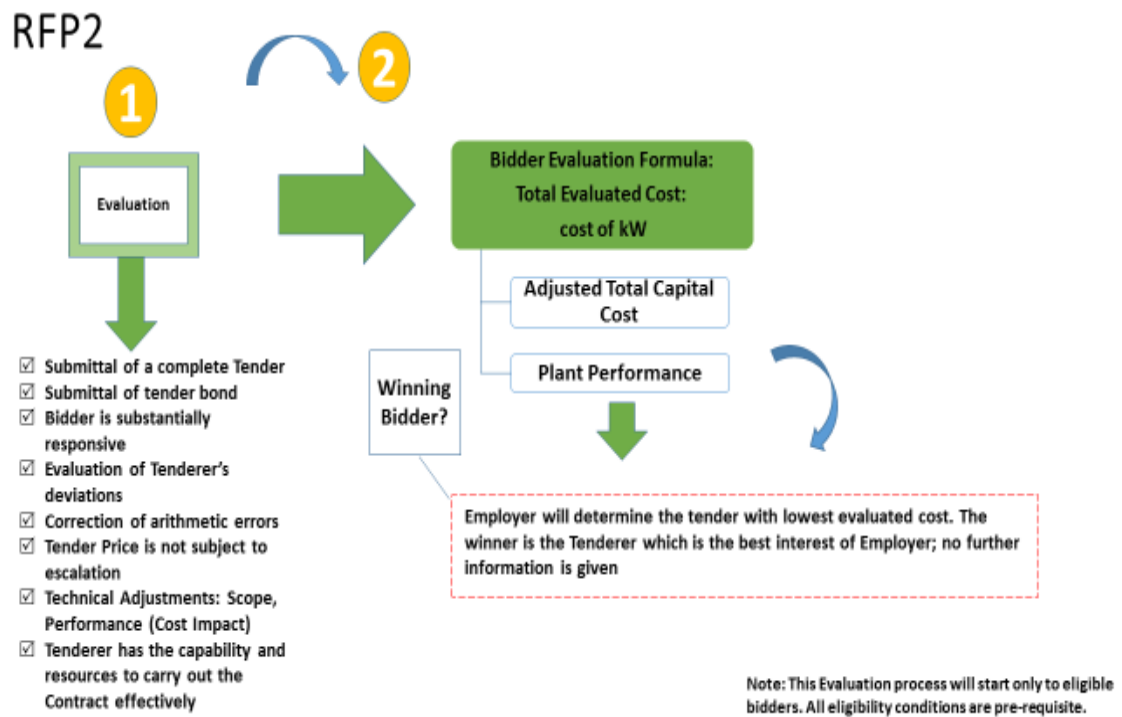


Fig. 4.7. Bid Evaluation-RFP2

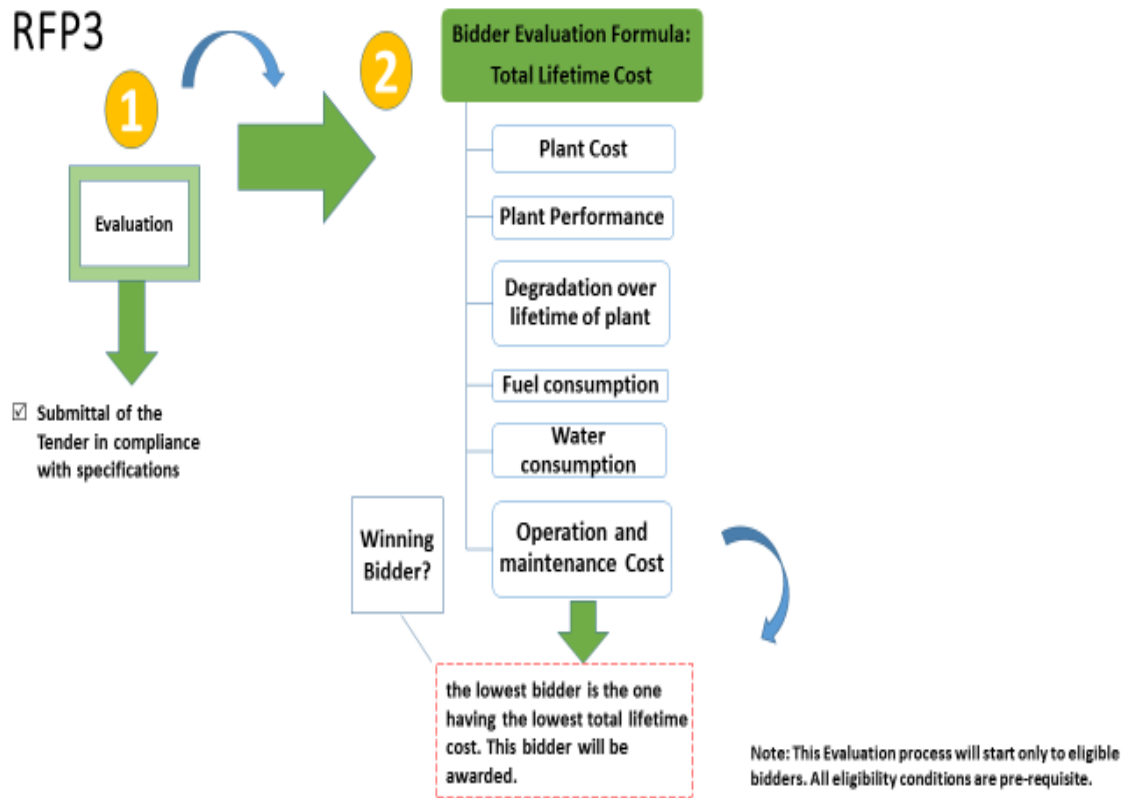


Fig. 4.8. Bid Evaluation-RFP3

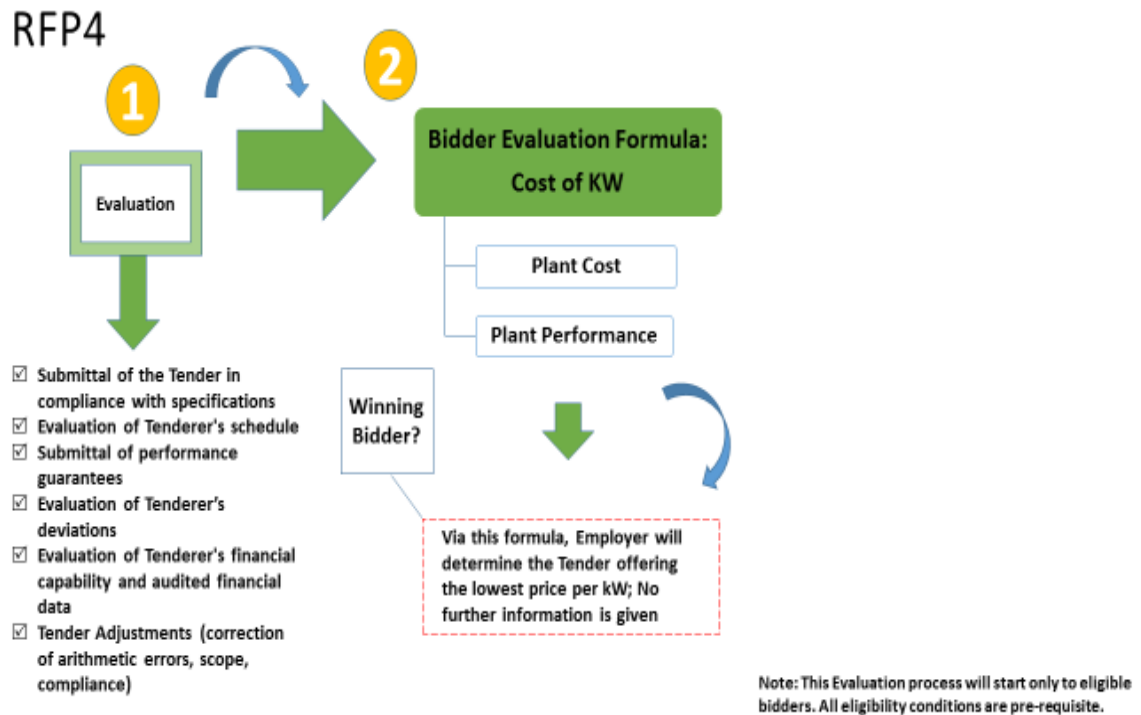


Fig. 4.9. Bid Evaluation-RFP4

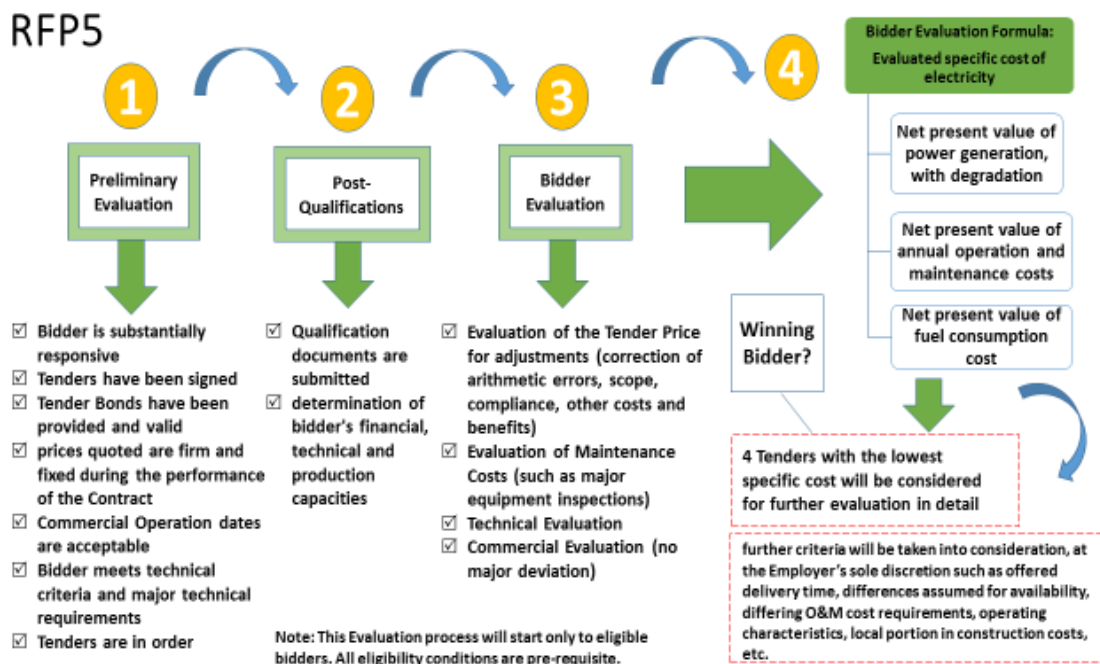


Fig. 4.10. Bid Evaluation-RFP5

As a first step in Figure 4.6, the Employer will ensure that the Bid Bond is submitted and will do arithmetic corrections if needed in the price schedule submitted by Bidder. As a second step, in Figure 4.6, the Employer has introduced the concept of levelized cost of electricity over a life time power plant period of 25 years formula, which incorporates and takes into consideration the following factors:

- Plant Cost with respect to the Employer.
- Plant performance: performance of the power plant is the generated power output and efficiency of the plant.
- Degradation factor: Degradation on power plant output and power plant efficiency over the 25 years. Degradation is the lowering of the power plant output and efficiency over the period of operation; many causes of degradation incorporate poor quality of fuel, air contaminants, aging of

equipment etc.

- Availability factor over the period of 25 years: Availability of the plant is the quantity of time when the power plant generates electricity. Occasions such as maintenance or unexpected outages will stop the power generation.
- Water consumption of the power plant over the lifetime of the plant.
- Fuel consumption of the power plant over the lifetime of the plant.

In this RFP1, the Bidder who results into the lowest calculated levelized cost of electricity will be awarded the project. Also it should be noted that only the short-listed Bidders from the first technical submittal stage as introduced in Figure 4.1, Bidding Procedure of RFP1, will proceed to this stage of evaluation.

Figure 4.7's first step is to ensure that the Bidder has submitted a complete Tender, the tender bond is submitted and Bidder has shown a responsive approach during the bidding procedure. In addition to that, Employer will evaluate the deviations, will correct arithmetic errors if they exist, will perform cost impacts of technical adjustments for scope and performance and will ensure that the Plant Cost is not subject to escalations and that Bidder has adequate resources to perform the Contract. Adjustment for performance is the cost impact given by a formula which is a way to perform and evaluate a given Bidder based on the Bidder who has submitted the lowest performance. Finally, this adjusted cost along with the performance. In this way, the Employer will be able to determine the lowest Bidder.

In Figure 4.8's, the Employer of RFP3 first checks if Bidder has submitted a Bid in compliance with the RFP requirements, then proceeds with an evaluation formula which is similar to RFP1's formula, except with the fact that it considers a further quotation price of a seven year operation and maintenance period, quoted by Contractor. The lowest Bidder is the one who will be awarded the project.

The formula introduced in Figure 4.9 is much simpler than the previous ones. The only factors considered in this formula are Plant Cost and Plant Performance. Via this evaluation, the Employer will learn the lowest Bidder; however there is no information about the awarding process in terms of whether the lowest Bidder gets awarded the project or not. Before the formula evaluation, Bidder will go into a detailed evaluation. Such evaluation consists of ensuring that the Bid is in conformance to the RFP requirements, the project schedule is acceptable, performance guarantees are submitted, deviations are evaluated, financial capabilities are acceptable, and arithmetic and other errors are corrected.

Figure 4.10 shows a much more complicated process of evaluation versus the rest of the figures. As a first step, Employer will check whether Bidder has been responsive during the bidding stage, if the Proposal has been signed, if the Bid Bond has been submitted, prices are fixed, project schedule is acceptable, Bid is compliant to the RFP requirements, and the proposal contains the documents in a proper order. After this first preliminary evaluation step, Employer will begin with a post-qualification process. This includes checking if all the qualification documents have been submitted and whether Bidder is technically and financially capable to perform the Contract. Before proceeding with the evaluation formula, another major step is the evaluation of Tender Price and the making of necessary adjustment for arithmetic errors if they exist, scope adjustment for technical and commercial compliance and adjustment for any other costs and benefits. On top of this, Employer will technically evaluate the Bid as well as the maintenance and operation cost impacts. Finally, the formula which the Employer will use includes net present value of power generation, net present value of operation and maintenance costs, as well as fuel consumption. The net present value concept is to the methodology of calculating the net present value as in finance of a cash flow over 30

years, where costs such as fuel price, inflation and interests are added. All of these mentioned parameters will lead to a result of “Evaluated specific cost of Electricity”. Only the first lowest four Bidders whose results are the lowest evaluated specific cost of electricity will proceed to the final evaluation stage which is at the Employer’s sole discretion.

By reviewing the above evaluation and contract award processes, the following can be concluded:

- RFP1, 3 and 5 share a common ground of evaluating Bidders, in terms that they all consider whether to a limited or non-limited extent, the cost impact of the plant’s lifetime such as fuel cost, water cost, operation and maintenance costs, degradation, availability etc.
- RFP2 and 4 represent a very simple basic evaluation which does not consider the lifetime of the plant. It is important to note that old versions of RFP1 used to use such simple and traditional evaluation, until it was recently updated and up-graded to have a more holistic and realistic approach with the introduced formula.
- Further important conclusions can be made on awarding process:
 - a. RFP1 and 3 show a very clear instruction that the lowest Bidder is the one having the lowest evaluated formula result. However RFP1 is transparent, since the result will be announced in the presence of all Bidders, whereas RFP3 does not announce it openly to all Bidders.
 - b. RFP2 and 4 show unclear instructions regarding project award since it is unknown whether the lowest Bidder will be awarded the project or not.
 - c. RFP5 takes partially into consideration the lowest evaluation formula results and provide uncertainties in project award. This means, that the

lowest Bidder will not necessarily be project awarded, however the 4 lowest Bidders will be evaluated through specified and unspecified criteria and under the Employer's hidden processes. Therefore, this RFP is not transparent at all when it comes to project award.

In conclusion, chapter 4 provided a clear individual and collective RFP comparison and conclusive narratives with respect to the first part of a given RFP document, the instruction to Bidders or tenderers, as explained in section 4.1. It consisted of and covered all the RFP requirements and specifications related to Eligible Bidders, bidding procedures, Offer Rejection, approved Vendor or Sub-Contractor list, deviations and clarifications, localization policies and finally detailed bid evaluation and contract award processes. These were the major and important Instructions to Bidders. It can be seen that each RFP provides unique instructions to the Bidders. Further conclusions and suggestions to deal with the presented requirements will be covered in the chapter 6.

CHAPTER 5

BENCHMARKING VERSUS FIDIC

As already defined in section 2.5.1, FIDIC is a typical Contract, a compilation of standardized general conditions. It is judged to provide a fair and balanced distribution of rights, risks and obligations between Employer and Contractor. What are the similarities (if any) and the differences between the various RFPs' general and particular conditions, one versus each other, and versus FIDIC clauses?

The main focus of chapter 5 will be the discussion of the major topics, part of general and particular conditions, as per the following:

- Contract Formation
- Project Taking-Over
- Contract Close-Out
- Extension of the project's Time of Completion
- Delay Liquidated Damages
- Suspension
- Variations
- Advance Payment
- Termination
- Certificates Time-Bar and Conditions
- Arbitration

The following sections refer to the general and particular conditions of the five RFPs, as well as the general conditions of FIDIC. Before any discussion, it is important to understand how the RFPs' projects are divided into works or portions since project

milestone certificates, discussed later, and project schedule are inter-related to them.

Project portions for RFP1 are clearly defined as: Gas Turbine Power Plant, Steam Turbine Power Plant, Balance of Plant, Non-power plant Facilities, Substation and Transmission Line. Project Works for RFP2 to RFP5 are not implicitly defined. In these RFPs, “Works” are simply defined as all Plant and work to be done by Contractor under the Contract.

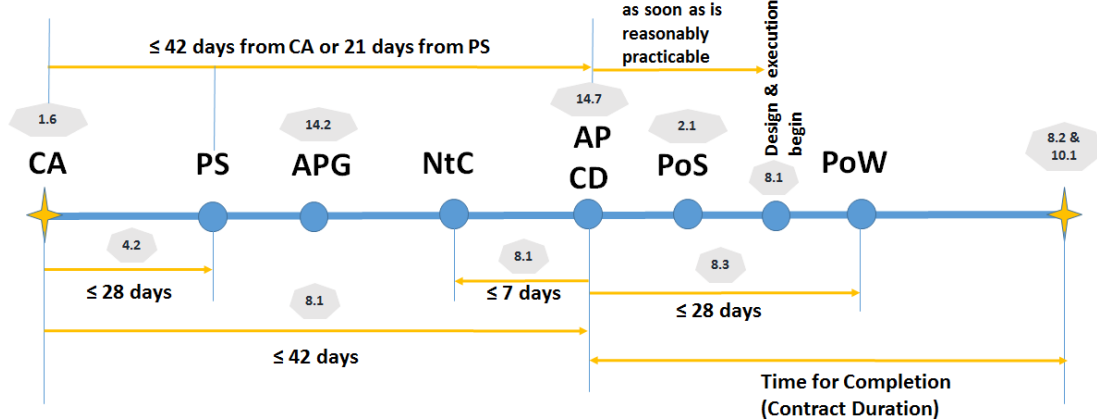
5.1. Contract Formation, Taking-Over and Close-Out Timelines

In order to envisage the consecutive project events and the inter-relations of these events with regards to the Contract Formation, Contract Taking-Over and Contract Close-Out processes, three types of timeline diagrams have been formed corresponding to each topic. These diagrams are shown in the following figures 5.1 to 5.21. These timelines are seven in numbers per topic: five are specific for each RFP, one is combined for all RFPs, and one is specific to FIDIC. The aspects of these comprehensive diagrams will be highlighted throughout the discussion section following these diagrams. All certificates corresponding to major milestones will be discussed separately in section 5.8.

