



Engineering Procedure

SAEP-360

31 January 2006

Project Planning Guidelines

Document Responsibility: Facilities Planning Dept.

Saudi Aramco DeskTop Standards

Table of Contents

1	INTRODUCTION.....	4
2	OBJECTIVES.....	4
3	SUMMARY.....	7
4	IMPLEMENTATION OF GUIDELINES.....	9
5	PROJECT PLANNING PROCESS.....	11
	ATTACHMENT A – DEFINITIONS.....	88
	ATTACHMENT B – DEVELOPMENT APPROACH.....	91
	ATTACHMENT C – DEFINITION OF A BUSINESS CASE.....	94
	ATTACHMENT D – PROJECT PLANNING PROCESS SCHEMATICS.....	96

PROJECT PLANNING GUIDELINES

Table of Contents

1.	INTRODUCTION.....	4
2.	OBJECTIVES.....	4
3.	SUMMARY.....	7
4.	IMPLEMENTATION OF GUIDELINES.....	9
5.	PROJECT PLANNING PROCESS.....	11
5.1	PROPONENT PLANNING PHASE.....	11
5.1.1	Planning Guidelines.....	11
5.1.2	Gate #1 – Proponent Project Submittal Gate.....	18
5.1.2.1	Description.....	18
5.1.2.2	Approval Form.....	19
5.2	QUALITATIVE ASSESSMENT PHASE.....	20
5.2.1	Planning Guidelines.....	20
5.2.2	Gate #2 – Conceptual Development Start Gate.....	22
5.2.2.1	Description.....	22
5.2.2.2	Approval Form.....	23
5.3	PRELIMINARY ECONOMIC EVALUATION PHASE.....	24
5.3.1	Planning Guidelines.....	24
5.3.2	Gate #3 – Business Plan/Study Start Gate.....	29
5.3.2.1	Description.....	29
5.3.2.2	Approval Form.....	31
5.4	STUDY PHASE.....	32
5.4.1	Planning Guidelines.....	32
5.4.2	Gate #4 - DBSP/Budgetary Project Scope Definition Start Gate.....	40
5.4.2.1	Description.....	40
5.4.2.2	Approval Form.....	42
5.5	DBSP AND BUDGETARY PROJECT SCOPE DEFINITION PHASE.....	43
5.5.1	Planning Guidelines.....	43
5.5.2	Gate #5 – Capital Budget Cost Estimate Start Gate.....	56
5.5.2.1	Description.....	56
5.5.2.2	Approval Form.....	57
5.6	CAPITAL BUDGET ECONOMIC EVALUATION PHASE.....	58
5.6.1	Planning Guidelines.....	58
5.6.2	Gate #6 – Capital Budget Gate.....	66
5.6.2.1	Description.....	66
5.6.2.2	Approval Form.....	69
5.6.3	Gate #7 - DBSP Approval Gate.....	70

5.6.3.1	Description.....	70
5.6.3.2	Approval Form.....	71
5.6.4	Gate #8 – Project Proposal Start Gate.....	72
5.6.4.1	Description.....	72
5.6.4.2	Approval Form.....	73
5.7	PROJECT PROPOSAL PHASE.....	74
5.7.1	Planning Guidelines.....	74
5.7.2	Gate #9 – Project Scope Modification Gate	77
5.7.2.1	Description.....	77
5.7.2.2	Approval Form.....	78
5.7.3	Gate #10 – Project Proposal Approval Gate	80
5.7.3.1	Description.....	80
5.7.3.2	Approval Form.....	81
5.8	EXPENDITURE REQUEST APPROVAL PHASE	82
5.8.1	Planning Guidelines.....	82
5.8.2	Gate #11 - Project ERA Gate.....	86
5.8.2.1	Description.....	86
5.8.2.2	Approval Form.....	88

ATTACHMENT A, DEFINITIONS

ATTACHMENT B, DEVELOPMENT APPROACH

ATTACHMENT C, DEFINITION OF A BUSINESS CASE

ATTACHMENT D, PROJECT PLANNING PROCESS SCHEMATICS

CAPITAL PROJECT DEVELOPMENT PROCESS PROJECT PLANNING GUIDELINES

1. INTRODUCTION

The capital project development process begins when a capital project is initially conceived and ends when the project has been successfully commissioned. These Project Planning Guidelines (Guidelines) specifically address the front-end project planning portion of the development process for projects in which the Facilities Planning Department (FPD) is primarily responsible for broadly defining the project scope. The basic approach for developing cost effective project scopes, which is described in these Guidelines, can, however, be applied to the development of any capital project, including those for which the Proponent is primarily responsible for developing project scope (e.g., Master Appropriations).

The project planning period generally begins when a Proponent first identifies and then develops the proposed project to the extent required to effectively describe the project as stipulated in FPD's *Submittal Requirements for New Projects*, and ends with a recommendation to present the project to Management Committee for its review and endorsement. During this period, the project's Business Case (i.e., the information required to make reasonable business decisions regarding the project) is progressively developed. Decisions are made to advance sequentially from one planning phase to another. These decisions, the corresponding "decision-making gates", and a process for developing the information required to effectively make decisions which are consistent with Saudi Aramco's Strategic Direction and Business Plan objectives are the focus of these Guidelines.

The definition for a Business Case is more fully described in Attachment A, Definitions, along with the definitions of other terms used in these Guidelines, and in Attachment C, Definition of a Business Case. A description of the approach used to develop these Guidelines is presented in Attachment B.

2. OBJECTIVES

- The primary objectives of these Guidelines are to:
 - Ensure that each capital project included in the Business Plan and Annual Capital Budgets is consistent with Saudi Aramco's Strategic Direction and Business Plan Objectives
 - Improve productivity of the organizations involved in the capital project development process, by ensuring that the capital project planning process is effectively implemented by:
 - Making decisions regarding the continued development of proposed projects as early in the planning process as reasonably possible
 - Limiting the evaluation of a proposed project to that required to make reasonable business decisions regarding continued project development and ultimately ER Approval

- The Guidelines are structured to:
 - Sequentially develop the Business Case for a proposed project in phases, refining the assessment in each planning phase through ER Approval, and thereby provide the individuals responsible for planning the project and ultimately Saudi Aramco's Management with sufficient information to make reasonable and timely business decisions regarding a proposed project
 - Ensure that the decisions required to effectively plan capital projects are well founded
- They are intended to improve the quality and consistency of the project planning process by describing the role of each of the organizations primarily involved in the project planning process and the specific planning tasks for which they are responsible in each phase of the project planning process (i.e., what is expected of each organization):
 - Proponent
 - FPD
 - Construction Agency
 - Corporate Staff (the Business Analysis Department and the Program, Forecasts & Analysis Department)
 - Project Support & Controls Department (PS&CD)

In summary:

- The Proponent's role in planning capital projects is expanded under the Guidelines to include a more definitive evaluation of each proposed project before it is submitted to FPD for further consideration.
- FPD continues to be primarily responsible for:
 - Planning Saudi Aramco's capital projects, based in part on information provided by the Proponent and other organizations
 - Developing well-founded and timely recommendations to ensure that Saudi Aramco's Management has sufficient information to make reasonable and timely business decisions regarding a proposed project

FPD's recommendations are subject to:

- Review by the Proponent, Corporate Staff, the Construction Agency, and other organizations
- Approval by the Proponent and/or the Proponent's Business Line

These Guidelines are intended to provide FPD the discretion and independence required to:

- Effectively perform its corporate mission and achieve the stated objectives
- Ensure the validity and objectivity of FPD's recommendations

In summary:

- FPD retains control over its project scope recommendations and the underlying analysis. For example:
 - FPD independently decides which alternatives to evaluate during the Study Phase and DBSP and Budgetary Project Scope Definition Phase, taking into account information provided by the Proponent and other organizations
 - FPD independently evaluates the alternatives, sequentially comparing each alternative with the alternative having the next lower capital investment
- FPD seeks:
 - To understand the Proponent's perspective regarding:
 - The project's objective (i.e., purpose)
 - The operating environment in which this objective would be achieved (e.g., the environment at the Operating Plant level and Operating System level)
 - The proposed project's Net Benefits (i.e., The benefits after taking into account other actions which could contribute to partially or wholly achieving the project's stated Business Objective)
 - To convey to the Proponent FPD's perspective regarding these same issues (i.e., the framework which FPD will use to develop the proposed project's scope)
 - The project's Business Objective (i.e., the project's purpose in terms of Saudi Aramco's Strategic Direction and Business Plan objectives)
 - The operating environment in which this Business Objective would be achieved (i.e., the environment at the Kingdom level, the Saudi Aramco level, the Operating System level and the Operating Plant level)
 - The proposed project's Net Benefits
- FPD does not necessarily seek agreement with the Proponent, particularly during the early phases of the project planning process

By so doing, the analysis required to develop project scope is not as likely to be constrained and is more likely to provide an independent view of:

- The project scope required to economically achieve the stated Business Objective in the anticipated operating environment, and
- The consequences of deviating from this project scope

This information will provide the basis for:

- FPD's recommendations regarding the continuation of a proposed project's development
 - FPD's recommendations regarding project scope
 - The alternatives presented to Saudi Aramco's Management for consideration
 - The Construction Agency continues to be primarily responsible for further developing the scope of each proposed project during Project Proposal. Its role in better defining project scope during the DBSP and Budgetary Project Scope Definition Phase is expanded under the Guidelines.
 - Corporate Staff continues to be primarily responsible for providing independent assessments of each proposed capital project. For projects that do not have a Business
-

Case that is clearly supportive of continued development, based on FPD's initial evaluation, the Guidelines stipulate that Corporate Staff assess the project before FPD finalizes its recommendation regarding the project's inclusion in the Business Plan.

- PS&CD continues to be primarily responsible for providing:
 - Estimates of the initial capital investment required for each proposed capital project, specifically the Conceptual Cost Estimate, the Capital Budget Cost Estimate, and ER Cost Estimate
 - Project execution schedules
- Finally, these Guidelines are intended to provide a means of consolidating and organizing information pertinent to the planning of each proposed project and the corresponding decisions to better ensure:
 - Continuity throughout the planning of each project
 - The ready availability of the information required to effectively perform a post-project appraisal of the project scope and Business Case development

3. SUMMARY

These Guidelines describe the tasks that shall generally be completed by each organization during each of eight project planning phases to highlight the collaborative nature of the overall capital project development process:

1. Proponent Planning Phase
2. Qualitative Assessment Phase
3. Preliminary Economic Evaluation Phase
4. Study Phase
5. DBSP and Budgetary Project Scope Definition Phase
6. Capital Budget Phase
7. Project Proposal Phase
8. ER Approval Phase

The resulting information will provide a credible basis for each of the periodic decisions regarding the continued development of proposed projects.

The Guidelines also stipulate that decisions regarding the continued development of each proposed project be made at eleven (11) decision-making "gates", to better ensure that the stated objectives are achieved. Three (3) of these "gates", the "gates" that involve decisions that must ultimately be endorsed by Management Committee and approved by the Board of Directors, have been characterized as "primary gates". The remaining gates, perhaps best be characterized as "secondary gates", involve decisions at the working level within the responsible organization. The purpose of each of the eleven "gates" is summarized below by planning phase, in the order in which they will typically occur in the project planning process.