5.1.1. Contract Formation

The timeline of Contract Formation contains many project related events, as well as project Milestones represented by Certificates. These Timelines are shown in the following figures 5.1 to 5.7:

Contract Formation Timeline-FIDIC EPCT



- CA: Contract Agreement
- PS: Performance Security
- CD: Commencement Date
- APG: Advance Payment Guarantee
- NtC: Notice to Commence
- AP: Advance Payment
- PoW: Programme of Work
- PoS: Possession of Site

Fig. 5.1. Contract Formation Timeline-FIDIC

Contract Formation Timeline-RFPs

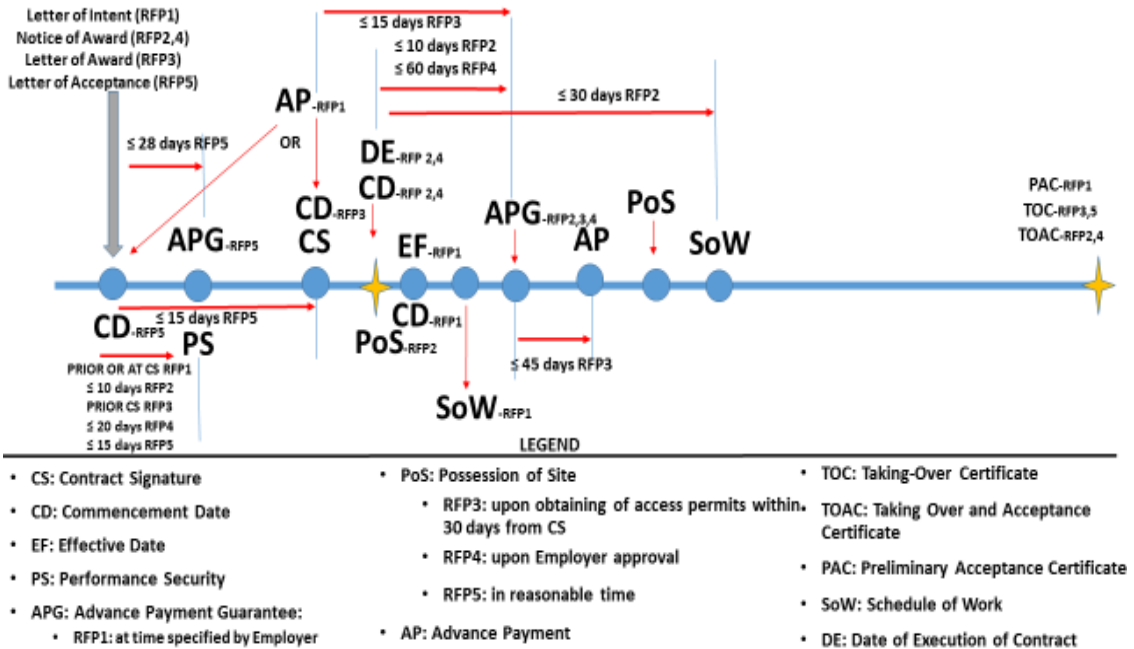


Fig. 5.2. Contract Formation Timeline-RFPs

Contract Formation Timeline-RFP3

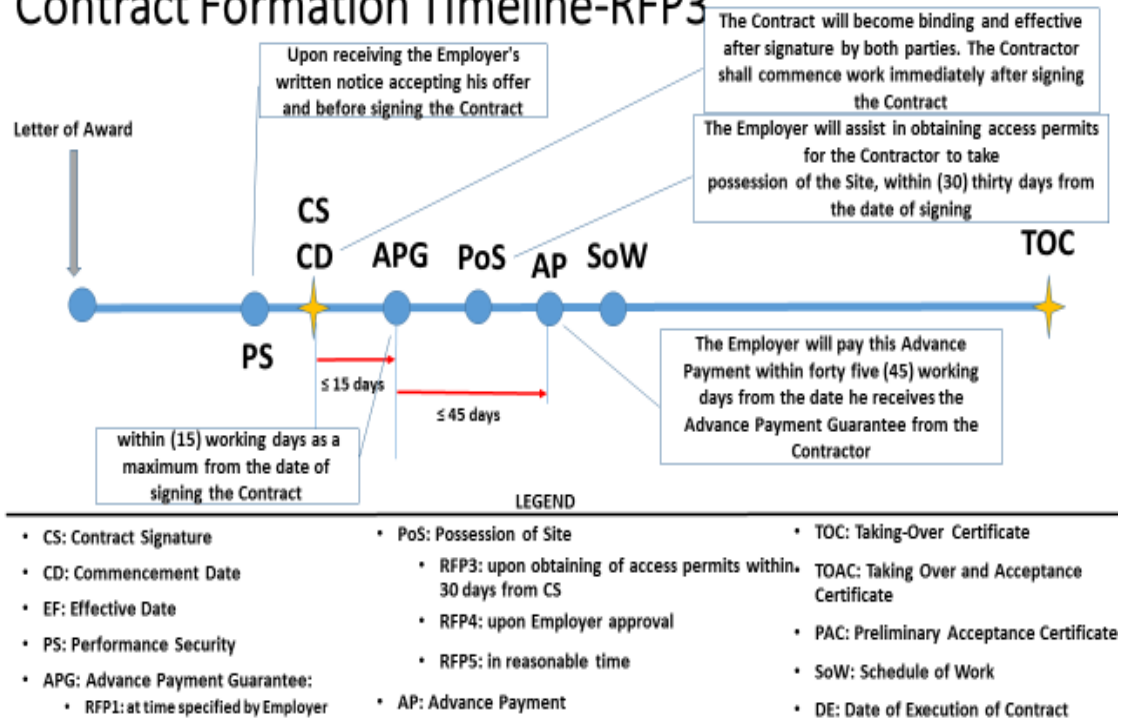


Fig. 5.5. Contract Formation Timeline-RFP3

Contract Formation Timeline-RFP4

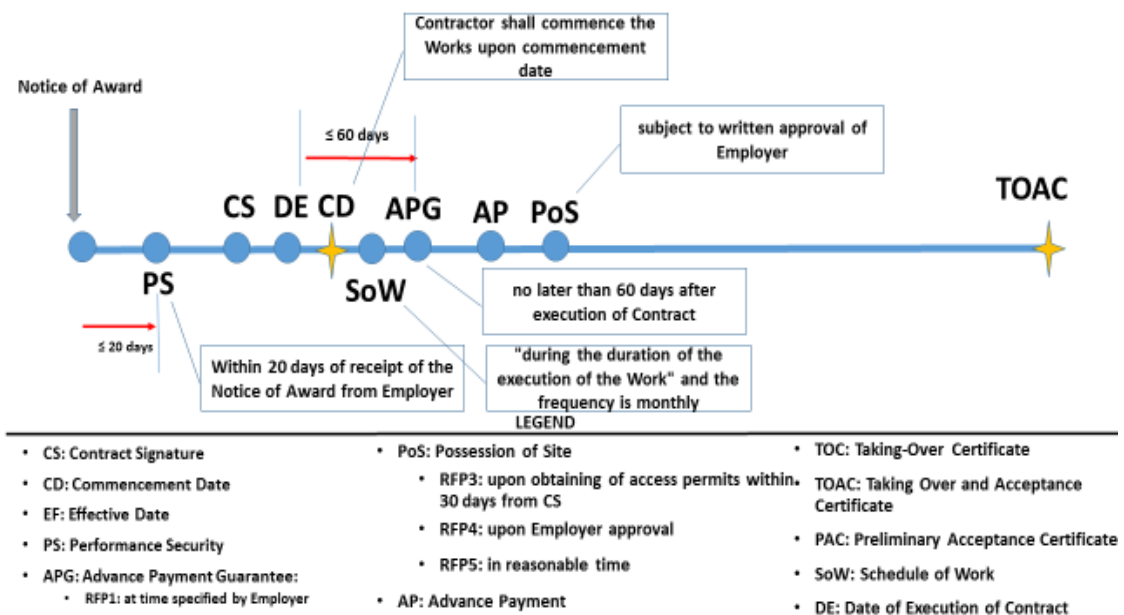


Fig. 5.6. Contract Formation Timeline-RFP4

Contract Formation Timeline-RFP5

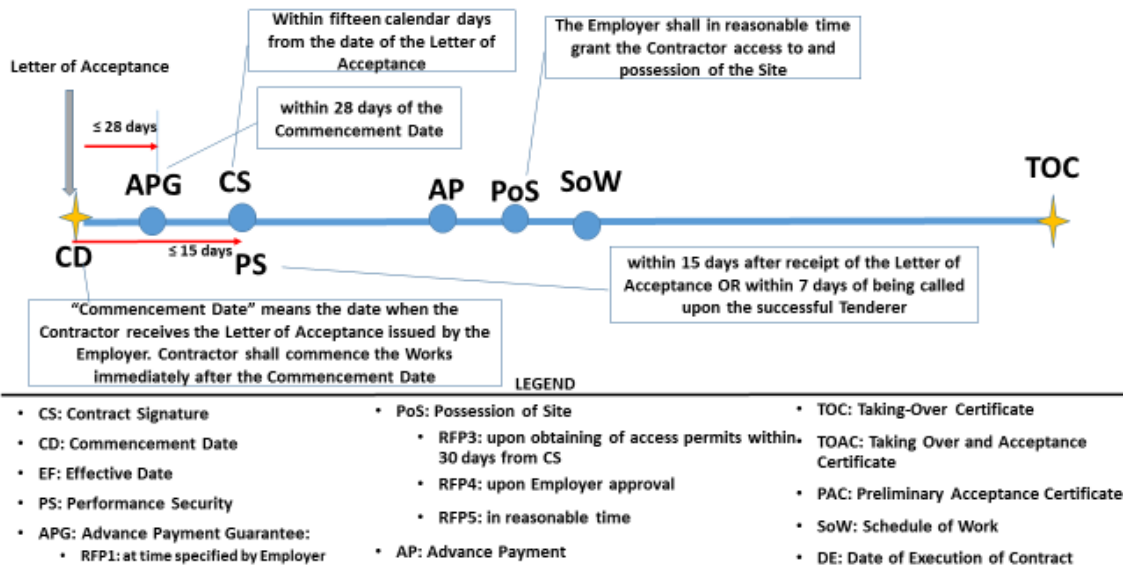


Fig. 5.7. Contract Formation Timeline-RFP5

The following sub-sections 5.1.1.1 to 5.1.1.6 discuss the topics shown as legend in above figures. These topics are Commencement of Work, Performance Security, Advance Payment Guarantee, Advance Payment Possession of Site and Submission of Programme of Work.

5.1.1.1. Commencement of Work

The “CD”, as referred in figures 5.1 to 5.7, or “Commencement Date or Work” is specified in each RFP differently. In Figure 5.3, RFP1 refers to it as the “Effective Date” of the Contract which is the first date stated in the Signed Contract, upon which the Contractor will completely have the right to start the Work. In Figure 5.4, the Contractor shall commence the Work at the date of Execution of the Contract. In Figure 5.5, the Commencement Date is the same date of the Contract signature date, upon which the Contractor shall immediately start the Work. There is a lack of specification on Commencement Date for RFP4, where the RFP specifies that the Contractor shall

commence the Works on the Commencement Date which is not defined and nor specified anywhere within the RFP. In Figure 5.7, the “Commencement Date” is shown to be the same date when the Contractor will receive the Letter of Acceptance by the Employer and upon which Contractor shall immediately commence the Work. This Letter of Acceptance is a letter which notifies the successful Tenderer of Contract Award. As shown in the Figure, the Contract Agreement will be signed within 15 days after the Letter of Acceptance. Therefore, in RFP5, Commencement date shall fall within 15 before Contract Agreement. Furthermore, this RFP discusses the Commencement Date in a section called “Commencement and no objection certificates” within RFP.

None of the RFPs collectively seem similar to FIDIC when it comes to this topic of Commencement Date. Through Clause 8.1, FIDIC specifies that the commencement date falls within 42 days after the Contract Agreement, which is not the case with the RFPs. None of the RFPs share a time duration pre-condition between Commencement Date and Contract Agreement except for RFP5 which is 15 days as shown in Figure 5.7. Furthermore, there is a “practicable” time between the commencement date and the commencement of the Works for FIDIC, whereas the RFPs either describe the commencement of the Works at a specific date or specify the Commencement Date to be same as commencement of the Works.

Another difference versus FIDIC is that in RFP5, a new pre-condition to the commencement of any work at site is added. This pre-condition is the receipt of the Contractor, under his own cost, all of the No Objection Certificates from the concerned parties. The RFP does not specify nor provide a comprehensive list of these NOCs, therefore it is assumed that the Contractor needs to be self-informed in this topic.

There is an important aspect to note for the RFPs. None of them specifies the

date of the Contract Signature, except for RFP5 where Signature will fall within 15 days from Letter of Acceptance. For the rest of the RFPs, as per experience, Contractor although awarded the project, might sometimes wait up until one year to sign the Contract, with a continuous renewal of the bid validity.

In conclusion, in contrast to FIDIC, many of the RFPs show imprecise time duration between Commencement Date and contract agreement. For FIDIC, this information is clear and it is 42 days, whereas for RFPs 1, 2 and 4, there is no time relation between contract signature and commencement date.

5.1.1.2. Performance Security

Performance Security, sometimes also called Performance Guarantee or Performance Bond, constitutes an important factor of a given project Contract. It is a guarantee submitted by Contractor to Employer. It is a way to secure that the Contractor will comply with a proper project performance, and all the other parts of the Contract Documents. In the following Table 5.1, the comparison between FIDIC and the RFPs will be shown with respect to the submission timing of the Performance Security by Contractor to Employer.

Table 5.1. Submission of Performance Security

FIDIC	RFP1	RFP2	RFP3	RFP4	RFP5
Within 28 days from Contract Agreement	Prior to or at Contract Signature	Within 10 days from notice of Award	Upon receiving the Employer's written notice accepting his offer and before signing the Contract	Within 20 days from Notice of Award	within 15 days after receipt of the Letter of Acceptance OR within 7 days of being called upon the successful Tenderer

As it can be seen in Table 5.1, none of the Performance Security submission dates of the RFPs is pre-conditioned by Contract Agreement as in FIDIC. All of them are conditioned by the first contact or written communication that the Employer will make to the successful Bidder whether via a Letter of Acceptance or Letter of Award, which fall before Contract Signature. Furthermore, the allowed period given to the Contractor to submit the performance security is shorter than FIDIC's 28 days.

5.1.1.3. Advance Payment Guarantee

To receive a project Advance Payment from the Employer, Contractor must submit an irrevocable guarantee against this payment. In this way, the Employer will guarantee that the payment will be returned in case the Contractor does not fulfill his project obligations.

Table 5.2. Submission of Advance Payment Guarantee

FIDIC	RFP1	RFP2	RFP3	RFP4	RFP5
Timing not specified	Within time specified by Employer	Within 10 days from Notice of Award	Within 15 days from Contract Signature	Not later than 60 days after execution start of Contract	Within 28 days from Commencement Date

As it can be seen in Table 5.2, most of the RFPs request to receive the Advance Payment Guarantee before or in a short time from the beginning of Contract Formation or Commencement Date. RFP4 represents a surprising request where the Contractor has two months period after the execution start of the Contract to submit it. After the submission of Advance Payment Guarantee, the Employer can proceed with its payment

based on the requirements of then next Section 5.1.1.4.

5.1.1.4. Advance Payment

After receiving the Advance Payment Guarantee, the Employer will support the Contractor with an Advance Payment in the timings specified in the following Table

5.3. The importance of the advance payment rises in the fact that it helps the Contractor in meeting the project start expenses during the initial phases of the project execution.

Table 5.3. Advance Payment

FIDIC	RFP1	RFP2	RFP3	RFP4	RFP5
Within \leq 42 days from Contract Agreement or 21 days from Performance Security	Upon Contract Signature or Letter of Intent	Not specified	Within 45 days from the date of receipt of Advance Payment Guarantee	Not specified	Not specified

As shown in Table 5.3, the majority of the RFPs lack concrete information on the timing when the Advance Payment will be paid to the Contractor. This is the case with RFP2, RFP4 and RFP5. Such lack of concrete information on an essential financial parameter in Contract is discouraging to the Contractor, as it does not assure its payment at a concrete and right timing.

5.1.1.5. Possession of Site

The Possession of Site will allow the Contractor to start executing the Works as per Contract. Many times, delays of possessing the site has led into project delays as discussed in Section 2.6.3, as well as claims and disputes. At the end of the day, the

Contractor has formed a project specific schedule and needs to realize the scheduled activities.

Table 5.4. Possession of Site

FIDIC	RFP1	RFP2	RFP3	RFP4	RFP5
Mentioned in particular conditions; if not, upon Commencement Date	Not specified	Not specified	Within 30 days from Contract Signature	Not specified	In a reasonable time

It can be seen that most of the RFPs have not specified the time to allow the Contractor to possess the site. This opens the door to future delays and claims which are undesirable. The best approach of FIDIC, where the possession of site will be upon Commencement Date, does not exist within the RFPs.

5.1.1.6. Submission of Programme of Work or Schedule of Work

FIDIC has discussed a requirement of submitting a Programme of Work from the Contractor to the Employer within 28 days from Commencement Date. It will allow the Employer to have a base-line schedule in hand to follow-up with the Contractor on the project.

Table 5.5. Submission of Programme of Work or Schedule of Work

FIDIC	RFP1	RFP2	RFP3	RFP4	RFP5
Within 28 days from Commencement Date	Prior to Commencement of Work	On monthly basis	Not specified	On monthly basis	Not specified

As mentioned above and shown in Table 5.5, the Programme of Work, requested by FIDIC from the Contractor which falls within 28 days from the Commencement

Date is not similar to the RFPs. In RFPs, a project schedule shall be submitted during bidding stage and will become part of the Contract Documents, and later on, after Commencement Date, an up-to-date Schedule of Work shall be submitted frequently. Furthermore, for RFP1, it shall also be submitted after the Contract Signature and prior to Commencement of Work. Some RFPs request to receive the Programme of Work on monthly basis; others have not specified the submission frequency conditions of this document. The fact that the Contractor provides in RFPs a programme schedule during bidding stage becomes a huge responsibility since the document will be considered as binding on the Contractor. Any deviation from such schedule can be subject to later damages. In this way, the Employer in RFPs seem to be more advantageous than FIDIC. They will be able to access contractually the project progress versus the contractual document.