1. Proponent Planning Phase

- Gate #1, Proponent Project Submittal Gate - To ascertain whether the Business Case for a proposed project is sufficiently supportive of continued project development to submit the project to FPD for further consideration
-

2. Qualitative Assessment Phase

- Gate #2, Conceptual Development Start Gate - To decide whether to proceed with development of the conceptual project scope and Conceptual Cost Estimate

3. Preliminary Economic Evaluation Phase

- **Gate #3, Business Plan/Study Start Gate (Primary Gate)** - For projects scheduled for approval in the second year of the upcoming Business Plan, to decide whether to recommend their inclusion in the Plan and to initiate the Study Phase. For projects scheduled for approval in the last three years of the Plan, to decide whether to recommend their inclusion in the Plan.

4. Study Phase

- Gate #4, DBSP Start Gate - To decide whether to proceed with the development of the DBSP and Budgetary Project Scope Definition

5. DBSP and Budgetary Project Scope Definition Phase

- Gate #5, Capital Budget Cost Estimate Start Gate - To decide whether to request a Capital Budget Cost Estimate from PS&CD

6. Capital Budget Economic Evaluation Phase

- **Gate #6, Capital Budget Gate (Primary Gate)** - To decide whether to recommend inclusion of the proposed project in the Annual Capital Budgets
- Gate #7, DBSP Approval Gate - To decide whether to seek approval of the DBSP
- Gate #8, Project Proposal Start Gate - To decide whether to initiate the Project Proposal

7. Project Proposal Phase

- Gate #9, Scope Modification Gate (for each proposed scope change) - To decide whether to modify the project scope during Project Proposal development
- Gate #10, Project Proposal Approval Gate - To decide whether to seek approval of the Project Proposal

8. ER Approval Phase

- **Gate #11, Project ERA Gate (Primary Gate)** - To decide whether to recommend that the proposed project be presented to Management Committee for endorsement

The more detailed descriptions of these eleven decision-making “gates” also stipulate:

- The requirements which shall generally be met to approve the “gate”
- The alternative decisions which shall typically be made
- The individual responsible for making the decision and approving the “gate”

An Approval Form for each of the decision-making “gates” is also provided. Each 1-page form provides a convenient means of summarizing the following information:

- Basic information regarding the project (i.e., BI Number, BI Title, Project Location)
- The project's Proponent
- Contact information for the responsible individuals:
 - Proponent
 - The organization responsible for the planning phase (e.g., FPD, Construction Agency)
- The requirements, in the form of a checklist, that must generally be met to approve the "gate", and thereby allow continued development of the proposed project
- The decision regarding the project's continued development (i.e., the recommended action)
- The name and title of the individual responsible for making the decision and approving the "gate"
- The approval signature

The project planning process and corresponding decision-making "gates" are shown schematically in Attachment D, Project Planning Process Schematics.

4. IMPLEMENTATION OF GUIDELINES

These Guidelines must be effectively applied when planning a capital project, if the stated objectives are to be consistently achieved. The individuals assigned to each particular project are primarily responsible for completing the required tasks and effectively interacting with the other involved organizations. It is essential that these individuals utilize all available resources (i.e., expertise) throughout the project planning process to effectively plan Saudi Aramco's capital projects, and thereby provide Management the information required to make reasonable business decisions. For example, in the case of FPD, the assigned FPD Planners are primarily responsible for completing the tasks for which FPD is responsible, with assistance, as required, from their Work Directors and Coordinators, and other organizations such as FPD's Advisory Council, and FPD's Economic Council.

The descriptions of the tasks to be completed during each of the project planning phases (i.e., the Planning Guidelines) provide an indication of the scope of the evaluation that will generally be required to provide a credible basis for each of the periodic decisions regarding the continued development of proposed projects. Circumstances specific to individual projects may warrant a change in the scope of a particular evaluation.

It is essential that the amount of time, actual time and calendar time, required to effectively complete each of the planning phases be estimated, and that sufficient time be allowed in the project's development schedules. The amount of time allowed should be commensurate with the scope and importance of the project (e.g., capital investment, Net Benefits), the complexity of the individual tasks, the availability of resources, internal and external to FPD and Saudi Aramco, and the level of experience of the assigned individuals.

Estimates of the quantifiable Net Benefits and expected life cycle costs, other than the required capital investments, shall generally be developed using values (i.e., economic evaluation bases)

obtained from the Business Analysis Department. Typically, these values reflect the Kingdom's perspective (i.e., they are estimates of the values which the Kingdom would likely realize).

Estimates of the initial capital investments included in the Business Plan, the Capital Budgets and the Expenditure Requests shall be prepared by PS&CD, unless PS&CD and FPD otherwise mutually agree. Other estimates may be internally developed by FPD, or obtained from either PS&CD or some other credible source.

The most recent version of FPD's economic evaluation model shall generally be used to complete the economic evaluations required for the Proponent Planning Phase, the Preliminary Economic Evaluation Phase, the Study Phase, the Capital Budget Phase, and the ER Approval Phase of the project planning process.

The analysis required to complete each "gate", including all underlying assumptions, shall be formally archived prior to approval of the "gate" (e.g., a properly labeled file in FPD's electronic library, a hard copy project binder). The information archived for each project shall be formally transmitted to the organization responsible for performing post-project appraisals immediately after completion of ER Approval Phase.

5. PROJECT PLANNING PROCESS

5.1 PROPONENT PLANNING PHASE

5.1.1 Planning Guidelines

The Proponent Planning Phase is the phase during which the Proponent performs the analysis required to ascertain whether the Business Case for a proposed project is sufficiently supportive of continued development to submit the project to the Facilities Planning Department (FPD) for further consideration. The Proponent's initial assessment should be primarily limited to qualitative considerations, to ensure that the focus is on an assessment of the Business Objective and the operating environment in which this Business Objective would be achieved. If this initial assessment indicates that further analysis is warranted, the analysis should be extended to include a preliminary assessment of the project scope required to economically achieve the stated Business Objective and a preliminary economic evaluation of the proposed project.

- The Proponent
 - The Proponent identifies the proposed project, generally an opportunity to either upgrade or expand an existing Operating Plant (i.e., a facility which is capable of contributing to achieving a Business Objective on a stand-alone basis) or Operating System (i.e., a group of related facilities that contribute to achieving a common Business Objective). The proposed project may also have been initially identified by another organization, such as FPD, as a result of a broad planning assessment (e.g., a Master Plan) or a specific study.
 - The Proponent develops the proposed project to the extent required to describe the project as stipulated in FPD's *Submittal Requirements for New Projects*
 - The Proponent qualitatively assesses the Business Case for the proposed project
 - The Proponent clearly defines the Business Objective of the proposed project in broad terms (i.e., the project's purpose in terms of Saudi Aramco's Strategic Direction and Business Plan objectives; e.g., meet domestic energy demand), as opposed to operational considerations pertinent to a particular operating facility (e.g., increase capacity or reliability of the operating facility).
 - The Proponent clearly describes the operating environment in which the stated Business Objective would be achieved, to the extent reasonably possible at this preliminary phase of the project planning process. The initial focus of this description should be on the primary business reasons for implementing the proposed project (e.g., a forecast supply deficit for product). The description should be broad, encompassing relevant aspects of the anticipated operating environment at four levels:
 - The Kingdom level (e.g., the net impact of the proposed project on the Kingdom's petrochemical and crude exports; the net impact of the proposed project on the Kingdom's fuel and feedstock supply/demand balances, other

third-party companies which may already or could become capable of providing the required equipment, facilities, and/or services)

- Saudi Aramco level (e.g., the net impact of the proposed project on other Saudi Aramco Operating Systems; the means by which and the extent to which other Operating Systems could offset (i.e., mitigate) the adverse consequences of a partial or complete shutdown of the proposed facilities, and thereby achieve the stated Business Objective)
- The Operating System level (e.g., the net impact of the proposed project on the applicable Operating System; the extent to which other related facilities could offset a partial or complete shutdown of the proposed facilities)
- The Operating Plant level (e.g., the net impact of the proposed project on the facility in which the project would be built)

A comprehensive assessment of the anticipated operating environment is essential, in that it provides the basis for:

- Establishing the Net Benefits of the proposed project in both quantitative and qualitative terms
- Establishing a preliminary list of viable alternatives for achieving the stated Business Objective
- Establishing the project scope which can be justified in terms of Saudi Aramco's Strategic Direction and Business Plan objectives
- The Proponent clearly describes the quantifiable and qualitative Net Benefits that would likely be realized, considering the anticipated operating environment
- The Proponent qualitatively assesses the strength of the Net Benefits, and/or roughly quantifies the Net Benefits to the extent reasonably possible. This assessment should generally be limited to estimating the magnitude and likelihood of the Net Benefits.
- The Proponent documents its qualitative assessment of the Business Case (i.e., the Business Objective, the anticipated operating environment and the Net Benefits)
- The Proponent establishes whether the Business Case supports continued project development, taking into account its assessment of:
 - The project's Business Objective (i.e., Would the project effectively support Saudi Aramco's Strategic Direction, and one or more of its Business Plan Objectives in the anticipated operating environment?)
 - The strength of the Net Benefits
- The Proponent develops a preliminary assessment of the project scope required to economically achieve the stated Business Objective
 - The Proponent develops a rough estimate of the initial capital investment that could be economically justified, to the extent reasonably possible at this preliminary stage, by:
 - Developing rough estimates of the quantifiable Net Benefits and the expected life cycle costs
 - Determining the Net Present Values of the quantifiable Net Benefits and expected life cycle costs at the established Company discount rate

- Subtracting the Net Present Value of the expected life cycle costs from the quantified Net Benefits
- Note that this assessment, alone, may provide a clear indication of whether to continue developing the proposed project. Development should generally continue if the economically justified investment is less than a rough estimate of the required investment.
- The Proponent identifies viable alternatives to the extent reasonably possible during the Proponent Planning Phase, keeping in mind the maximum initial capital investment that can be economically justified. Alternatives that would achieve, at least to a reasonable extent, the stated Business Objective in the anticipated operating environment should be considered. Examples of viable alternatives include alternatives that:
 - Would entail deferral of the proposed project
 - May not fully meet the stated Business Objective
 - May not fully meet a Government directive or regulation
 - Would entail changing Saudi Aramco's operating practices to achieve, at least partially, the stated Business Objective
 - Would entail using spare parts obtained from reputable after-market suppliers to sustain the operation of the existing facilities
 - Would entail utilizing "new" proven technologies (e.g., technologies that have been successfully applied elsewhere)
 - Would entail changing Saudi Aramco's typical facility scoping practices
 - Would effectively employ Saudi Arabs, particularly in entry-level capacities
 - Would entail further outsourcing equipment, facilities, and/or services to a third party (e.g., leasing)
 - For each viable alternative, the Proponent develops a preliminary project scope (i.e., what the proposed project would physically provide), in sufficient detail to develop a preliminary estimate of the initial capital investment. The objective of this task should be to identify the minimum scope required to achieve the stated Business Objective, keeping in mind the maximum initial capital investment that can be economically justified.
 - The Proponent develops a preliminary assessment of the facilities required to achieve the stated Business Objective in the anticipated operating environment
 - * The types of facilities
 - * The corresponding technical design bases (i.e., the required capabilities). At this early phase of the planning process, a description of the required capabilities for the proposed facility, as a whole, and estimates of the conditions at each of the major physical interfaces between the proposed facilities and the existing facilities may be sufficient.
 - The Proponent describes "how" the required facility capabilities could actually be achieved (e.g., equipment list, plot plan). The extent of this assessment should be limited to that required to develop a preliminary cost estimate.
-