5.1.2. Taking-Over

Taking-Over or handing over the project at the end of the construction phase to the Employer is the most important part of the project. Taking-Over itself represents a process which needs to be completed in coordination with both parties. This process has been put into timelines, which are shown in the following figures 5.8 to 5.14:

Taking-Over Timeline-FIDIC EPCT

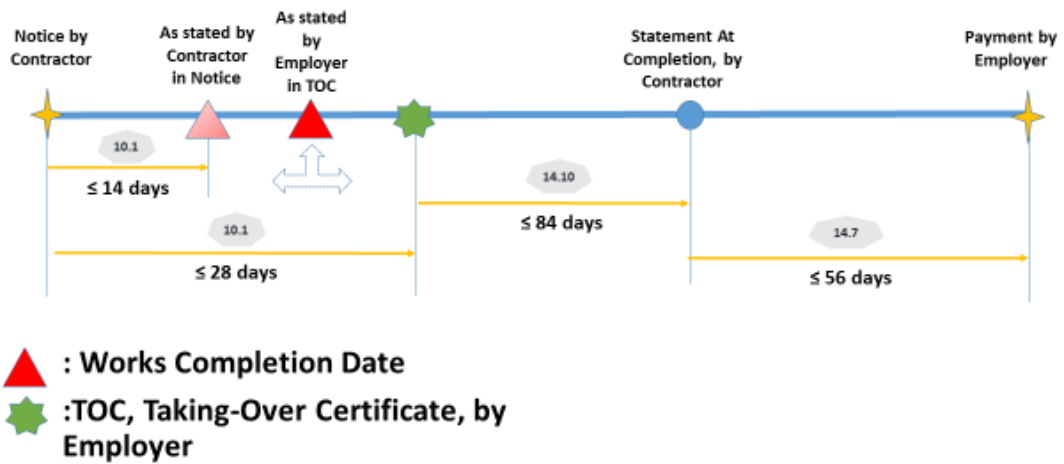


Fig. 5.8.. Taking-Over Timeline-FIDIC

Taking-Over Timeline-RFPs

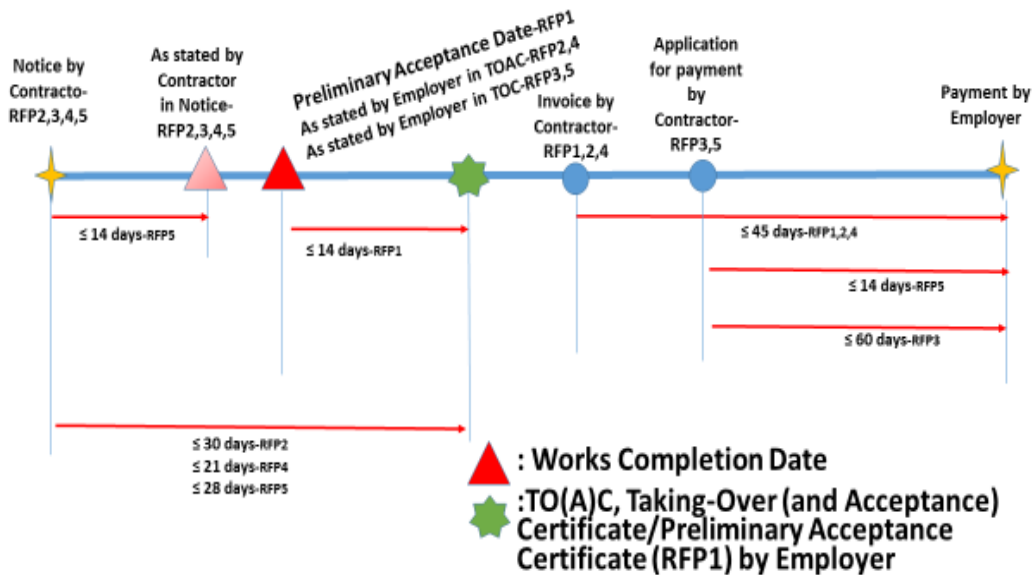


Fig. 5.9. Taking-Over Timeline-RFPs

Taking-Over Timeline-RFP1

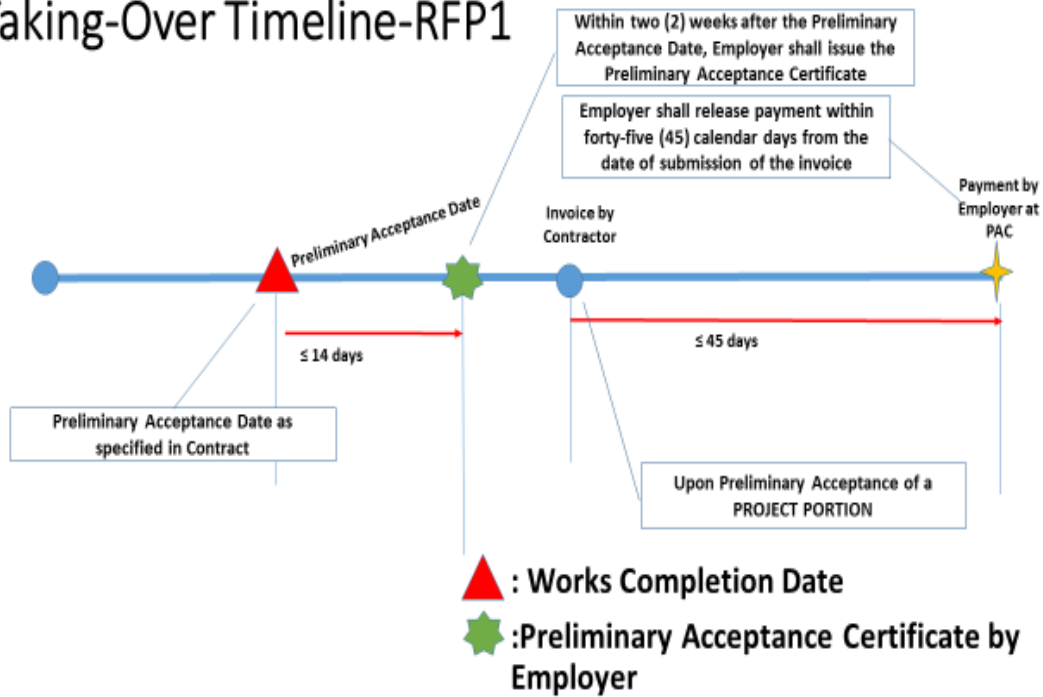


Fig. 5.10. Taking-Over Timeline-RFP1

Taking-Over Timeline-RFP2

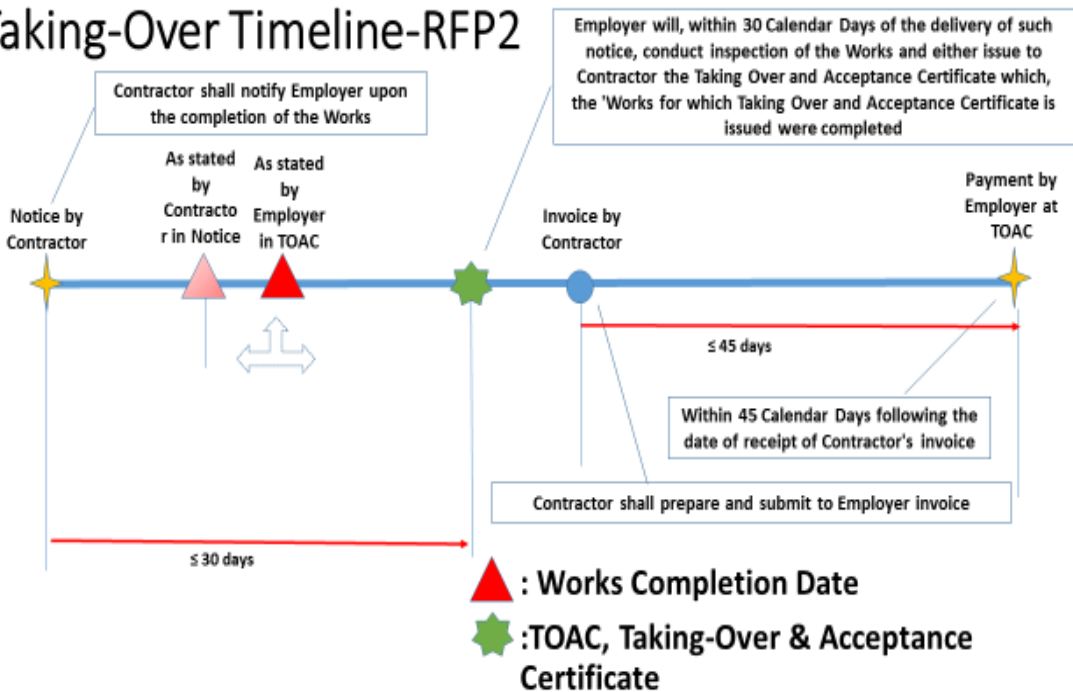


Fig. 5.11. Taking-Over Timeline-RFP2

Taking-Over Timeline-RFP3

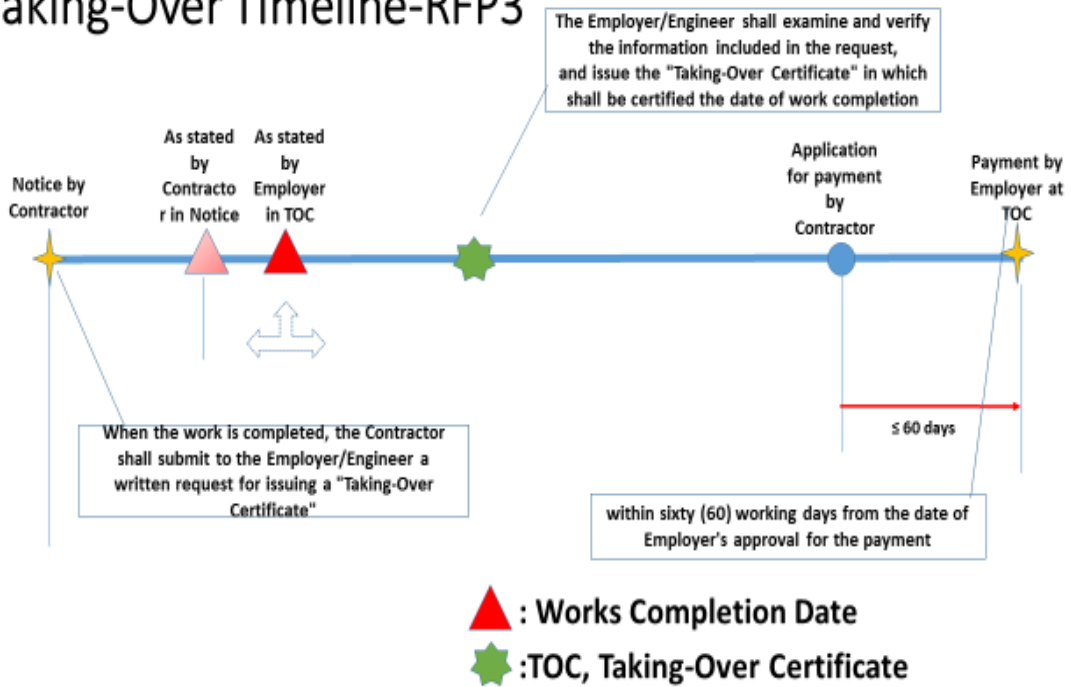


Fig. 5.12. Taking-Over Timeline-RFP3

Taking-Over Timeline-RFP4

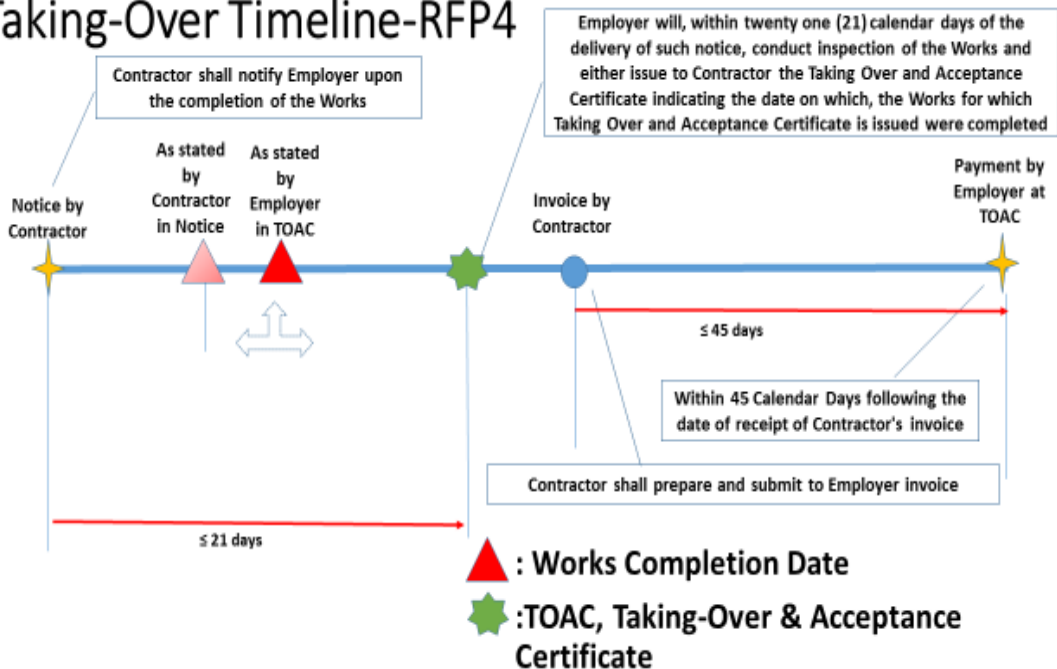


Fig. 5.13. Taking-Over Timeline-RFP4

Taking-Over Timeline-RFP5

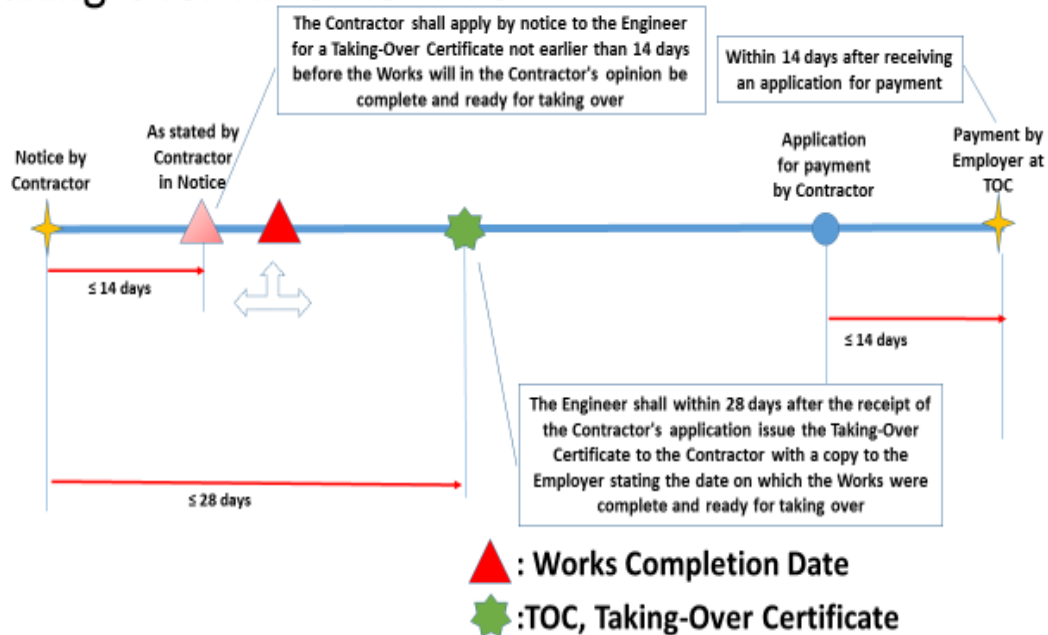


Fig. 5.14. Taking-Over Timeline-RFP5

Starting with Figure 5.9, the specified Preliminary Acceptance Date is the date when the Project is completed. This date is not in the opinion to any party; it is simply a date fixed and stated in the Contract. Within 14 days from this Date, Employer shall issue the Preliminary Acceptance Certificate. This is in contrast to FIDIC (Figure 5.8) and the rest of the RFPs (Figures 5.11 to 5.14) with the fact that these documents allow the Contractor to submit a date of completion of work in his opinion, after which the Employer will evaluate accordingly. When it comes to the Taking-Over Certificate, it will be issued, in FIDIC, within 28 days from Contractor's notice of work completion as shown in Figure 5.8. However, this time duration is 30 in Figure 5.11, 21 in Figure 5.13 and 28 in Figure 5.14. Finally, it is only Figure 5.12 that has not conditioned a specific time duration between the Contractor's notice and the issuance of the Certificate.

Regarding the payment at Taking-Over, FIDIC is the only document which links the Taking-Over Certificate receipt to the statement at completion notification with a

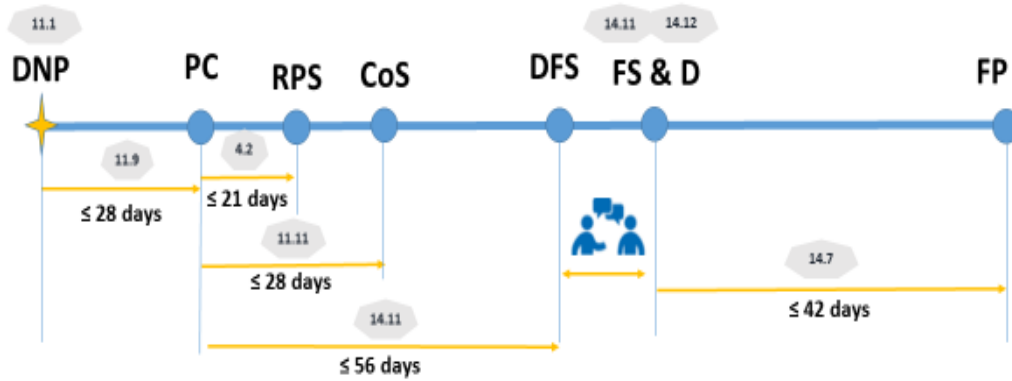
time period of 84 days and links the latter to payment at Taking-Over with a period of 56 days, both shown in Figure 5.8. The rest of the RFPs do not show any such interconnected links with the receipt of Certificate. Period between this payment and the Contractor's submission of notice varies between 60 days and 14 days: for FIDIC, it is 56 days as shown in Figure 5.8, for RFP3 it is 60 days as shown in Figure 5.12, for RFPs 1, 2 and 4, it is 45 days as shown in figures 5.10, 5.11 and 5.13 whereas for RFP5 it is only 14 days as shown in Figure 5.14. As it can be seen, the longest duration corresponds to RFP3 whereas the shortest corresponds to RFP5.

In conclusion, when it comes to Taking-Over process, RFPs show similarity with FIDIC with mainly time period duration as differences between the different events of the Taking-Over Certificate issuance, as elaborated in above paragraph. The main difference is that all of the RFPs treat payment without linking it to Certificate. A new process of invoice or application for payment shall be submitted after receipt of Certificate.