For projects required to comply with either a Government directive or regulation, particular care should be taken to establish the minimum scope required to meet these requirements, with the objective of minimizing the cost of compliance. Other unrelated project scope should be identified and justified separately.

- The Proponent determines the economics of each viable alternative (this approach is generally easier and less likely to result in errors, than determining the relative economics of two alternatives). The most recent version of FPD's economic evaluation model should generally be used to complete this task. FPD will assist the Proponent with this economic evaluation, as required.
 - The Proponent identifies and quantifies the Net Benefits which would likely be realized if the alternative is implemented. If the Net Benefits of each viable alternative are essentially the same, this task may not be necessary (i.e., the analysis may be limited to a comparison of the costs which would be incurred with each alternative).
 - * Net Benefits may include revenues and/or savings attributable to reductions in facility outages and/or repairs
 - * Forecasts of Net Benefits should generally be based on factors such as:
 - Forecasts of incremental production
 - Forecasts of facility outages and/or repairs, and the corresponding costs, consistent with the historical information
 - Estimates of monthly charges typically levied by other providers of similar services (provided these charges are not subsidized)

These benefits should generally be developed using values (i.e., economic evaluation bases) obtained from FPD (FPD in turn obtains these economic evaluation bases from the Business Analysis Department). Possible sources of the other information required to quantify the Net Benefits) include in-house expertise, documented industry experience, equipment vendors, and consultants.

 - * This assessment should determine the extent to which each of the Net Benefits can be reasonably quantified.
 - * The Net Benefits which can not be reasonably quantified should be characterized as qualitative Net Benefits.
 - The Proponent estimates the total life cycle costs attributable to each viable alternative
 - * The initial capital investment, based on the Proponent's preliminary project scope definition
 - * Other expected life cycle costs. These costs should generally be developed using values (i.e., economic evaluation bases) obtained from FPD (FPD in turn obtains these economic evaluation bases from the Business Analysis Department). Typically, these values reflect the Kingdom's perspective (i.e., they are estimates of the costs which the Kingdom would likely incur).

- The annual operating and maintenance costs. One acceptable approach at this phase in the planning process is to apply a percentage to the preliminary cost estimate. The percentage should be applicable to the proposed facilities and reflect fully burdened costs to account for overhead costs directly related to its employees. When using this approach, it is particularly important to verify that the resulting costs appear reasonable for the proposed facilities.
- The annual sustaining capital investments (e.g., maintenance capital). One acceptable approach for estimating these investments is to apply a percentage (generally 1 – 2%) to the preliminary cost estimate.
- The cost of utilizing existing spare capacity. Generally, the total cost of providing additional capacity (e.g., initial capital investment, annual operating and maintenance costs) should be used, at least initially, to be conservative. If it can be clearly and conclusively demonstrated that there is no foreseeable use for the existing spare capacity, this estimate may be adjusted to reflect the period of time during which the spare capacity is not likely to be used.
- Annual lease payments, for alternatives involving third-party companies
 - Determines the Net Present Value of the forecast cash flows (i.e., Net Benefits, initial capital expenditures, other expected life cycle costs), using the most recent version of FPD's economic evaluation model
- The Proponent compares the Net Present Value of each viable alternative. Each alternative should be compared to the next most economical alternative. The starting point for this incremental economic analysis should be the alternative with the lowest initial capital investment. This alternative should be compared to the alternative with the next lowest capital investment to determine if the incremental capital investment can be economically justified. If the second alternative is economically justified, it becomes the basis for evaluating the next most expensive alternative. Otherwise, the basis remains the first alternative.
- The Proponent assesses the sensitivity of the preliminary economics for each alternative to a change in the Net Benefits, the preliminary cost estimate, and the estimated life cycle costs, if further analysis is required to determine which is the most economical alternative (e.g., in cases where two alternatives have essentially the same economics), by:
 - Assuming positive and negative changes, commensurate with the accuracy of the estimates
 - Calculating the extent (e.g., %) to which the initial estimate of a particular parameter would have to change to lower the economics below the established Company discount rate
- The Proponent identifies the most economical alternative, for further development.