5.1.3. Contract Close-Out

After Contract Formation and after Project Taking-Over, the Contract does not yet come to an end. The Contract will close after the end of the Defects Liability Period, also called Warranty Period. The events corresponding to this procedure are similarly represented through timelines. The timelines of the Contract Close-Out are shown in the following figures 5.15 to 5.21:

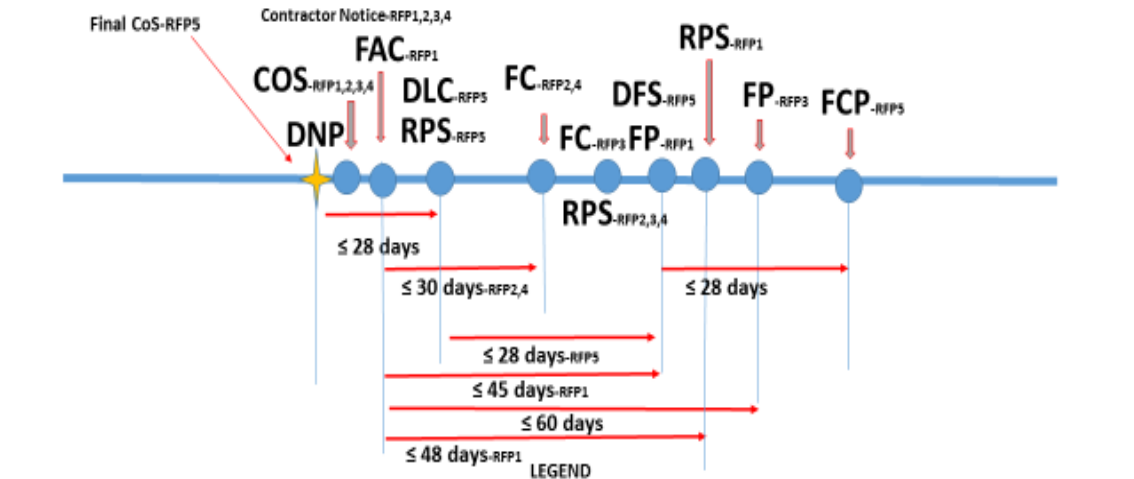
Contract Close-Out Timeline-FIDIC EPCT



- DNP: Expiry of Defects Notification Period
- PC: Performance Certificate
- RPS: Return of Performance Security
- CoS: Clearance of Site
- DFS: Draft Final Statement
- FS: Final Statement
- D: Discharge
- FP: Final Payment

Fig. 5.15.. Contract Close-Out Timeline-FIDIC

Contract Close-Out Timeline-RFPs



- DNP: Expiry of Defects Notification Period
- RPS: Return of Performance Security
- CoS: Clearance of Site
- DFS: Draft Final Statement
- F(A)C: Final (Acceptance) Certificate
- DLC: Defects Liability Certificate
- TOC: Taking-Over Certificate
- TOAC: Taking Over and Acceptance Certificate
- PAC: Preliminary Acceptance Certificate
- F(C)P: Final (Certificate of) Payment

Fig. 5.16. Contract Close-Out Timeline-RFPs

Contract Close-Out Timeline-RFP1

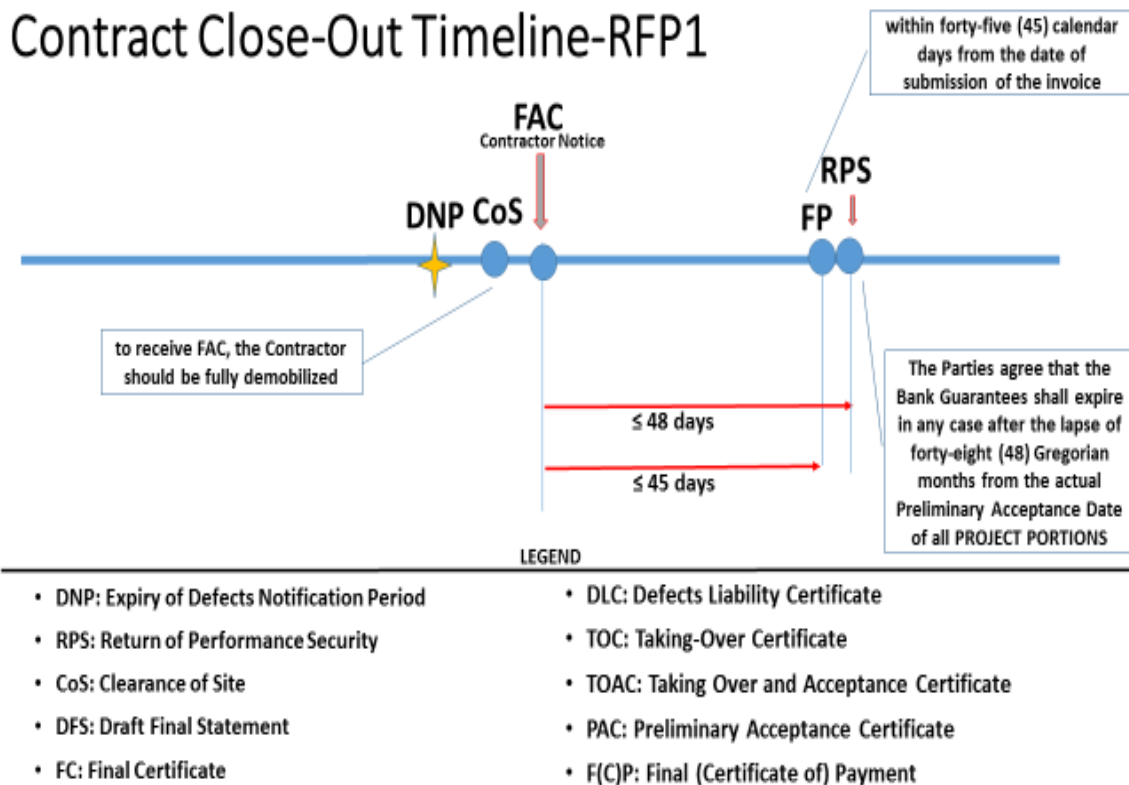


Fig. 5.17. Contract Close-Out Timeline-RFP1

Contract Close-Out Timeline-RFP2

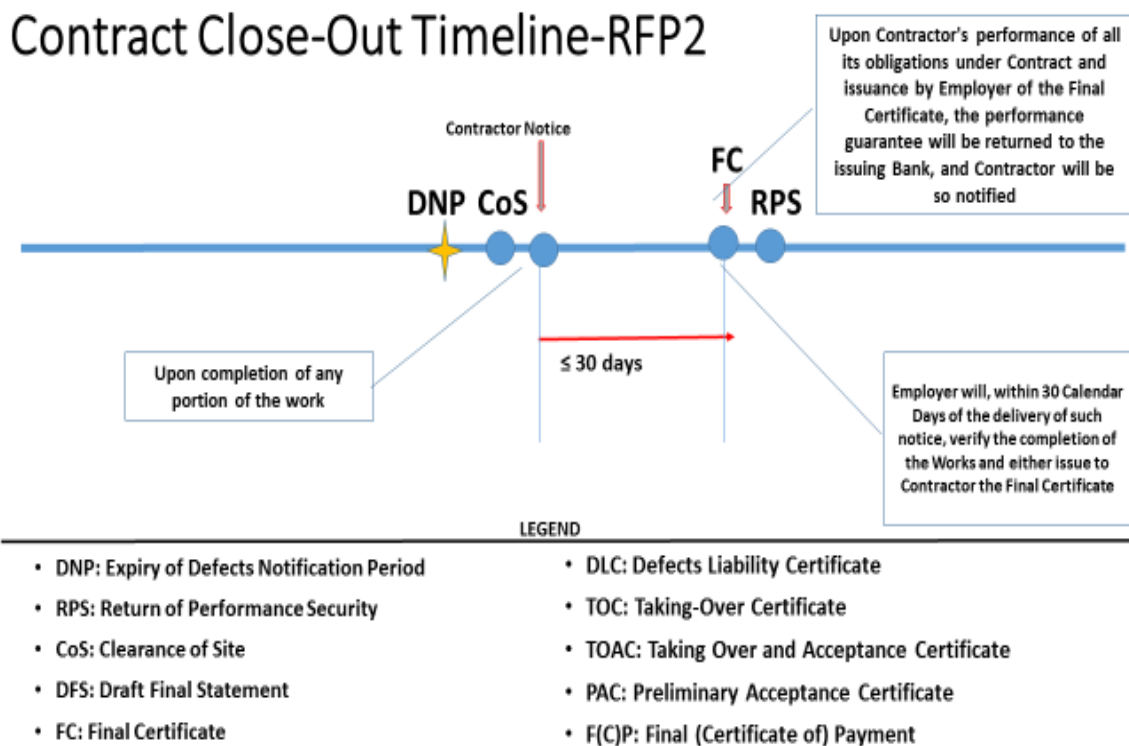


Fig. 5.18. Contract Close-Out Timeline-RFP2

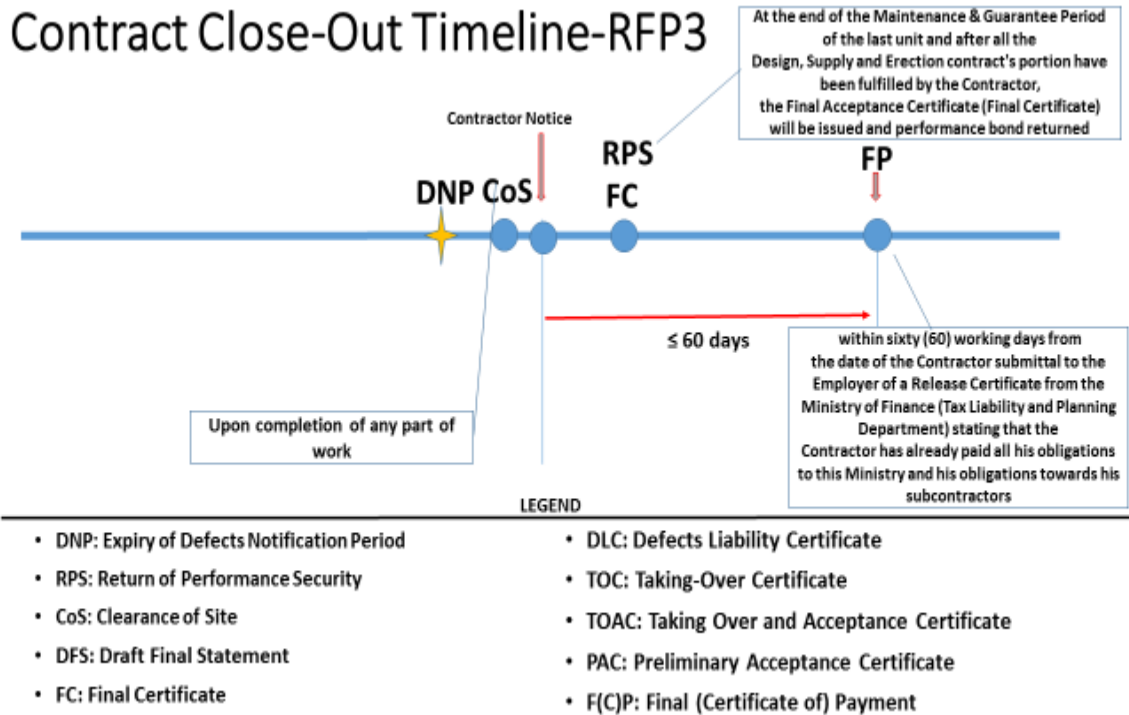


Fig. 5.19. Contract Close-Out Timeline-RFP3

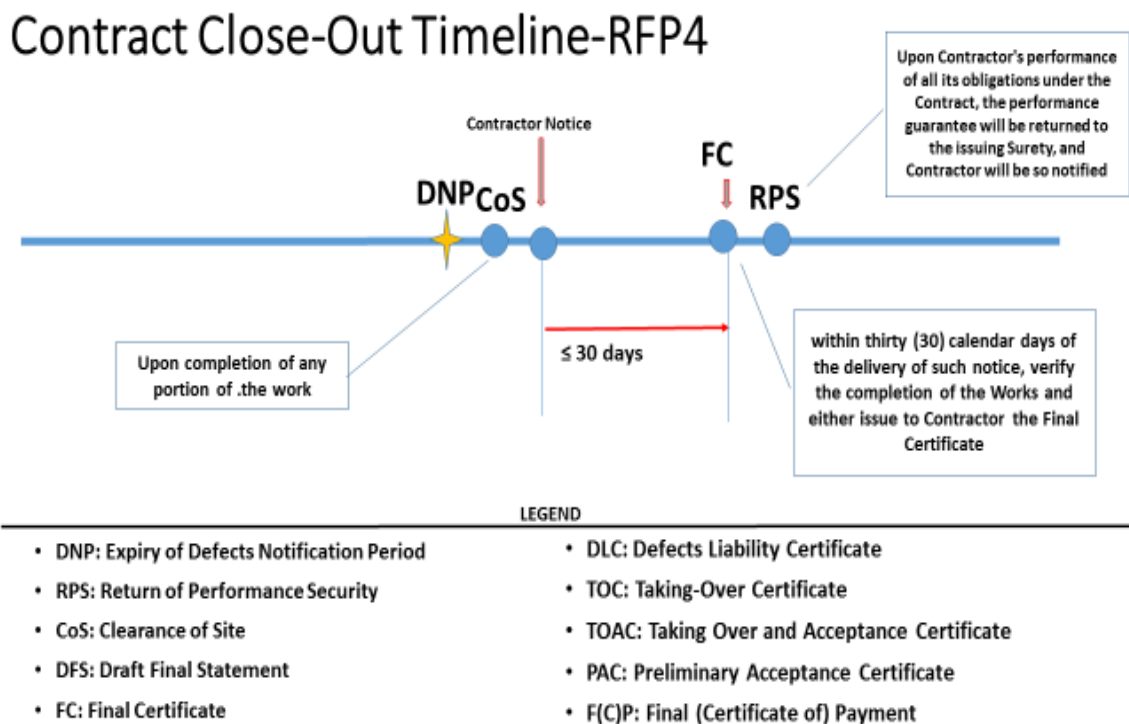


Fig. 5.20. Contract Close-Out Timeline-RFP4

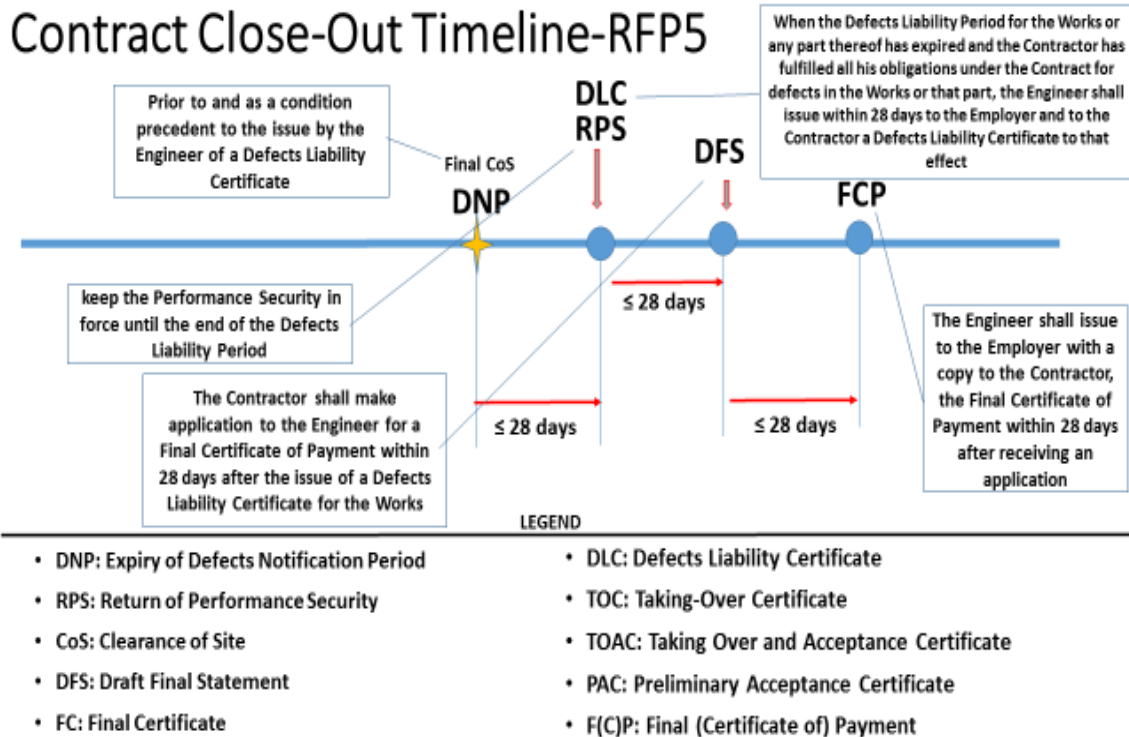


Fig. 5.21. Contract Close-Out Timeline-RFP5

The following sub-sections 5.1.3.1 to 5.1.3.3 discuss the topics shown as legend in above figures. These topics are the Return of Performance Security which was previously discussed in Section 5.1.1.2, the Clearance of Site and the most importantly the Final Payment.

5.1.3.1. Return of Performance Security

Since a Performance Security was submitted by Contractor to Employer in the beginning of the project, after the end of the Warranty Period, it is time to be returned back to Contractor. The requirement of the return of this Performance Security with respect to FIDIC and to the various RFPs is shown in the following Table 5.6.

Table 5.6. Return of Performance Security

FIDIC	RFP1	RFP2	RFP3	RFP4	RFP5
Within 21 days of Performance Certificate	Not specified. It seems it relies on expiry date. Performance Security expires within 48 days from Preliminary Acceptance Date	Upon issuance of Final Certificate as well as upon performance of all Contractual Obligations	Upon issuance of Final Acceptance Certificate as well as upon performance of all Contractual Obligations	Upon performance of all Contractual Obligations	Upon end of Defects Liability Period

Reference to Table 5.6, it can be clearly seen that, first, FIDIC links the return of the Performance Security to the issuance of the Performance Certificate. However this is not necessarily the case with the RFPs. Second, RFP1 does not provide any data with respect to this return. Third, RFPs 2, 3 and 4 link the return to the performance of all Contractual Obligations. This means that even if a final Certificate is issued, Employer can consider many other reasons to hold the Performance Security for minor reasons or other requests. Fourth, RFP5 presents a very general statement as “end of Defects Liability Period”, unlike the rest of the documents. Finally, the time duration of 21 days between Performance Certificate and return of Performance Security for FIDIC is very clear, however similar time duration does not exist for the RFPs, which creates a contractual gap and uncertainty.

5.1.3.2. Clearance of Site

To clear the site is one of the last activities of the Contractor. Every document has specified a specific timing for the accomplishment of this activity. This information is posted in the next Table 5.7 for FIDIC, as well as the various RFPs

Table 5.7. Clearance of Site

FIDIC	RFP1	RFP2	RFP3	RFP4	RFP5
Within 28 days of Performance Certificate	Condition precedent to Final Acceptance Certificate	Upon completion of any work	Upon completion of any work	Upon completion of any work	Condition precedent to Defects Liability Certificate

As shown in Table 5.7, Clearance of Site in FIDIC is after the receipt of Performance Certificate within a 28 days period, whereas for all the RFPs it is before any final Certificate. Furthermore, RFPs 2, 3 and 4 do not show any clear requirement for a site clearance rather than general statement with which clearance of site is a prerequisite condition upon completion of any Work. RFPs 1 and 5 represent the clearance of site as a condition precedent to receive the final Certificate.

5.1.3.3. Final Payment

The Final Payment represents the last payment that the Employer will make to the Contractor. Upon the Final Payment, the Contract can be finally closed-out. Usually, this payment for the RFPs is around 10% of the Contract Price. The timing when the Final Payment will be made is posted in the following Table 5.8 for the various documents.

Table 5.8. Final Payment

FIDIC	RFP1	RFP2	RFP3	RFP4	RFP5
Within 42 days of Final Statement	Within 45 days from final invoice	Within 30 days of Contractor's notice for final payment	within 60 days from Release Certificate from Ministry of Finance	Within 30 days of Contractor's notice for final payment	Within 28 days of Draft Final Statement

As it can be seen in Table 5.8, the time duration given from any invoice or statement up until Final Payment fluctuates between 28 and 60 days. 60 days encountered in RFP3 is the most stringent. An interesting and new requirement is represented by RFP3. In this RFP3, the Contractor will have to secure a Release Certificate from the Ministry of Finance. In this way, the final payment is directly linked to a third party, the Ministry of Finance, through which the Employer will ensure that the Contractor has paid all its dues to Sub-Contractors.

In conclusion to Contract Close-Out timeline for FIDIC and RFPs and the above comparative analysis, first, it was shown that the RFPs lack contractual time duration limitations between the issuance of Final Certificate and the return of Performance Security unlike FIDIC for which this time duration is 21 days. Second, the RFPs lack contractual time duration between the Final Certificate and the Clearance of Site as well unlike FIDIC where this time duration is 28 days. Third, the RFPs show similarity to FIDIC when it comes to Final Payment in terms that they contain a contractual time duration link between the payment and the Contractor's request for payment, with the exception of RFP3 where the time duration is linked to the Ministry of Finance's Release Certificate.

5.2. Extension of Time for Completion

The following Table 5.9 has consolidated all causes and events which contractually allow the Contractor to request for an extension of time from the Employer. The events and causes are followed by a notice from Contractor to Employer of request for a time extension and submission of necessary documents as a support to the notice. Therefore, the extension of time is possible in FIDIC and RFPs through the

following causes/circumstances:

Table 5.9. Extension of Time for Completion-Causes

Causes:	FIDIC	RFP1	RFP2	RFP3	RFP4	RFP5
1	Variation	Change-order	Changes in Works	Change-order	Change-order	Additional work
2	Delay or prevention caused by Employer			Industrial dispute or any other reason beyond Contractor's control		
3				Weather conditions		Weather conditions
4	Force Majeure	Force Majeure	Force Majeure	Force Majeure	Force Majeure	Force Majeure
5	Change in Laws	Change in Laws		Change in Laws		
6						Delay caused by any other Contractor engaged with Employer
7						Any suspension of the Works, except when due to the Contractor's default
8	Employer's risks					Employer's risks
9	Delays due to fossils found					Delays due to fossils found
10	Delay caused by Authorities					
11	other causes of delay due to Employer giving an entitlement to extension of time under any Sub-Clause: delay in giving possession to site, delays in testing, delays in carrying Tests on Completion due to Employer, delays in payments, other claims					
12						Failure of Employer in his obligations

Common causes for request for extension of time between all of the RFPs and FIDIC are first, Variation, which is also called or referred to as “Change-Order” in the RFPs, second, Force Majeure. Some other causes are common between them and some are different. FIDIC and RFP3 automatically allow for time for extension due to any reason attributed to Employer. The rest of the documents have not implicitly mentioned that. RFPs 3 and 5 have included adverse weather conditions as subject causes. Changes in Laws are common between FIDIC, RFP1 and RFP3. RFP5 specifies three causes which do not exist in any other RFP nor in FIDIC. These causes are delays caused by any other Contractor engaged with the Employer, suspended Works except when due to the Contractor’s default, delays due to fossils found and failure of Employer in his obligations. Other causes which are not repeated in all documents are: Employer’s Risks and discovery of fossils which are common between FIDIC and RFP5. Finally, FIDIC specifies the following which are never mentioned in RFPs: delays in giving possession to site to Contractor, delays caused in testing and delays in carrying Tests on Completion due to Employer, delays in payment by Employer and other claim related reasons.