- The Proponent completes the economic evaluation of the alternative selected for further development by:
 - Quantifying the total life cycle costs (e.g., initial capital investment, annual life cycle costs) of the selected alternative in terms that provide additional perspective about the reasonableness of the project costs. One useful approach is to determine the unit cost of the proposed project (e.g., \$/beneficial employee, \$/square meter, \$/BBL, \$/MMBTU). One reasonable approach for calculating the unit cost is to:
 - Calculate the Net Present Value of the life cycle costs
 - Divide the Net Present Value of the life cycle costs by the applicable units. In the case of crude or gas production, the Net Present Value of the annual production should be used.
 - Refining the estimates of the Net Benefits which would likely be realized from the proposed project (e.g., the most economical alternative), as required
 - Net Benefits may include revenues and/or savings attributable to reductions in facility outages and/or repairs.
 - Forecasts of Net Benefits should generally be based on factors such as:
 - * Forecasts of incremental production
 - * Forecasts of facility outages and/or repairs, and corresponding costs, consistent with the historical information
 - * Estimates of monthly charges typically levied by other providers of similar services (provided these charges are not subsidized)
 - These Net Benefits should generally be developed using values (i.e., economic evaluation bases) obtained from FPD (FPD in turn obtains these economic evaluation bases from the Business Analysis Department). Possible sources of the other information required to quantify the Net Benefits include in-house expertise, documented industry experience, equipment vendors, and consultants.
 - This assessment should determine the extent to which each of the Net Benefits can be reasonably quantified.
 - The Net Benefits which can not be reasonably quantified should be characterized as qualitative Net Benefits.
 - Comparing the estimates of the quantified Net Benefits to the estimates of total life cycle costs for the proposed project (e.g., the most economical alternative), if this was not done for the evaluation of the viable alternatives. This should be done by calculating:
 - The Net Present Value of the Net Benefits and costs at the established company discount rate
 - The Discounted Cash Flow Rate of Return (DCFROR)
 - The most recent version of FPD's economic evaluation model should generally be used to complete this task. FPD will assist the Proponent with this economic evaluation, as required.
 - Quantifying the value which would have to be attributed to the qualitative Net Benefits to achieve the established company discount rate, to the extent

reasonably possible. This should be done by calculating the difference between the Net Present Value of the initial capital expenditures and the Net Present Value of the quantified Net Benefits:

- Total value
 - The value in terms that provide added perspective about the reasonableness of the qualitative Net Benefits (e.g., unit benefits)
 - Refining the sensitivity analysis, as required (i.e., the impact of a change in the Net Benefits, the preliminary estimate of the initial capital investment, and/or the estimated life cycle costs on the preliminary project economics)
 - Documenting its preliminary economic evaluation
 - The Proponent determines the extent to which the Business Case is supportive of continued project development (i.e., submittal to FPD for further consideration).
 - The Proponent documents its complete assessment of the proposed project and the underlying analysis, as stipulated in FPD's *Submittal Requirements for New Projects* by preparing:
 - A draft Planning Brief, which effectively summarize the most important aspects (i.e., the information most important to making a decision to proceed with the development of the proposed project) of the complete analysis performed by the Proponent during the Proponent Planning Phase
 - Supporting information, which effectively describes the complete analysis performed by the Proponent and the results of this analysis
 - The Proponent reviews its assessment of the Business Case (e.g., the Business Objective, the anticipated operating environment, the Net Benefits, the project costs, and the project economics) and its conclusion regarding the Business Case with FPD to ensure that FPD fully understands the rationale for the Proponent's recommendation regarding continued project development.
- FPD
 - FPD provides the economic evaluation bases (e.g., the bases for valuing the expected Net Benefits and estimating other life cycle costs).
 - FPD guides the Proponent's efforts to develop the required information, to the extent reasonably required, recognizing that the Proponent is primarily responsible for developing this information.

5.1.2 Gate #1 – Proponent Project Submittal Gate

5.1.2.1 Description

- Purpose
 - To ascertain whether the Business Case for a proposed project is sufficiently supportive of continued project development to submit the project to the Facilities Planning Department (FPD) for further consideration
- Requirements
 - A Business Case that is supportive of continued project development
 - A preliminary assessment of Business Case
 - Clearly defined Business Objective (i.e., the project's purpose in terms of Saudi Aramco's Strategic Direction and Business Plan objectives)
 - Clear description of the anticipated operating environment in which the stated Business Objective would be achieved (i.e., the environment at the Kingdom level, the Saudi Aramco level, the Operating System level, and the Operating Plant level)
 - Preliminary assessment of the quantifiable and qualitative Net Benefits of the proposed project
 - For each viable alternative, preliminary estimates of:
 - The quantifiable Net Benefits
 - The project costs
 - Preliminary evaluation of viable alternatives
 - Completed preliminary economic evaluation of the proposed project
 - FPD's Submittal Requirements for New Projects, completed
 - Draft Planning Brief
 - Supporting Information
- Decisions/Actions
 - If requirements are fully met, then Proponent should submit the draft Planning Brief and supporting information to its Business Line for review and approval (the Business Line should in turn submit these documents to FPD, following its endorsement of the proposed project)
 - Otherwise, Proponent either:
 - Reassesses the proposed project, or
 - Drops the proposed project
- Responsibility/Approval Authority
 - Proponent Manager

5.1.2 Gate #1 – Proponent Project Submittal Gate

5.1.2.2 Approval Form

Project Description:
Project Location:

Proponent	Facilities Planning Department (FPD)
Business Line:	Division/Group:
Administrative Area:	Coordinator:
Department:	Work Director:
Proponent Contact	FPD Planner
Name:	Name:
Tel. No.:	Tel. No.:
E-mail:	E-mail:

Gate Requirements	Satisfied ⁽¹⁾	Comments ⁽²⁾
● Business Case supportive of continued project development		
● Proponent's assessment of Business Case		
– Clearly defined Business Objective		
– Clearly described operating environment		
– Preliminary assessment of Net Benefits		
– For each alternative, preliminary estimates of the Net Benefits and the total life cycle costs		
– Evaluation of viable alternatives		
– Preliminary economic evaluation of the proposed project		
● Completed <i>Submittal Requirements</i>		
– Draft Planning Brief		
– Supporting information		

Decision/Action: ⁽³⁾
--

Approval Authority	
Name:	
Title: Proponent Manager	
Signature	Date

Notes to Gate #1 Approval Form:

1. e.g., Yes, No, Partially
2. e.g., Summary explanation, Reference to an explanation, Reason requirement is not applicable
3. i.e., If the requirements are fully met, then Proponent submits the project (i.e., the draft Planning Brief and supporting information) to its Business Line for endorsement. Otherwise, Proponent either reassesses or drops the project.

5. PROJECT PLANNING PROCESS

5.2 QUALITATIVE ASSESSMENT PHASE

5.2.1 Planning Guidelines

The primary purpose of the Qualitative Assessment Phase is to perform the analysis required to decide whether the Business Case for a proposed project is sufficiently supportive of continued development to develop of a conceptual project scope and a Conceptual Cost Estimate (This decision is made at the Conceptual Development Start Gate, the first decision-making gate). This assessment should be primarily limited to qualitative considerations, to ensure that the focus of the assessment is on the Business Objective and the operating environment in which this Business Objective would be achieved.

- FPD
 - FPD confirms that the Proponent’s project description is complete enough to effectively proceed with a qualitative assessment. If it is not, FPD:
 - Requests that the Proponent provide the required information.
 - Guides the Proponent’s efforts to develop the required information, to the extent reasonably required, recognizing that the Proponent is primarily responsible for developing this information
 - FPD independently validates (i.e., assesses for reasonableness) the information provided by the Proponent, to the extent reasonably possible.
 - FPD independently performs a qualitative assessment of the Business Case for the proposed project
 - FPD clearly defines the Business Objective of the proposed project (i.e., the project’s purpose in terms of Saudi Aramco’s Strategic Direction and Business Plan objectives (e.g., meet domestic energy demand), as opposed to operational considerations pertinent to a particular operating facility (e.g., increase capacity or reliability of the operating facility))
 - FPD clearly describes the operating environment in which the stated Business Objective would be achieved, to the extent reasonably possible at this preliminary stage. The initial focus of this description should be on the primary business reasons for implementing the proposed project (e.g., a forecast supply deficit for product). The description should be broad, encompassing relevant aspects of the anticipated operating environment at:
 - The Kingdom level (e.g., the net impact of the proposed project on the Kingdom’s petrochemical and crude exports; the net impact of the proposed project on the Kingdom’s fuel and feedstock supply/demand balances; other third-party companies which may already or could become capable of providing the required equipment, facilities, and/or services)
 - Saudi Aramco level (e.g., the net impact of the proposed project on other Saudi Aramco Operating Systems; the means by which and the extent to which other

Operating Systems could offset (i.e., mitigate) the adverse consequences of a partial or complete shutdown of the proposed facilities)

- The Operating System level (e.g., the net impact of the proposed project on the applicable Operating System; the extent to which other related facilities could offset a partial or complete shutdown of the proposed facilities)
- The Operating Plant level (e.g., the impact of the proposed project on the facility in which the project would be built)

A comprehensive assessment of the anticipated operating environment is essential, in that it provides the basis for:

- Establishing the Net Benefits of the proposed project in both qualitative and quantitative terms
- Identifying, during the Study Phase, a list of viable alternatives for achieving the stated Business Objective
- Establishing the project scope which can be justified in terms of Saudi Aramco's Strategic Direction and Business Plan objectives
- FPD clearly describes the quantifiable and qualitative Net Benefits that would likely be realized, considering the anticipated operating environment.
- FPD qualitatively assesses the strength of the Net Benefits, and/or roughly quantifies the Net Benefits to the extent reasonably possible. This assessment should generally be limited to estimating the magnitude and likelihood of the Net Benefits.
- FPD establishes whether the Business Case supports continued project development (i.e., proceeding to the next planning phase), taking into account:
 - An assessment of the project's Business Objective (i.e., would the project effectively support Saudi Aramco's Strategic Direction, and one or more of its Business Plan Objectives in the anticipated operating environment?)
 - The strength of the Net Benefits
- FPD documents its preliminary assessments of the Business Objective, the anticipated operating environment and the Net Benefits, and its conclusion regarding the Business Case.
- FPD reviews its preliminary assessments of Business Objective, the anticipated operating environment, the Net Benefits, and FPD's conclusion regarding the Business Case with the Proponent:
 - To ensure the Proponent fully understands:
 - The rationale for FPD's recommendation regarding continued project development
 - The fundamental bases on which the proposed capital project will be developed
 - To identify issues and concerns of particular importance to the Proponent
- FPD formally archives the work products and underlying analysis completed during the Qualitative Assessment Phase (i.e., the information required for Gate #2).

5.2.2 Gate #2 – Conceptual Development Start Gate

5.2.2.1 Description

- Purpose
 - To decide whether to proceed with developing the conceptual project scope and Conceptual Cost Estimate
- Requirements
 - A Business Case that is supportive of continued project development
 - FPD's qualitative assessment of the Business Case, documented
 - Clearly defined Business Objective (i.e., the project's purpose in terms of Saudi Aramco's Strategic Direction and Business Plan objectives)
 - Clear description of the anticipated operating environment in which the stated Business Objective would be achieved (i.e., the environment at the Kingdom level, the Saudi Aramco level, the Operating System level, and the Operating Plant level)
 - Clear understanding of the Net Benefits of the proposed project in qualitative terms and/or rough quantitative terms
 - All work products and underlying analysis completed during the Qualitative Assessment Phase (i.e., the information required for Gate #2) formally archived
- Decisions/Actions
 - If requirements are fully met, then FPD proceeds with development of the conceptual scope development and subsequently requests a Conceptual Cost Estimate from PS&CD.
 - Otherwise, FPD recommends to the Proponent that the project be either:
 - Reassessed, or
 - DroppedIf the Proponent specifically requests that project development continue, FPD documents its Business Case assessment in an issue sheet for Management's consideration,
- Responsibility/Approval Authority
 - FPD Work Director, with participation of FPD's Advisory Council