Other than the Causes, the following Table 5.10 shows the notice period for requesting time extension and whether if supporting documents are requested to be submitted by the Contractor.

Table 5.10. Extension of Time for Completion-Notice & Supporting Document

	FIDIC	RFP1	RFP2	RFP3	RFP4	RFP5
Notice Time (Contractor to Employer)	Within 28 days of the circumstance	Not mentioned	Not mentioned	Immediately	Not mentioned	Within 7 days of the circumstance.
Information to be submitted after Notice	Supporting particulars	Not mentioned	Not mentioned	Complete details	Not mentioned	Supporting Documents

Table 5.10 shows that the notice period in FIDIC is 28 days. When it comes to the RFPs: this period is only 7 days for RFP5, this period is specified as “immediately” for RFP3, whereas the rest of the RFPs have not mentioned anything about duration nor any request for supporting documents. Only FIDIC, RFP3 and 5 have mentioned about the need of supporting documents to be submitted along with the notice.

In conclusion, the time period of 7 days for RFP5 or the “immediate” time for RFP3 seem to be very short for the Contractor to notice and prepare information on the circumstance which leads to a request for time extension. There is a contractual gap in the rest of the RFPs with respect to the aspect of notice period and supporting documents, as they do not discuss them at all.

5.3. Schedule Delays (Liquidated Damages)

FIDIC and all of the RFPs cover the topic of liquidated damages connected to project delays. If Contractor fails to complete the Works within the time for completion, the Contractor shall pay a price for every day of delay. In FIDIC, the cost of delay is said to be specified in particular conditions. This price is limited by a cap mentioned in the particular conditions as well. This is similar to RFPs 2, 3 and 4 which discuss them

indeed in their particular conditions, whereas RFPs 1 & 5 discuss them in their general conditions. The delays in FIDIC and all RFPs are the calculated days between time for completion and the date mentioned in Preliminary Acceptance Certificate in case of RFP1, Taking-Over Certificate in cases of FIDIC, RFPs 3 & 5, and Taking-Over and Acceptance Certificate in case of RFPs 2 & 4.

Several differences have been noticed while benchmarking the RFPs against FIDIC. As mentioned in above paragraph, RFPs 1 and 5 discuss delay damages in their general contract conditions unlike FIDIC and the rest. At the end of the day, the location where this aspect is discussed within the Contract is not an issue. Whether discussing it through general or particular condition, the issue is to analyze properly the requirements and notice the differences. These differences, one RFP versus the other, will be elaborated in the next paragraph.

First of all, in RFP1, as each project portion has its own preliminary acceptance date, the liquidated damages will apply with a rate specific for each project portion resulting from the delay of this portion with respect to the portion contract price. RFP1 provides a calculation formula to calculate the project portion daily average cost and provides damages in stages. The first stage is the delay up to the first 15 days or the 5% of the project portion duration, whichever is greater, where the damage is applied as 1/4th of the daily average cost. The second stage is the stage beyond the 15 days or the 5% of the project portion duration, whichever is greater. In this stage, one half of the average daily cost will apply. Finally, the third stage is the period after the second 15 days or the 5% of the project portion duration where the full daily average cost will apply. Unlike FIDIC where the cap or the maximum liquidated damages is referred to be specified in particular conditions, this data is mentioned in the general condition and is equal to 10% for each project portion. Second, in RFP2, the Employer clearly

specifies a specific cost to be applied for each calendar day of delay in completing the works after the first 15 days beyond the specified commercial operation for each unit without division of portions. The cap is specified as 90 days cumulative. Third, in RFP3, it is the Employer who will deduct the value of delay from interim payment due of Taking Over and Acceptance Certificate or from bank guarantee without any notice, starting from the first day of delay in completing all the Works within the period specified in the Contract. Similar to RFP2, this value is a specific cost per day specified within the RFP. Fourth, in RFP4, the Contractor shall pay 0.5% of the Total Contract Price for every calendar week of delay after the first 15 days beyond the Construction Completion Certificate Date. The total delay penalty shall not exceed 10% of the Total Contract Price. Finally, in RFP5, the delay damages apply on any section of the Works, as well as interface or tie-in (specific milestones) dates delayed in their Time for Completion. The damage will be deducted from the relevant part of the Contract Price by 0.1% per day. Specifically in this RFP, it is specified that damages also apply to completed parts of the Works which cannot be used due to the non-completed part. The total damage shall not exceed 10% of the total Contract Price of the part. Only in RFP5, a scenario is discussed where the maximum total damage has been reached. In this case, and in case Employer wants Contractor to complete the works, he would notify Contractor accordingly with a new fixed completion time. In this case, if Contractor fails to complete it without any reason attributed to the Employer, then Employer can terminate the Contract while recovering all the losses.

In conclusion, it is clear that first FIDIC does not specify any specific daily rate for delay, whereas all the RFPs specify them and the rates and caps differ from one RFP to the other. In contrast to the rest of the RFPs, RFP1 and 5 provide a more fair approach since Employer will implement liquidated damages with rates specific to the

relevant section or work, rather than considering a rate on the complete Contract Price. Finally, only RFPs 2 & 4 provide a grace period of 15 days, which is of the benefit of the Contractor.

5.4. Suspension of Work

The suspension of Work topic is characterized in the RFPs by many aspects: first, the notification from Employer to Contractor to suspend the Work, second the Contractor's responsibilities due to suspension, third compensation of costs due to Suspension, fourth the maximum allowed period of the suspension without a cause and finally details on the recommencement of the suspended work. In FIDIC, this topic is divided by the sub-clauses of 8.8 Suspension of Work, 8.9 Consequences of Suspension, 8.10 Payment for Plant and Materials in Event of Suspension, 8.11 Prolonged Suspension and 8.12 Resumption of Work. The following Table 5.11 summarizes the aspects mentioned above and is followed by discussion which comes to complement the comparison with further details.

Table 5.11. Suspension of Work

Criteria	FIDIC	RFP1	RFP2	RFP3	RFP4	RFP5
Notification from Employer/Engineer to Contractor	At any time, without cause	At any time, without cause	At any time, without cause	At any time, without cause	At any time, without cause	At any time, without cause
Suspended Scope	a part or all of the Works	a part or all of the Works	a part or all of the Works	a part or all of the Works	a part or all of the Works	a part or all of the Works
Contractor's responsibilities due to suspension	maintain and safeguard the suspended work against any damages or losses	maintain and safeguard the suspended work against any damages or losses	maintain and safeguard the suspended work against any damages or losses	maintain and safeguard the suspended work against any damages or losses	maintain and safeguard the suspended work against any damages or losses	maintain and safeguard the suspended work against any damages or losses
Money compensation due to suspension	payment	payment, compensation costs by mutual agreement	payment, costs are specified in details	payment, costs are specified in details	payment, costs are specified in details	payment, reasonable costs
Schedule compensation due to suspension	Extension of time	No compensation except if critical path is affected	Extension of time, upon Employer evaluation	no information	Extension of time, upon Employer evaluation	no information
Maximum period of the suspension without a cause	84 days	3 consecutive months	3 consecutive months	no information	no information	84 days
Step1 after the above maximum suspension period	Contractor may request to proceed the work	same as FIDIC	Employer to meet the Contractor to agree on how to proceed	no information	no information	same as FIDIC
If Step1 is not responded in 28 days	Treat it as omission if part of the works, or termination if suspended works is the whole of the works	same as FIDIC	no information	no information	no information	same as FIDIC
If Step1 is responded in 28 days	Contractor shall make good any deterioration or defect in or loss of the Works or Plant or Materials, which has occurred during the suspension	same as FIDIC	no information	no information	no information	same as FIDIC
Extra criteria mentioned in RFPs	None	Material manufacturing & shipment that have started prior to suspension are exempted from suspension	Contractor shall utilize construction equipment and labor in a way to minimize costs of suspension	None	Contractor shall utilize construction equipment and labor in a way to minimize costs of suspension	Engineer instructs to suspend the Works

Reference to Table 5.11, all of the RFPs agree with FIDIC, that first, the Employer or the Engineer may at any time instruct the Contractor to suspend a part or all of the Works without any cause, and it is specifically specified in the RFPs that this instruction shall come in writing. Second, the Contractor is responsible to maintain and safeguard the suspended work against any damages or losses due to suspension. Third, in case the suspension was with cause, Employer is not liable to any expected profits or damages or costs resulting from the suspension of work during the suspension with cause period. Such causes include Contractor's default, negligence, non-compliance to Employer requirements etc. Fourth, the costs incurred due to the suspended Works without cause shall be compensated by Employer. Fifth, Contractor should resume the work after the written resumption notice by Employer. Sixth, the suspension costs to be compensated are subject to Employer's approval. All of these are similarities between the documents related to Suspension topic.

In addition to the above similarities, the comparative observation and reading of the various RFPs and FIDIC resulted into many differences. With respect to RFP1, it is clearly mentioned that material manufacturing and shipment that have started prior to suspension, are exempted from suspension. Another aspect of suspension is, in case if the suspension was without any cause, a mutual agreement and discussion shall happen to compensate the Contractor accordingly in the costs of the safeguarding or any other costs due to the suspended works such as Contractor or Sub-Contractor's equipment and personnel idleness cost and other. A compensation for project schedule is not mentioned in RFP1 unlike FIDIC and the only time the schedule can be edited is if the suspended work affects the Final Acceptance Date of the Work or the Project Portion or any other critical milestone, in this case Employer will extend the date by the same period of suspension.

When it comes to RFP2 and RFP4, both are similar in suspension requirements except for the requirement of prolonged suspension. Only in these RFPs, a new condition is added versus FIDIC that the Contractor shall utilize construction equipment and labor in a way to minimize costs of suspension as much as possible. Also, the notification of suspension should include a designation of the amount, type of plant and construction equipment to be committed to work during suspension period. All activities related to the suspended work shall stop; these activities are for example placing orders, subcontracting etc. Furthermore, only in RFP2 and RFP4, it is specifically mentioned that the costs to be compensated include, in addition to the standby costs at site such as costs related to construction equipment and other, all related costs such as mobilization and demobilization of labor and construction equipment, cost of safeguarding. RFP3 specified further the suspension costs, by incorporating new costs such as site salaries, depreciation and maintenance costs of plant, site costs, and Contractor overheads.

A minor difference in RFP5 was noticed versus the remaining RFPs and FIDIC. Here, it is the Engineer who will instruct to suspend the Works, suspend the delivery of Plant or Contractor's Equipment and erection rather than the Employer. In any case, such minor difference of whether the Engineer will instruct to suspend the Works or the Employer, is insignificant and does not make any difference in terms of instructing the Contractor to do the required.

When it comes to prolonged suspension, the prolongation period is 84 days in FIDIC and RFP5 and is 3 consecutive months for RFP1 and RFP2. RFP3 and 4 have not discussed any prolonged suspension scenarios. After this prolonged period, FIDIC specifies that Contractor can request to resume the work and if the Employer does not permit that within 28 days, it can either be subject to Clause 13 (Variations and

Adjustments) of the affected part or termination by Contractor if the suspended works are the whole of the works. This is similar to RFP1 and 5, however not to RFP2 where it discusses that if the suspension delays the performance of the Contract beyond consecutive three months, Employer and Contractor should meet to agree on how to resume the Works without any termination or variation clauses. RFP3 and RFP4 have not specified a scenario of what happens when the suspension is prolonged.

Resumption of Work and schedule when the suspension costs shall be notified to be compensated are summarized into the following bullet points:

- RFP1 & 3 does not specify any schedule requirement of when a notification for compensation of suspended Works shall be done. The requirements of a claim resolution would apply.
- RFP2 & 4: Upon receipt of a notice to resume the work, the Contractor will have the right to claim for extra costs and revised schedule due to suspended works under Employer's evaluation only within 30 calendar days after the notice.
- In RFP5, the intention of extra costs to be compensated shall be notified by Contractor within the 28 days after the suspension instruction.

Finally, Only in FIDIC and RFP1, the Contractor has a right to suspend the Work in the case when the Employer delays an interim payment. In RFP1, the Contractor has this right only in the case where the approved payments are delayed by more than 60 days after payment due date and in case Contractor has failed to reach an agreement with the Employer to find a solution within a reasonable period of time. In FIDIC, the Contractor can suspend the Work for a delayed payment after a notice period of 21 days.

As a conclusion, it is clear that some requirements in RFPs are similar to FIDIC,

and some others are different. RFP3 completely lacks information and specification on what happens if suspension is prolonged nor any information on schedule compensation due to suspension. This lack of information is a source and risk to the execution of the Contract. In case of such lack of information, Contractor can proceed to claims. Furthermore, the power to suspend the Works is only given to the Employer, whereas this is possible in RFP1 and FIDIC due to payment issues.

5.5. Variations

Variations in the Contract are characterized by many aspects. These aspects are: scope of Variations, time for Variations, means of Variations, steps to take and limitation to Variations if any. The following Table 5.12 summarizes these aspects of Variations for FIDIC and RFPs.

Table 5.12. Variations

Criteria	FIDIC	RFP1	RFP2	RFP3	RFP4	RFP5
Scope	Variations in the Works of Contract	Variations in the Works of Contract	Variations in the Works of Contract	Variations in the Works of Contract	Variations in the Works of Contract	Variations in the Works of Contract
Time	any time prior issuance of Taking-Over Certificate	at any time	at any time	always and at any time prior issuance of Taking-Over Certificate	at any time	at any time before the Works are taken over
Mean	issuing an instruction or requesting proposal from Contractor	issuing a form of Change Order	issuing a form of Change Notice	issuing an instruction or requesting proposal from Contractor	issuing a form of Change Notice	by instruction
Step1	instruction for variation is issued by Employer to Contractor	issuing the Change Order	Employer to issue a Change Notice, an instruction in writing, or oral first if emergency cases: An oral instruction is possible only when there is a danger for life or plant in emergency cases. The Change Notice will contain drawings and data necessary to carry out the change, changes in contract price and schedule	Employer to the instruction or request for proposal	Employer to issue a Change Notice, an instruction in writing, or oral first if emergency cases: An oral instruction is possible only when there is a danger for life or plant in emergency cases. The Change Notice will contain drawings and data necessary to carry out the change, changes in contract price and schedule	Engineer to instruct a Variation Order
Step2	Determination for Adjustment of Contract Price by Employer	negotiations with Contractor	if Contractor agrees, he shall sign the Change Notice and resubmit to Employer within 14 Calendar Days	Contractor may agree or submit an alternative which proves an accelerated completion, a reduced cost, improved efficiency or value along with supporting data and details	if Contractor agrees, he shall sign the Change Notice and resubmit to Employer within 14 Calendar Days	Contractor to submit a description of the work and program of work and proposal of price adjustment
Step3	If Employer has requested a proposal rather than instruction, Contractor responds back by submitting its proposal: a description and work program, the project program variation, the change of time for completion, adjustment of the Price of the proposal		if Contractor does not agree, he should respond back with his proposal of changes in contract price and schedule again within 14 days, along with supporting documents with price breakdowns and man-hours required for the tasks, any other impact to performance guarantees	payments of changes will be evaluated by Employer according to the Contract price rates; if such rates of the work do not exist in the Contract, a committee shall be formed by all parties who shall decide the costs which shall be certified by the Minister. In case no agreement has been reached, the Contractor shall proceed with the work and provide the bills to Employer approval	if Contractor does not agree, he should respond back with his proposal of changes in contract price and schedule again within 14 days, along with supporting documents with price breakdowns and man-hours required for the tasks, any other impact to performance guarantees	Engineer to approve or disapprove. If prices are not agreed, the rates of the Contract price schedule shall apply. If such rates of that specific work do not exist, then Engineer shall apply comparable rates
Step4	Employer to approve, disagree or comment			Contractor to proceed with change only after written notice by Employer	Further steps are not specified	
Limitations to Variation amount	no limitations	should not exceed 20% of Contract Price	no limitations	10% for supply and erection portion of Contract Price & 15% for non-construction work	no limitations	should not exceed 15% of Contract Price
Other notes on Limitation				it is possible to exceed the percentages of limitation, after a written request by Contractor within 30 days of the change notice		spare parts price change is not limited

Variations have been discussed both in FIDIC and RFPs. Most of the RFPs have referred and named Variations as “Changes” or “Change-Orders”. These Variations similarly cover the Works of the Contract and can be initiated at any time by the Employer through an instruction or a form issued.

In FIDIC, Variations are initiated either by the Employer or the Contractor, which is not similar to RFPs. Specifically, based on Clause 13, FIDIC gives a right to vary to the Contractor through Value Engineering. However such right is not given to the Contractor in the RFPs except to some extent during bidding stage and before signing the Contract. Therefore any proposition to deviate from or change the Employer’s requirements by the Contractor during the Contract execution phase is not possible in RFPs. It is only the Employer who can initiate Variations in the RFPs.

In all the documents, there are steps to be followed for any given Variation. First is when Employer instructs a change-order in writing. Only in RFPs 2 and 4, in some emergency cases, Employer can give an oral instruction. It is important to note that as per FIDIC Clause 13.1 “A Variation shall not comprise the omission of any work which is to be carried out by others.”, however such requirement is completely not there in RFPs. The procedure of Variations is similar between FIDIC and RFPs. It mainly consists of negotiations for Variation costs between Employer and Contractor. The only difference is that RFPs 2 and 4 give a time limit of 14 days to respond to any Change-Order issued by Employer. Only In FIDIC and RFP3, a variation can be canceled or varied again by Employer if Contractor proves that it is not possible to obtain the required Goods, safety and suitability of the Works will be affected or that the variation will have a negative impact on the performance of the Plant. Such cancelation is not possible in the rest of the RFPs. In RFP1, the change-order form shall clearly contain a description, a change in critical milestone date or final acceptance date resulting from

the change, the lump sum change of price, and any changes to performance guarantees. Unlike FIDIC, where the Contractor will propose the cost impact, RFP1 states that it is the Employer who will decide it referring to the project pricing schedule and this will be negotiated with the Contractor. Furthermore, in RFP1, all Change-Orders shall be signed by both parties and Contractor shall not start the changes until their signature. RFP1 discusses changes required by poor design and Contract specifications. In this case, it is completely the Contractor's responsibility to do these changes at his own cost without any compensation requests. Finally, if Employer and Contractor fail to agree on a change-order or a compensation of a change-order, after a written instruction by Employer, Contractor shall proceed with the change without any further compensation with a change-order signed only by Employer.

When it comes to Contract Price changes, only RFPs 1, 3 and 5 have introduced limits to Variations. These limits are within the ranges of 10% to 20% as shown in table 5.10. Such limitation is not there in FIDIC, RFPs 2 and 4.

In conclusion, Variations by Employer are possible amendments to Contract in all the RFPs and FIDIC at any time during the Contract execution period. The possibility of agreeing in price adjustment of Variation between Employer and Contractor is there for RFPs and FIDIC and is similar in general. As a matter of fact, in all documents, the adjustment to Contract Price due to changes is determined by Employer and negotiated with Contractor. The major differences lie in two aspects. First, alternatives to Variations are accepted only in RFP3, second half of the documents (FIDIC, RFP2 & 4) show unlimited or unconstrained amount of changes or Variations, which may lead into open-ended changes.

5.6. Advance Payment

Advance Payment was already introduced in section 5.1.1. RFPs 1 to 4 discuss advance payment in their particular conditions. FIDIC and RFP5 discuss it in their general conditions. In all RFPs and FIDIC, the Employer should pay an advance payment to the Contractor against advance payment guarantee which, in RFPs, has to be issued by a local Bank, within the timeframe specified by Employer and at Contractor's own cost. The currency of the payment shall be same as the Contract price schedule. The validity shall be in a manner until the total advance payment has been recovered and could be extended up until Taking Over.

When it comes to differences, the below Table 5.13 clearly shows the different approaches of Advance Payment:

Table 5.13. Advance Payment

Criteria	FIDIC	RFP1	RFP2	RFP3	RFP4	RFP5
Amount of Advance Payment	not specified	10% of the total Contract Price	10% of the total Contract Price	20% of the total Contract Price	10% of the total Contract Price	10% of the total Contract Price
Recovery of Advance Payment		Employer will deduct 13% from each Contractor approved invoice until recovered fully. Advance Payment shall be completely recovered prior 79%	10% will be deducted from approved invoices	does not specify the percentage to be deducted from the interim payments rather it says "proportional deduction"	10% will be deducted from approved invoices	shall be reduced by an amount equal to 10% of the value of Plant delivered to Site in accordance with the Contract and 10% of the value of Works executed at Site until recovery
Amortisation rate for repayments	yes	no	no	no	no	no
Pay Advance Payment in installments	yes	no	no	no	no	no
Advance Payment for Variations	not specified	not specified	not specified	no	not specified	if there is an increase of Contract Price, 10% will be paid in advance, whereas for decrease, the excess amount paid shall be repaid by Contractor
Termination of Contract & its relation to advance payment	outstanding balance shall be repaid by Contractor to Employer	outstanding balance shall be repaid by Contractor to Employer	not specified	not specified	not specified	not specified
Suspension & force majeure & their relation to advance payment	outstanding balance shall be repaid by Contractor to Employer	not specified	not specified	not specified	not specified	not specified

One of the differences lies in the percentage amount of advance payment. FIDIC does not specify the number rather than refers to particular condition. All of the RFPs refer to a 10% advance payment amount of the total Contract Price except for RFP3, it is 20%. Unlike FIDIC, none of the RFPs consider amortization rate for the repayments of the advance payment.

Mainly the repayments or recovery system of the advance guarantees differ from one RFP to the other. For example, in RFP1, Employer will deduct 13% from each Contractor approved invoice. This is simply because Employer will recover the Advance Payment from invoices of a portion of the project which sum up to an 80% of

Contract Price. Furthermore, Advance Payment shall be completely recovered prior 79% of the Contract Price has been invoiced by Contractor, or upon Contract termination. For RFP2, 4 and 5, the amount of 10% will be deducted from approved invoices. RFP3 does not specify the percentage to be deducted from the interim payments rather it says “proportional deduction” and specifies that Employer will not pay any interest of the guarantee bond. RFP5’s recovery is part of the value of Plant delivered to site and part of Works executed on site. When it comes to Variations, RFP3 does not allow any advance payment for Variations, whereas for RFP5, if there is an increase of Contract Price, 10% will be paid in advance, if there is a decrease of Contract Price, the excess amount paid shall be repaid by Contractor. The rest of the RFPs do not discuss this matter and have not specified anything. It is only in FIDIC, where Employer is allowed to pay the advance payment in many installments, which is not the case to any RFP. When it comes to Termination of Contract and its relation to advance payment, the outstanding balance upon Termination shall be repaid by Contractor to Employer in RFP1 and FIDIC. FIDIC also incorporates the same for suspension and force majeure while the RFPs do not.

In conclusion, RFP3’s advance payment recovery system is obscure, a fact which is to the disadvantage of the Contractor, as it may raise surprises if recovery was very soon for example. RFP5’s recovery system is postponed up until material delivered to site which seems to be in the advantage of the Contractor. In contrast to FIDIC, no amortization rates are applied to advance payments to all RFPs. In addition to that, only RFP5 has allowed room for advance payments for Variations. Contract Clauses allowing such room is not there for the rest of documents, which is not beneficial to the Contractor. Finally there is a contractual gap in the RFPs, unlike FIDIC, which is the lack of discussion about the relation between advance payment to suspension and force

majeure.

5.7. Termination

Termination in Contracts can be initiated either by Employer or by Contractor. In order to consolidate all cases, which are scenarios, which lead to termination, the following Tables 5.14 and 5.15 have been formed. In these tables, these cases are posted in the left column. The notation “yes” means the given case or scenario exists within the subject document, the notation “no” means such case does not exist. The tables are divided into two: the first one, Table 5.14, refers to termination cases by Employer, the second one, Table 5.15, refers to termination cases by Contractor. The tables are clear to analyze, the major differences will be highlighted in the discussion following each table. Furthermore, Termination in case of suspended Works is previously discussed within the Suspension section (Table 5.11).

The only Termination case which is fully in common between all RFPs and FIDIC is the one due to Contractor’s bankruptcy or insolvency. Termination can be initiated by Employer at any time at Employer’s convenience. Interestingly enough, only RFP3 does not allow that. The only automatic Termination which can happen is within RFP1, where Termination of a part or the complete Contract will happen after three consecutive months of Suspension. No other document allows that.

Termination for breach of Contract is not discussed in FIDIC; however it is discussed in all the RFPs. The Contract can be terminated in case Contractor did not stop breach after Employer’s notice period between 15 and 30 days depending on RFP as shown in Table 5.14. Only RFP3 does not discuss any time duration for notice. Only in RFP2 and 4, Employer can terminate the Contract in case a work is given to a Sub-contractor without approval. Almost all RFPs allow Employer to terminate Contract in

case Contractor abandons the Works. The exception RFP which did not mention such thing is RFP1. Bribes and gifts from Contractor to any party will cause Termination in FIDIC and RFP3.

Table 5.14. Termination by Employer

Case	FIDIC	RFP1	RFP2	RFP3	RFP4	RFP5
Termination of the Contract or part of the Work at Employer's Convenience at any time	yes	yes	yes	no	yes	yes
automatic Termination of Contract or part of Contract in case when the Work is suspended for three consecutive months without any cause	no	yes	no	no	no	no
Termination by Employer for a cause of Contractor's breach of Contract	no	yes with 30 days notice	yes with 15 days notice	yes	yes with 15 days notice	yes with 28 days notice
because of bankruptcy or insolvency of the Contractor	Contractor becomes bankrupt or insolvent, goes into liquidation, has a receiving or administration order made against him, compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors, or if any act is done or event occurs which has a similar effect to any of these acts or events	yes	yes	yes	yes	yes
if any part of the work is given to a subcontractor without the approval of the Employer	no	no	yes	no	yes	no
if any or all of the Works to be performed under the Contract is abandoned by Contractor	Contractor abandons the Works or otherwise plainly demonstrates the intention not to continue performance of his obligations under the Contract	no	yes	yes	yes	yes
if Contractor's Schedule is not being maintained due to Contractor's default	no	no	yes	no	no	no
if Contractor is in violation of applicable laws	no	no	yes	no	yes	no
if Contractor fails to start the work upon receiving written order to do so	no	no	no	yes	no	no
if Contractor makes slow progress in the execution of the Works	no	no	no	yes	no	no
if Contractor gives or offers to give (directly or indirectly) to any person any bribe, gift, gratuity, commission or other thing of value, as an inducement or reward	Contractor gives or offers to give (directly or indirectly) to any person any bribe, gift, gratuity, commission or other thing of value, as an inducement or reward: (i) for doing or for bearing to do any action in relation to the Contract, or (ii) for showing or forbearing to show favour or disfavour to any person in relation to the Contract	no	no	if Contractor has paid or offered a commission or a benefit whatsoever to a third party clear or hidden in the Contract	no	no
if the Contractor has committed any fraudulent action	no	no	no	yes	no	no
if Contractor fails to comply with Sub-Clause 4.2 [Performance Security] or with a notice under Sub-Clause 15.1 [Notice to Correct]	yes	no	no	no	no	no
if without reasonable excuse Contractor fails to proceed with the Works in accordance with Clause 8 [Commencement, Delays and Suspension]	yes	no	no	no	no	no
if Contractor subcontracts the whole of the Works or assigns the Contract without the required agreement	yes	no	no	no	no	no

Other cases which are discussed in one or two RFPs and are not in FIDIC are:

- If Contractor's schedule is not maintained due to Contractor's default (RFP2)
- If laws are violated (RFP2 & 4)
- If after suspension and notice to proceed the Works, Contractor does not start performing the Works (RFP3)
- If the Contractor has committed any fraudulent action (RFP3)

Other cases which are discussed in FIDIC and not in RFPs are:

- If Contractor fails to comply with Sub-Clause 4.2 [Performance Security] or with a notice under Sub-Clause 15.1 [Notice to Correct]
- If without reasonable excuse Contractor fails to proceed with the Works in accordance with Clause 8 [Commencement, Delays and Suspension]
- If Contractor subcontracts the whole of the Works or assigns the Contract without the required agreement

Termination cases where Termination will be done by Contractor are shown in the following Table 5.15.

Table 5.15. Termination by Contractor

FIDIC	RFP1	RFP2	RFP3	RFP4	RFP5
if Contractor does not receive a reasonable evidence within 42 days after giving notice under Sub-Clause 16.1 [Contractor's Entitlement to Suspend Work] in respect of a failure to comply with Sub-Clause 2.4 [Employer's Financial Arrangements]	no	no	no	in the case where the Engineer fails to issue an interim payment certificate, after one month of notice to do so	in the case where the Employer fails to pay within a period of 60 days, after one month of notice to do so
the Employer becomes bankrupt or insolvent, goes into liquidation, has a receiving or administration order made against him, compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors, or if any act is done or event occurs which (under applicable Laws) has a similar effect to any of these acts or events	no	no	no	no	Termination because of bankruptcy or insolvency of the Employer
no	no	no	no	no	when Employer interferes with or obstructs the issue of any certificate by the Engineer
the Contractor does not receive the amount due within 42 days after the expiry of the time stated in Sub-Clause 14.7 [Timing of Payments] within which payment is to be made (except for deductions in accordance with Sub-Clause 2.5 [Employer's Claims])	no	no	no	no	no
the Employer substantially fails to perform his obligations under the Contract	no	no	no	no	no
the Employer fails to comply with Sub-Clause 1.7 [Assignment]	no	no	no	no	no

It can be noticed, first, that Contractor has the right to terminate the Contract through 5 Sub-Clauses in FIDIC, whereas such privilege is completely not there in

RFPs 1, 2 and 3. Second, RFP4 shows one scenario for such privilege, which is when an interim certificate of payment gets delayed to be approved for one month. Third, three Terminations by Contractor cases are there for RFP5, which are if Employer delays payment for more than 60 days, when Employer interferes with Engineer in issuance of any certificate and when Employer gets bankrupt or insolvent.

In conclusion, privilege to terminate the Contract without any reason and at any time is given to all Employers in FIDIC and RFPs except RFP3. In case of a breach of Contract, the period for the Contractor to resolve the breach after the Employer's notice is very minimum compared to the complete duration of the Contract. Finally, a lot of Termination by Employer cases mentioned in FIDIC are missing in RFPs, a fact that creates doubts of whether all possibilities to Termination have been encountered in the current regional Contracts are there or not.

5.8. Prerequisite conditions of Critical Milestones/Certificates

In order to have a clear understanding on how the Power Projects are handled in terms of Critical Milestones and Certificates, and given that the Certificate terminologies differ from one RFP to the other, i.e. from one Employer to the other, as well as FIDIC, it is essential to provide a guideline or a tool with which one can see and compare one Certificate to the other for each RFP, one versus the other and one versus FIDIC. As per experience, a given Contractor can face difficulties to get used to new certificate or milestone terminologies while reading different RFPs. For this reason, the following has been formed as a catalogue in hand while dealing with all the milestones in Contracts and many regional RFPs. Finally, this section is for information only and not for conclusive comparative purpose.

The successive tables (Tables 5.16 to 5.21) represent prerequisite parameters

corresponding to each subject Certificate; the methodology which was used to form them, is first identifying the Certificates in a given RFP, second understanding the prerequisites of each Certificate in each RFP, third comparing how equivalent or similar a given Certificate in one RFP is to the other RFP while having a check-list of prerequisites.

Before representing the tables, which will show the Certificates in a chronological order, the following Figure 5.22 facilitates the visualization of all the FIDIC and RFP milestones, which are connected to Certificates through a timeline, in one figure. Two things should be noted while reviewing Figure 5.22. First, that Reliability Run is a period where the Power Plant passes through a demonstration period proving it is capable to operate within a period of time without any malfunctions. Second, that Performance Test is a test where the Power Plant will demonstrate its performance in terms of Power Output and Plant Efficiency.

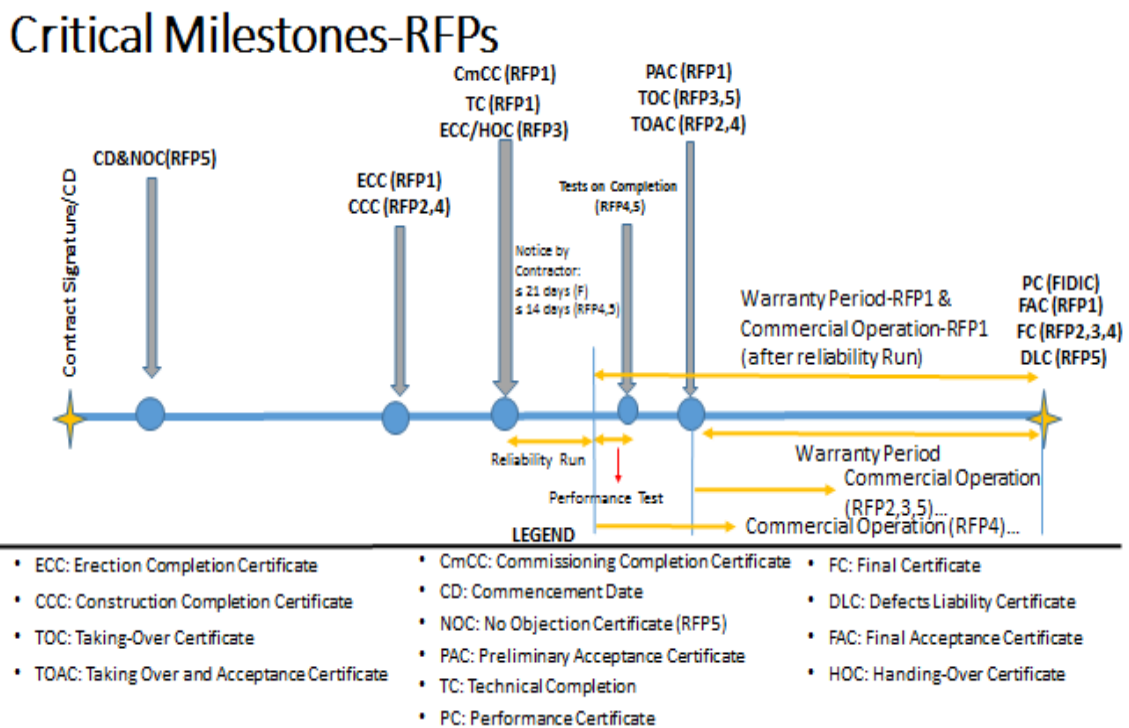


Fig. 5.22. Critical Milestones-RFPs & FIDIC

Figure 5.22 “Critical Milestones-RFPs & FIDIC” uses Certificate terms such as ECC, CCC, TOC, TOAC and other. What are these Certificates issued by the Employer? And how does the Contractor achieve them? The following sub-sections 5.8.1 to 5.8.6 will respond to these questions.

5.8.1. Erection Completion Certificate or Construction Completion Certificate

The Erection Completion Certificate (ECC) or the Construction Completion Certificate (CCC) is the first Certificate given to the Contractor in the project. This Certificate is valid and given for any project portions or Work. RFP1 calls it “ECC”, whereas RFP2 and RFP4 uses the terminology of “CCC” to refer to the same Certificate. This was not possible to acknowledge before forming the following Table 5.16, where all the prerequisites of each are posted.

Table 5.16. Erection Completion Certificate or Construction Completion Certificate

Condition	FIDIC	RFP1	RFP2	RFP3	RFP4	RFP5
Terminology	None	ECC	CCC	None	CCC	None
Installation/Erection is completed		YES	YES		YES	
Installation/Erection tests are completed		YES	YES		YES	
Inspection tests are completed		YES	YES		YES	
Related documents are submitted		YES				
Readiness for commissioning		YES				

As it can be seen in Table 5.16, FIDIC, RFP3 and RFP5 do not give any such Certificates. The Certificate prerequisites for the rest can be summarized as all installation, installation tests and inspection tests are completed. RFP1 requests two additional prerequisites which are, first, the erection related documents are submitted,

second, the plant is ready for the commissioning stage. The commissioning is a stage or process where the installed system or equipment will prove its operation without any errors or problems.

5.8.2. Commissioning Completion Certificate

The Erection Completion Certificate will be followed by a Certificate called “CCC” or Commissioning Completion Certificate. This Certificate is valid or applicable to any system or sub-system or equipment. The following Table 5.17 unites all its prerequisites.

Table 5.17. Commissioning Completion Certificate

Condition	FIDIC	RFP1	RFP2	RFP3	RFP4	RFP5
Equipment or System is put in service	None	YES	None	None	None	None
Commissioning Tests are successful		YES				
Related documents are submitted		YES				
ECC is issued		YES				

As shown in the above Table 5.17, it is only the Employer of RFP1 who certifies the completion of the commissioning. All the other documents do not provide any such Certificate. Therefore the “CCC” of the rest of documents refer to Construction Completion Certificate rather than Commissioning Completion. The prerequisites of CCC for RFP1 are first, the equipment or system is put in service, second the commissioning related tests are successfully completed, all the related commissioning related documents are submitted and finally, before reaching this stage, the related ECC was issued.

5.8.3. Technical Completion Certificate/Handing Over

The previous Certificates will be followed by the Technical Completion Certificate (TCC) or the Handing-Over Certificate (HOC). RFP1 uses the terminology of TCC, whereas the RFP3 refers to such Certificate in the terminology of HOC. It is important to note that HOC is also referred as ECC in same RFP meaning Erection Completion Certificate, which is different than the ECC of Table 5.16 based on the prerequisites. These certificates are valid for any given project portion. The following Table 5.18 provides a consolidated list of prerequisites for these certificates.

Table 5.18. Technical Completion Certificate/Handing Over

Condition	FIDIC	RFP1	RFP2	RFP3	RFP4	RFP5
Terminology	None	TCC	None	ECC (HOC)	None	None
Installation has completed with respect to specifications and approved documents		YES		YES		
Installation/Erection tests are completed				YES		
Turnover packages have been submitted to Employer (including approved ECCs and CCCs)		YES				
Testing and commissioning have been successful		YES		YES		
Punch items affecting operation are closed				YES		
The work site is clean and in a safe condition		YES		YES		
Power plant project portion is ready for reliability run		YES		YES		

As it can be seen in Table 5.18, most of the RFPs and FIDIC do not provide such Certificates. The common prerequisites between RFP1 and RFP3 are first, the completion of installation, which seems to be a repeated prerequisite from previous Certificate, second the completion of testing and commissioning and third, the readiness of the plant for Reliability Run, defined in section 5.8. As HOC is the first Certificate given in RFP3 to the Contractor, the prerequisites of installation completion and installation tests completion are given accordingly. Finally, RFP3 enforces Contractor

to close all punch lists which affect the system operation.

5.8.4. TOC or Taking-Over and Acceptance Certificate/Preliminary Acceptance Certificate

Chronologically, the next Certificate which will be issued during the last stages of the project, is the Taking-Over Certificate (TOC), also called Taking-Over and Acceptance Certificate (TOAC) or Preliminary Acceptance Certificate (PAC). These Certificates are valid for a given project portion. These Certificates are issued in all of the RFPs and FIDIC without exception. The prerequisites vary from one document to the other. They are shown in the following Table 5.19.

Table 5.19. TOC or Taking-Over and Acceptance Certificate/Preliminary Acceptance Certificate

Condition	FIDIC	RFP1	RFP2	RFP3	RFP4	RFP5
Terminology	TOC	PAC	TOAC	TOC	TOAC	TOC
Acceptance of the works in accordance with Contract requirements	YES	YES	YES	YES	YES	YES
Passing of Reliability and Acceptance Test		YES		YES		YES
Performance Test has been conducted		YES		YES		YES
Beginning of Warranty Period		YES	YES	YES	YES	
Ready for Commercial Operation				YES		
Technical Completion Achieved		YES				
Satisfactory completion of tests	YES	YES	YES	YES	YES	
Complete Spare Parts data package for each equipment is submitted		YES				
Test Record Book is submitted		YES				
List of Manufacturers is submitted		YES				
Warranties are in place		YES				
Training on O&M is Completed		YES				
“As-Built” drawings and O&M manuals have been submitted	YES					YES
The work site is clean and in a safe condition	YES					
Punch items affecting operation are closed	YES	YES	YES	YES	YES	YES
All punch items are closed					YES	
Tests on Completion are passed	YES					YES
Test Certificates have been achieved						YES
Site clearance of rubbish, Equipment and surplus material	YES					YES

Referring to the above Table 5.19, FIDIC, RFP3 and RFP5 refer to the subject Certificate using the terminology “TOC”, RFP1 refers to it as “PAC”, whereas RFP2 and RFP4 refer to it as “TOAC”. All of the Certificates are conditioned by the Employer’s acceptance of all the project Works based on the Contract requirements and by the closure of all punch lists affecting the plant operation. As it can be further noticed through the above Table, RFP1 presents twelve prerequisites for this Certificate, which is the largest number in contract to the remaining documents.

5.8.5. Final Acceptance Certificate

The Final Acceptance Certificate (FAC) is given only in RFP1. This is given after PAC to a given project portion and Work. The prerequisites for this Certificate are mentioned in the following Table 5.20.

Table 5.20. Final Acceptance Certificate

Condition	FIDIC	RFP1	RFP2	RFP3	RFP4	RFP5
For project portions						
Technical Completion has been achieved	None	YES	None	None	None	None
Preliminary Acceptance Certificate has been achieved		YES				
Performance testing is complete		YES				
Liquidated damages of performance testing have been imposed		YES				
All “As-Built” drawings and O&M manuals have been submitted		YES				
All punch list items are closed		YES				
For the Work						
Final Acceptance of all project portions have been received	None	YES	None	None	None	None
Contractor has fully demobilized		YES				
Final Receipt and Release Agreement has been signed by Contractor		YES				

This Certificate shows a very advanced stage in project for RFP1. When this

Certificate is issued by Employer for a project portion, it means the Contractor has received all the previously mentioned Certificates, has completed all tests, has closed all the punch lists and has submitted all “As-Built” and Operation & Maintenance documents. When the FAC of all project portions are issued, the Contractor has fully demobilized and the “Final Receipt and Release Agreement” has been signed, the Employer will finally issue an FAC for the Work.

5.8.6. Final Certificate or Defects Liability Certificate

The previous Certificates will be followed by the Performance Certificate (PC) or the Final Certificate (FC) or the Defects Liability Certificate (DLC). FIDIC uses the terminology of PC, RFP2, RFP3 and RFP4 refer to it as FC, whereas the RFP5 uses the terminology of DLC. These certificates are valid for the project Works. The following Table 5.21 provides a consolidated list of prerequisites for these certificates.

Table 5.21. Final Certificate or Defects Liability Certificate

Condition	FIDIC	RFP1	RFP2	RFP3	RFP4	RFP5
Terminology	PC	FAC	FC	FC	FC	DLC
Termination of Warranty period	YES		YES	YES	YES	YES
Performing all the Contract Obligations by Contractor	YES		YES	YES	YES	YES
Site clearance	YES					YES
Defects in the Works are closed	YES			YES		YES
furnishing of social insurance clearance certificate			YES			
clearances from tax authorities and customs authorities			YES			
release of liens and evidence of customs regularization of all imported shipments			YES			

RFP1’s Final Acceptance Certificate was discussed in section 5.8.5. As it can be seen in Table 5.21, all of the remaining RFPs and FIDIC will issue the Certificate when the Contractor performs all of the contractual obligations. As previously mentioned in

section 5.1.3.2, the clearance of site is linked as prerequisite to the Certificate for FIDIC and RFP5. RFP2 shows a more elaborated and detailed prerequisites such as finalizing the social insurance clearance certificate and the clearances from tax and customs authorities.

Finally, in addition to all of the above Certificates, it is important to discuss the warranty period and commercial operation in the various documents. As shown in Figure 5.22, the warranty period for all the RFPs and FIDIC start at PAC or TOC or TOAC, except for RFP1. The start of the commercial operation of RFP1 is the start of the warranty period. The end of the Reliability Run marks the beginning of the warranty period for this RFP. The warranty period after covering the period in months mentioned in contract requirements. When it comes to commercial operation in RFPs, it is defined as the operation at which the Employer will extract power to the grid. First of all, as per Clause 10.2, the Employer cannot use the plant without any pre-agreements with the Contractor. RFP1 and RFP4 do not show a similar requirement. RFP1 & RFP4 allow the Employer to use the plant starting the end of the Reliability Run. The commercial operation for the remaining RFPs start at PAC, TOC or TOAC.

In conclusion to all of the above analysis, it can be said that RFP1 exercise a huge control over the Contractor's project activities by imposing the issuance of the largest number of Certificates which is seven, while FIDIC and RFP5 provide only two Certificates. The rest of the RFPs provide three Certificates. It is of the advantage of the Employer to issue more and more Certificates. In one word, most of the RFPs give importance to various stages of the construction phase of the project from beginning to the end.

5.9. Claim, Dispute and Arbitration

Any claim or dispute will need resolution or settlement; arbitration is one means to resolve disputes. In order to understand and visualize the processes how disputes are handled both in FIDIC and RFPs, the following process diagrams (figures 5.23 to 5.28) with timelines have been formed. These timelines start with FIDIC and end up with RFP5.

Claim Timeline as per the 1999 FIDIC-EPC

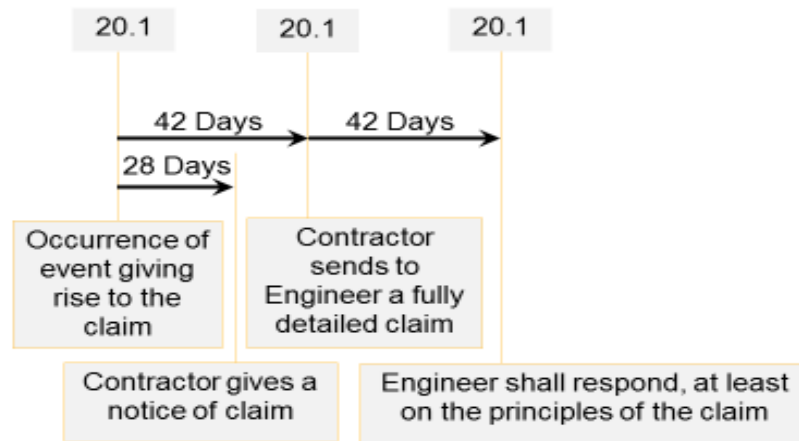


Fig. 5.23. Claim Timeline-FIDIC

Dispute Timeline as per the 1999 FIDIC-EPC

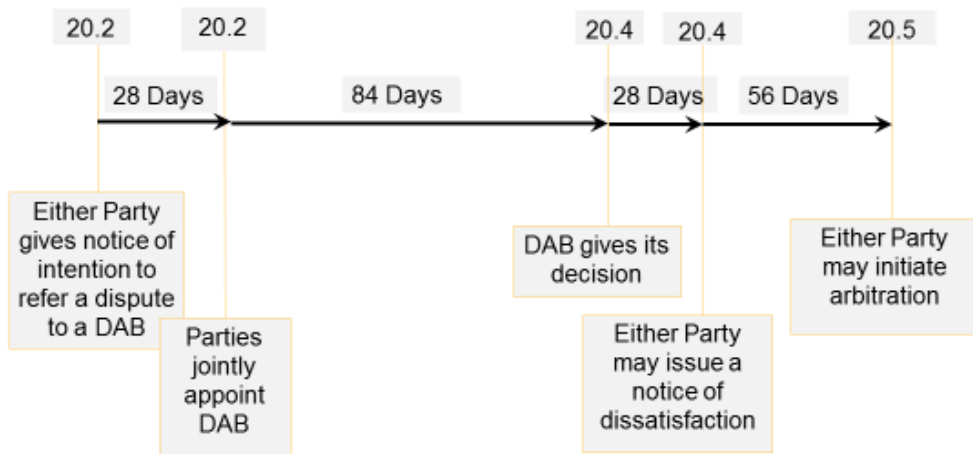


Fig. 5.24. Dispute Timeline-FIDIC

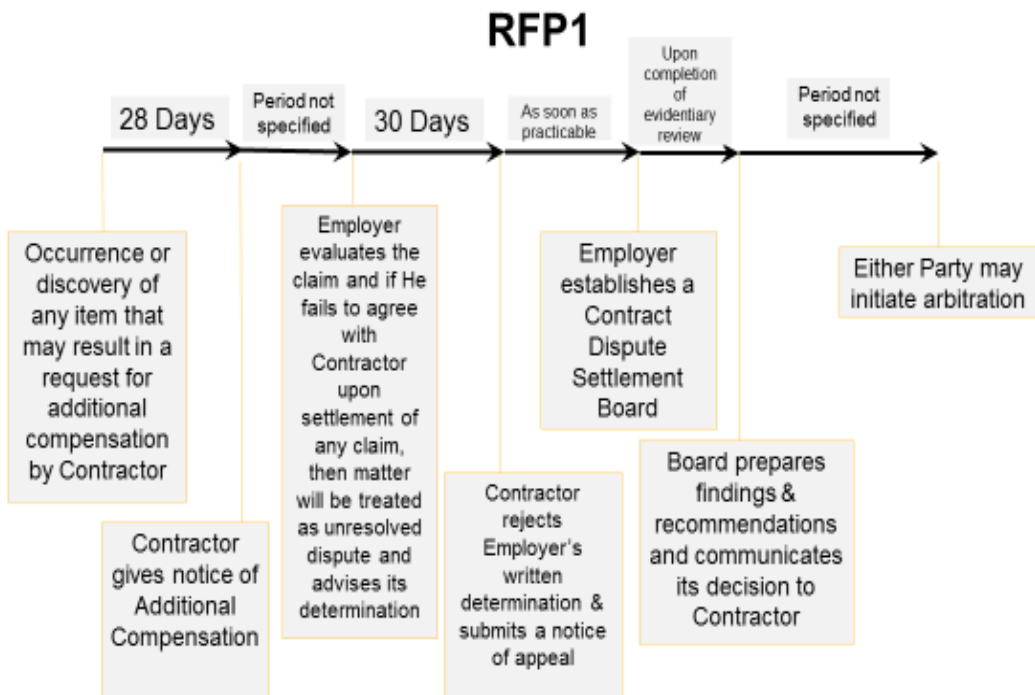


Fig. 5.25. Claim & Dispute Timeline-RFP1

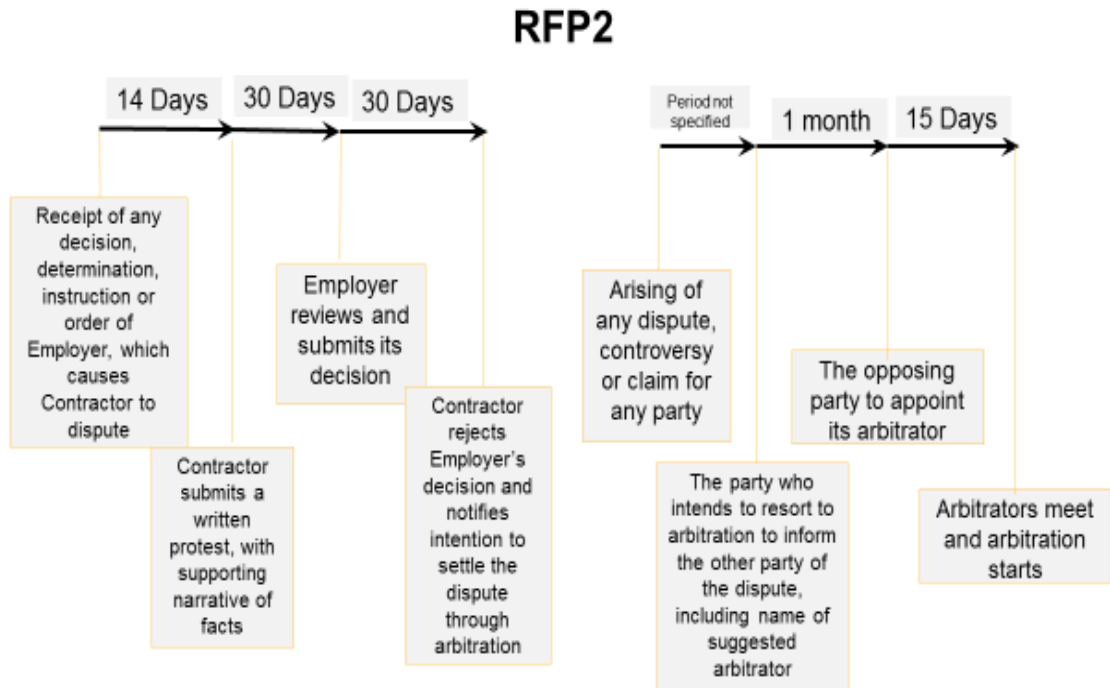


Fig. 5.26. Claim & Dispute-RFP2

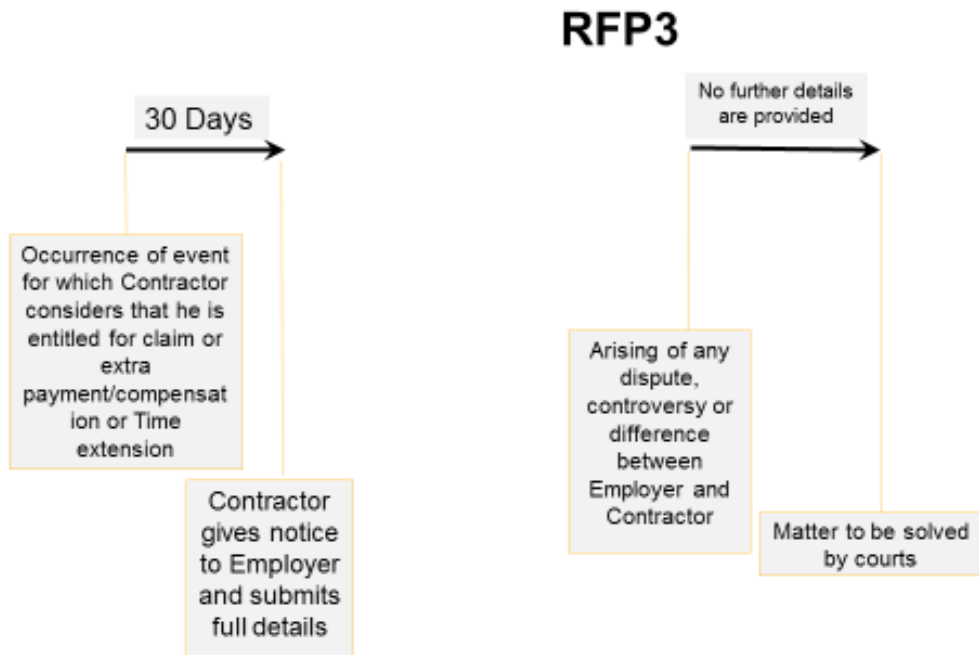


Fig. 5.27.. Claim & Dispute-RFP3

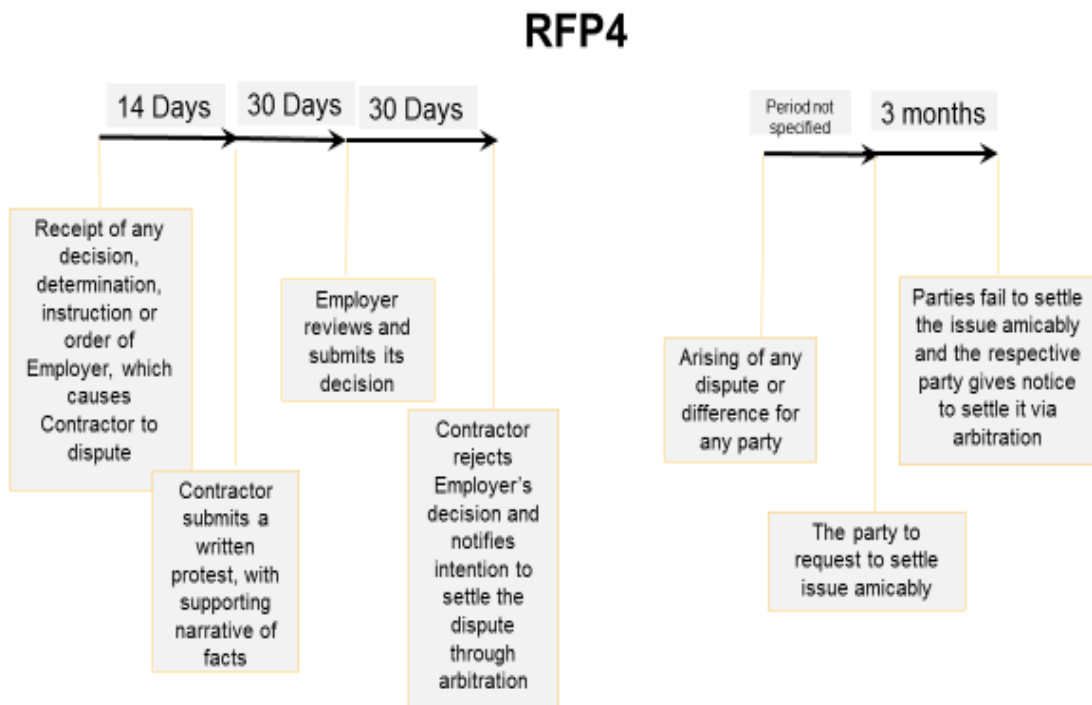


Fig. 5.28. Claim & Dispute-RFP4

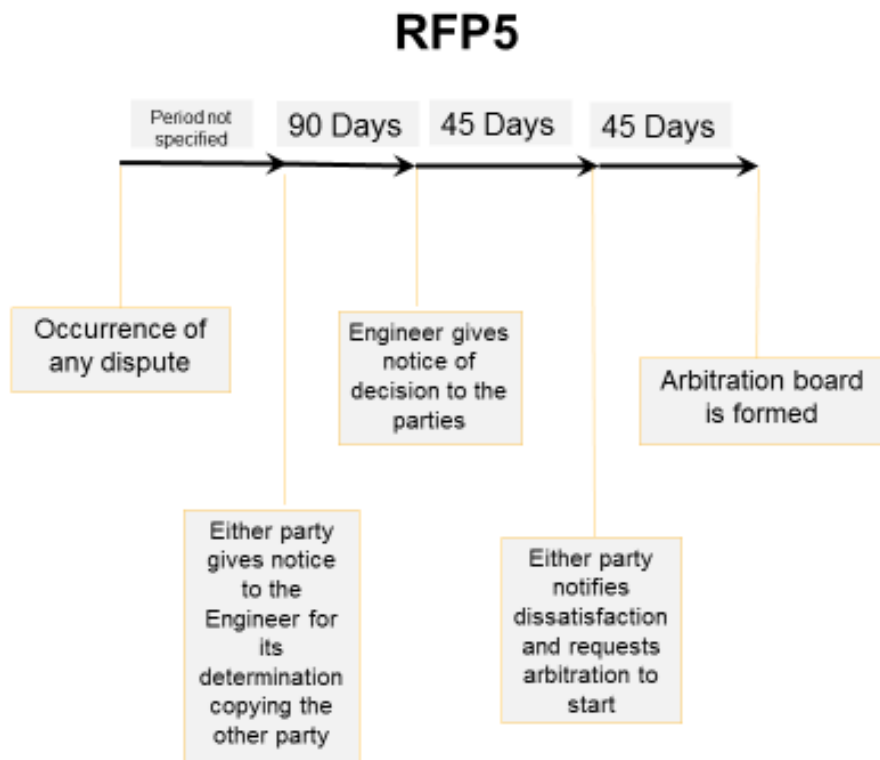


Fig. 5.29. Claim & Dispute-RFP5

According to the figure claim timeline of FIDIC (Figure 5.23), which is based

on Sub-clause 20.1, FIDIC claim procedure is very clear to all parties, with set time durations between each event such as the occurring event which causes a claim, the notice of the Contractor, the submission of claim details of the Contractor and the response of the Engineer. Any dispute can lead into arbitration using FIDIC Sub-clauses 20.2, 20.4 and 20.5 which represent the timeline shown in Figure 5.24 with similar clear time duration between each event as shown in figure. Things get unclear when it comes to the RFPs.

RFP1 represents the most unclear timeline to reach from any claim event to arbitration. It is the most unclear timeline because it contains gaps between events described as “period not specified”, “as soon as practicable” and “upon completion of evidentiary review”. These gaps are in favor to the Employer. When it comes for the Contractor to take any step, time-durations are clearly specified within the RFP. For example, Contractor has a time limit of 28 days to notify his request for a compensation from the event which gives rise to such request. Another example is, Contractor has the right to reject Employer’s determination only within a period of 30 days. In contract, when it comes to the Employer to take a step, RFP has not specified any time duration. For example, the time after Contractor’s notice up until Employer’s response or determination on this notice is not specified. Such time durations are not specified between further events such as Employer establishing a Dispute Settlement Board, the Board’s findings and initiation of arbitration. In RFP2, reference to Figure 5.26, time durations between events are much clearer than RFP1. The only gap in the RFP is that the period between the claim event and the notice for arbitration is not bound by any time limit. When it comes to RFP3, reference to Figure 5.27, there is lack of details and requirements for arbitration as shown in figure. RFP4 shows a clear path towards dispute resolution and encourages settling issues amicably first within a free period of

time around three months, only after which arbitration can start. Therefore it postpones arbitration as much as possible. RFP5 allows any party to request from the Engineer for a determination of a dispute within unspecified period of time from the occurrence of the dispute and then it takes around 135 days to reach arbitration.

The main conclusion, after the comparative figures and above discussion, is that many areas within the RFPs in the path of arbitration time-lines contain contractual gaps in timing or time periods. It is only in FIDIC, where all the periods of time are mentioned and clear to all parties.

CHAPTER 6

RESEARCH SUMMARY AND CONCLUSION, LIMITATIONS AND FUTURE WORKS

6.1. Summary of work

The research work started with chapter 1, a thorough literature review which was divided into two separate windows or platforms. The first one was more of a general window, a collection of data on the current situation of MENA's power field from non-academic resources, which incorporated information on the construction sector, energy sector and power industry. The second window, a "zoom-in", was more project specific, a collection of information from academic resources, which tackled the different project delivery approaches, mainly DBB, DB, EPC, EPCM and BOT, project bidding processes in terms of bid preparation, pre-qualification, evaluation, method and others. It proceeded to introduce the key project participants which were the Employer with its Consultant, and the Contractor. It also introduced Standard Contracts between these key participants, FIDIC and other. The Literature Review ended by addressing management related subjects such as the faced project challenges, risk management, delay liquidated damages, standardization and lessons learned.

The work continued with chapter 3, which provided an insight on how the EPC Contractors address a given RFP while preparing themselves to submit the bid. The objectives of this chapter were first to understand the overall subject picture of the Contractor while facing a given RFP prepared by the Employer, as well as to acknowledge the perception of the Contractor towards the project, and finally to give the opportunity for the reader to locate himself at the eyesight of the Contractor. Chapters 4 and 5 could not have been completed without the collection of the currently

existing real RFPs from five different major countries of MENA. Of course, these RFPs represent five different Employers, as such five different types of a Power Plant RFP. Chapter 4 completed the comparison of the instruction to bidders between each RFP versus the other. Chapter 5 completed the comparison of the general and particular conditions between the RFPs, one versus the other, and versus FIDIC. These chapters not only provided comparative and narrative discussions, but also provided many summary tables and figures which enable the reader to understand in an easier possible way. The work as summarized above, of chapters 3, 4 and 5 leads to various conclusions and recommendations which are discussed next, in section 6.2.

6.2. Conclusions & Recommendations for industry practitioners

The conclusions of this section are findings derived from the three previous chapters. These conclusions, along with an up-to-date industry experience and lessons learned, lead into different practical tasks that the industry practitioners can take into account in order to enhance their position for winning the bids and execute the projects in an improved contractual environment. Also, these recommendations can be applicable to any RFP and are not specific or limited to one Employer.

6.2.1 Conclusions

Without examining, analyzing and observing the similarities and the differences of the different Contract requirements of the RFP and FIDIC documents from the perspective of the Contractor, it would have not been possible to conclude facts about RFPs, which are relevant to the current and real industry in the MENA region. These facts show the extent of the Contractor's risk exposure while working with a given

Employer. The more there are variations from the standard contract FIDIC, the more is the risk exposure. Also, the RFP which will become a binding Contract to the Contractor and Employer, is the backbone of a given project success. The clearer and the more balanced it is, the better. At the end of the day, when the risks are allocated fairly between both parties, the project will be rewarding to everyone.

The conclusions are put in the following bullet points covering chapters 3, 4 and 5 consecutively. In one word, for chapters 4 and 5, some RFPs have shown common approach to some aspects, and different approach to others:

- Any mistakes during bidding stage affect the competitiveness of the Contractor. They also result into a poor project execution after award. The possible mistakes or the burdens faced by the Contractors while addressing RFP's Terms of References include mispricing (overpricing or underpricing) and misinterpretation of the RFP clauses and scope.
- It is important to know the optimum solution between project performance and project price.
- Technical design, project execution plan and constructability are essential parameters to be considered during bidding stage and beyond pricing.
- Three stages have been identified while addressing the RFP's Terms of Reference; First, careful, correct and complete reading results into less bid and project mistakes. Second, the consideration of the previous lessons learned, technical optimization and value engineering affects the probability of winning the bid and execute the project successfully.
- The price schedule is the most important bid deliverable to the Employer. Therefore building it in the correct way is essential.

- Employers have proved to be very concerned in Eligibility. Almost all of them have shared similar requirements. These requirements are critical as they will lead to Offer rejection if not met. Also, these requirements can be tools used to remove a Contractor or a Major Equipment Supplier from bid participation.
- Only one RFP has shown a more complex bidding procedure versus the rest. Transparency and fair evaluation with regards to Bid Results have varied from null to high. One RFP has shown full transparency and fair evaluation, one RFP has shown the opposite, the rest of the RFPs have shown partial transparency and evaluation of bid results.
- Offer rejection scenarios of the various RFPs do not constitute any risks or burdens. These are normal practices. No serious requirements are there with respect to these requirements. Only one RFP has shown a stringent requirement which is the exclusivity agreement between Contractor and major equipment supplier, as explained in research.
- Most of the RFPs have strict requirement from Contractor to choose the major equipment Vendor only from the Approved Vendor List. To choose a Sub-Contractor from the Employer's given list is not a must.
- Clarification and Deviation requirements are similar to all RFPs, except one. Only one does not allow deviations.
- All of the RFPs impose localization policies except one.
- Evaluation and contract award processes of the RFPs vary from an immature level to a more mature and advanced. Only one is advanced. Only one is pre-mature.

- The RFPs showed lack of clarity with respect to Commencement Date and its relation to Contract Agreement versus FIDIC. For the RFPs, the knowledge of the Contract Signature is the only key parameter of knowing the project start date.
- Unlike FIDIC, a lot of RFPs lack the information of when the Advance Payment will be paid.
- Unlike FIDIC, the date of the possession of site in most RFPs is unspecified.
- As per the comparison related to the Programme of Work of the RFPs versus FIDIC, it was shown that there is no specific time constraint for its submittal except a reasonable allowed time, then it can be deduced that this aspect does not constitute any major risk.
- Unlike FIDIC, it was concluded that the RFPs lacked contractual time duration and details with respect to return of Performance Security and Clearance of Site.
- There is a clear risk towards the Contractor in relation to the request for Time Extension in RFPs. The time allowed for notification from the event is very short.
- Schedule delay damages constitute a huge risk for Contractors, leading them to huge losses during project execution in case imposed. All of the RFPs impose strict damages.
- FIDIC has covered the suspension subject to a large extent whereas RFPs have covered them to a limited extent. For example, the mechanism of resolution when it comes to prolonged suspension is not specified in RFP3. Another example is compensation in project schedule is not specified at all in RFPs 3 and 5.

- When it comes to Variations, Employer has a great extent to impose them on Contractor with their estimated prices. As a matter of fact, RFP1 completely impose Variations while specifying the Price himself accordingly. The rest of the RFPs and FIDIC allow negotiations to some extent. Furthermore, some RFPs do not clarify the scenario of negotiations not reaching resolution.
- A breach of Contract is specified to be a cause to terminate the Contract in all RFPs. The time allowed to resolve the Contract breach after Employer's notice is in average between 15 and 30 days, which sometimes might be very short. It should be of Contractor's interest to prolong it.
- Prerequisites of the Certificates seem to be clear in RFPs as a first sight. However this is not true in reality. The recommendation section 6.2.2 will elaborate this.
- Unlike FIDIC, arbitration time-lines for RFPs were shown to be missing exact time-durations and time-limitations to the steps that Clients would take before reaching arbitration. Therefore, having reference to FIDIC, Contractors can request similar definite times during the bidding stage.

6.2.2 Recommendations or Implications for industry practitioners

The research work cannot be accomplished without providing recommendations or work implications, beneficial and relevant to the industry practitioners, which are foreseen to be Contractors currently willing to bid for projects in MENA region, whether they are local or International. In fact, the International or foreign Contractors have shown huge presence at least in the last 5 years in MENA's bids' participation and project awards. As mentioned in chapter 1, a target of 400,000 MW needs to become

reality by 2020 in MENA, therefore it is foreseen that more and more Contractors would emerge aiming for new businesses in the regional market. The research's contribution in terms of recommendations or implications to the industry practitioners becomes necessary to enlighten them with the current image of EPC power plant RFPs of many Employers and provide them with opportunities to possible amendments of Contract clauses mainly in favor of Contractors, while having FIDIC as a benchmark in hand, a Contract which is considered to be balanced in allocation of risks between Employer and Contractor.

Various implications can be derived based on the representation of the overall Contractor situation and role in bidding in chapter 3, based on the comparative approaches of each and every subject tackled in chapters 4 and 5 and previous industry experience. These derivations are put together in bullet points in the below and can be of a huge support and use for the industry practitioners:

- Best scenario is for the project proposal team to stay on board after project award. As it is the team who was greatly involved and familiarized with all the RFPs, addendums, clarifications, deviations and complete preparation of the technical and commercial bid. After experience, the gap between project proposal team and project execution team creates poor performance and most likely leads to project delays and over-runs. The importance of the proposal team was already highlighted in chapter 3.
- Given that the time of the proposal stage is very short versus the project execution phase, the proposal preparation duration seems to be a huge burden to the Contractors especially when they are not familiar with a given Client. Therefore it can be a good approach first to get familiarized with a previous RFP before participation in new bids, since a given RFP specific to

an Employer is typical. Previously, RFPs used to allow periods of more than a year for bid submission, however lately, they have become very fast allowing around two to three months only. Therefore this requires an experienced and exercised team to meet the deadline in the best possible way.

- Based on the burdens of addressing RFP's Terms of References mentioned earlier, Bidder must not miss any mentioned scope in RFP. Bidder must first ensure that the given RFP is complete. Second, Bidder must become aware of contradictory clauses in RFP. Third, he must not miss addendums and finally must read all the clarifications and amend the necessary. Any complications related to these aspects must be addressed with Client during the bidding stage.
- A Site Visit during bidding stage provides an important value in pricing the project right, since usually the risk of the correct site conditions in RFPs is completely removed from the Client and transferred to the Contractor.
- Bid preparation go beyond paper-work, bidder must not only analyze a given RFP and address it correctly, but needs to do other studies in parallel, such as the study of competitors, the study of the market and market prices, study of the Client, creating a good project execution plan, selection of the right Sub-Contractor etc. in order at the end to stay and increase its competitiveness.
- Bidder must benefit from value engineering during bidding stage, as value engineering after project award is not allowed.
- Bidder must overcome the risk of errors in the most important bid document submittal to the Employer which is the price schedule, and shall immediately

get familiarized with the given format and acknowledge what prices are considered in bid evaluation, in order not to spend a lot of time and efforts on optional prices and prices of scope which will not be evaluated.

- Bidder must work on eligibility requirements for a given RFP as an ongoing process. It is the first thing to check before taking any decision to bid for a given project. If Contractor is not eligible and in case the RFP allows, he can participate with an eligible partner in JV or Consortium. Therefore searching for the right and qualified partner becomes an important task and goal.
- Bidder must be familiarized with the RFP's bidding procedure. In fact, many RFPs lacked transparency when it came to sharing the bid results and the bid evaluation criteria or project award criteria. Therefore, if the evaluation formula is not the only parameter which leads to project award, bidder must work on extra criteria such as for example the enhancement of relation with the Client in order to understand his interests, benefit from information and impress working on further criteria of interest for Client to award him the project. Furthermore, for example and as per experience, while bidding for RFP3, researcher met one of the Client's Employees who before even bid submission date expressed that the X Contractor will be the winner. Therefore, if such obscure bid award requirements exist in RFP, bidder must acknowledge the risk related.
- Clarification period is of extreme importance, bidder must benefit to clear all doubts and questions. However these questions must be smart since they will be shared to all Contractors, which are the competitors. If a clarification shows an added value or an advantage versus a given requirement, other bidders would benefit as well. Therefore bidder must be careful.

- Bidder must get familiarized with the Approved Vendor and Sub-Contractor List. If RFP refers to major equipment vendors, the understanding of major equipment must be clear. Some Clients would consider a simple pump as major equipment. Therefore, if RFP contains such unclear requirement, bidder must raise it as a clarification.
- Since deviations directly result into savings, the Project Price will be directly affected by the number of deviations considered. Bidder must first identify the RFP requirement whether it allows for deviations or not. If not, bidder must price everything without any value engineering. Bidder must never take any risk of major deviations versus the RFP requirement. If RFP allows for deviations, Bidder must spend a lot of efforts in value engineering as it will enhance its competitiveness.
- When localization policy is imposed to all the bidders equally, then there shall be no problem while implementing it. However, a Bidder must be careful in case there are penalties related to this policy such as RFP3 for example, as shown in section 4.2.6.
- Since the most important goal in the proposal preparation is the evaluation formula as discussed in section 4.2.7, then Bidder must find the best optimized solution of prices and plant performances which lead to the lowest evaluation formula result. If bidder misunderstands the formula or has doubts about it, he must raise his questions through clarifications to the Employer before the bid submittal date.
- The best way to deal with the unclear Commencement Date of the RFPs is to raise the question during clarification period to get the right and firm input of the Client.

- To clear the RFPs uncertainties, Bidder must raise questions on the Commencement Date, the Contract Signature date, when the Advance Payment will be paid, when the site will be possessed, the return of the Performance Security, the clearance of time.
- It is suggested for the Bidders to consider this risk of delay damages in their prices as contingencies. On the other hand, Bidders can also study the Client's previous experience whether he has imposed for real such damages or not.
- Since some RFPs does not provide any mechanism of resolution when it comes to prolonged suspension, project schedule compensation, Bidder must request Employer to clarify these aspects before bid submission.
- Regarding the prerequisites of the Certificates and as per experience after passing through two ongoing projects under execution with same Employer, it is extremely important to specify for example an exact list of documents required to be submitted for a given Certificate whenever it is mentioned a condition such as "related documents are submitted". As these Certificates are related to payments, Clients would create new conditions to delay the issuance of Certificates. Therefore, a detailed request for a comprehensive list early from bidding stage is important.
- The best way to deal with the current RFPs' general and particular conditions as they are, is to suggest deviations to the Employer to reflect the same FIDIC general conditions.

All these bullet points lead into some sort of managing the risk areas by reducing them in the Contract clauses to the benefit of the Contractor. However they may not lead into reaching a final resolution. Whenever a clarification is raised, the

concern is directly raised to the Employer's notice, who will be reverting back with an answer, not necessarily positive. And whenever a deviation is considered, it will be discussed in case awarded the project with the Employer and result into a not necessarily positive response. Therefore, these risks must be clearly acknowledged by bidder before entering into the project and the answers of clarifications by the Employer must be analyzed in depth. In this way, the Bidder will be able to make correct calculation of contingencies in the final price.

In conclusion, a good contract is the one that is very clear, complete and that provides the necessary resolution mechanisms to problems possible to be faced. RFPs proved that they do not satisfy these three parameters fully. They lacked time related contractual features, included subjective terms such as "in reasonable time", "as soon as practicable" and other. Therefore, a given Contractor today in MENA region, needs to take into account this research and take the necessary steps accordingly.

6.3. Research Limitations and Future Works

This research seems to have many limitations. First of all, it represents the opinion and perspective of one EPC Contractor only, which might not apply to other Contractors. It would have been good if it was a result of many Contractors jointly doing this research in order to give it a much larger umbrella covering larger perceptions. Second, the study was limited only to few aspects of general conditions, many other contractual aspects such as force majeure, performance liquidated damages, payment terms, warranty and others were not tackled. Third, the research is based on the current RFPs, while the selected RFP represents the latest RFP version of a given Employer. As per experience, Employers throughout the years, improve the RFPs while adding, removing or editing many Clauses or requirements. Therefore a given RFP is a

part of an ongoing trajectory subject to upgrades and changes throughout the years and along with the advancements of Contracts. Fourth, in section 2.2.6, an IPP structure was introduced since it is the latest trend in MENA. Therefore when a power plant is implemented as an IPP project, this study will no longer be relevant, as the RFPs are very unique and different. Therefore the current study is only valid for EPC project delivery approach of a governmental entity. A final limitation could be that the research is valid only to MENA region.

Future Works related to this research could be the study of one single RFP and its changes along the trajectory discussed above, meaning the study of the different old and new RFP versions or editions corresponding to the same Employer. This can reflect the way of thinking and the lessons learned of the Employer. Other Works can incorporate an engineering technical comparison of one RFP versus the other to answer the question of “If these RFPs, which correspond to different Employers, aim to realize simple and combined cycle similar projects, then what are the main technical differences and requirements of one power plant versus the other?”, since the current research only tackled instructions to bidders and general Contract conditions of a given RFP. Further Works can incorporate the study of all the sets of clarifications and questions raised by all Contractors while bidding on same RFP and the corresponding answers of the Employer. These clarifications are consolidated, separated by date, are huge in number and can show what exactly are the concerns, doubts and questions of Contractors while addressing a given RFP, as well as show the approach of the Employer through the answers to clarifications. Extra Works can tackle only the bid evaluation formula and its optimization in terms of power output and project price while seeking the best solution or the best selection of the major equipment such as Gas

Turbines that would result into the winning evaluation formula result. Finally, additional work can be the preparation of a Standardized RFP while having FIDIC and all the 5 and further RFPs in hand as reference. This Standardized RFP will provide the most complete RFP which contains no gaps nor limitations nor obscurity nor unfairness nor subjective terms.

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