5.2.2 Gate #2 – Conceptual Development Start Gate

5.2.2.2 Approval Form

Project Description:
Project Location:

Proponent	Facilities Planning Department (FPD)
Business Line:	Division/Group:
Administrative Area:	Coordinator:
Department:	Work Director:
Proponent Contact	FPD Planner
Name:	Name:
Tel. No.:	Tel. No.:
Email:	Email:

Gate Requirements	Satisfied ⁽¹⁾	Comments ⁽²⁾
● Business Case supportive of continued project development		
● FPD's preliminary assessment of Business Case, documented		
– Clearly defined Business Objective		
– Clearly described operating environment		
– Clear understanding of Net Benefits		
● All Gate #2 work products, including the completed <i>Submittal Requirements</i> , and underlying analysis formally archived		

Decision/Action: ⁽³⁾
--

Approval Authority	
Name:	
Title: FPD Work Director	Division/Group:
Signature	Date

Notes to Gate #2 Approval Form:

1. e.g., Yes, No, Partially
2. e.g., Summary explanation, Reference to an explanation, Location of archived information, Reason requirement is not applicable
3. i.e., If the requirements are fully met, then FPD proceeds with development of the conceptual scope and subsequently requests a Conceptual Cost Estimate from PS&CD. Otherwise, FPD asks the Proponent to either reassess the need for the project or recommends dropping the project.

5. PROJECT PLANNING PROCESS

5.3 PRELIMINARY ECONOMIC EVALUATION PHASE

5.3.1 Planning Guidelines

The primary purpose of the Preliminary Economic Evaluation Phase is to develop the information required for the Business Plan/Study Start Gate, the second gate and the first of the three primary gates), more specifically:

- For projects scheduled for approval in the second year of the upcoming Business Plan, to decide whether to recommend their inclusion in the Plan and to proceed with the Study Phase of the project planning process. Note that this decision must take place early enough in the planning schedule to obtain a Capital Budget Cost Estimate for the proposed capital project (i.e., sufficient time needs to be allowed to complete the Study Phase and the DBSP and Budgetary Project Scope Definition Phase of the project planning process, and to develop the Capital Budget Cost Estimate).
- For projects scheduled for approval in the last three years of the Plan, to decide whether to include the proposed project in the Plan

The scope of this preliminary economic evaluation should be limited to that required to make a reasonable business decision on whether to continue project development.

- The Proponent
 - The Proponent provides additional information, as reasonably required, for FPD to complete this phase of its Business Case assessment.
 - The Proponent reviews and comments on:
 - FPD's assessment of the conceptual project scope
 - FPD's assessment of the Business Case
 - The presentation of the Business Case in the draft Planning Brief
 - The Proponent identifies additional project scope (including additional plot space), and explains the rationale for each additional scope element.
 - The Proponent confirms the project scope to be presented to Management for inclusion in the Business Plan.
- PS&CD
 - PS&CD establishes the project scope definition required to develop a Conceptual Cost Estimate.
 - PS&CD develops, in close coordination with FPD, a Conceptual Cost Estimate based on the conceptual project scope.
 - PS&CD delivers the Conceptual Cost Estimate to FPD, with an explanation of the bases for the cost estimate (i.e., a complete breakdown of the Conceptual Cost Estimate).

- FPD
 - FPD searches its files for previously completed conceptual project scope developments and preliminary economic evaluations for similar facilities and reviews them for use as a “go-by”.
 - FPD independently validates additional information provided by the Proponent, to the extent reasonably possible.
 - FPD confirms with the Business Analysis Department the economic evaluation bases (e.g., the bases for valuing the expected Net Benefits and estimating the expected life cycle costs).
 - FPD develops rough estimates of the quantifiable Net Benefits and the expected life cycle costs.
 - FPD develops a preliminary estimate of initial capital investment that could be economically justified at the established company discount rate (i.e., economic hurdle rate) based on the rough estimates of the quantified Net Benefits and life cycle costs. Note that this assessment, alone, may provide a clear indication of whether to continue developing the proposed project.
 - FPD visits site of the proposed project, if required.
 - FPD independently develops a conceptual project scope, in sufficient detail to obtain a Conceptual Cost Estimate from PS&CD.
 - FPD confirms with PS&CD the level of detail required to develop a Conceptual Cost Estimate.
 - FPD develops a preliminary assessment of the facilities required to achieve the stated Business Objective in the anticipated operating environment:
 - The types of facilities
 - The corresponding technical design bases (i.e., the required capabilities)At this early phase of the planning process, a description of the required capabilities for the proposed facility, as a whole, and estimates of the conditions at each of the major physical interfaces between the proposed facilities and the existing facilities may be sufficient.
 - FPD describes “how” the required facility capabilities could actually be achieved, consistent with the project’s stated Business Objective and the anticipated operating environment, based on:
 - The project description provided by the Proponent in accordance with FPD’s *Submittal Requirements for New Projects*
 - An independent assessment of the required project scope. The extent of this assessment should be limited to that required to obtain a Conceptual Cost Estimate from PS&CD.
 - FPD documents its assessment of the conceptual project scope
 - FPD delivers its conceptual project scope to PS&CD for cost estimating.
-

- FPD independently completes a preliminary economic evaluation:
 - FPD establishes the scope of the economic evaluation. This evaluation should be commensurate with the importance of the proposed project (e.g., capital investment, Net Benefits).
 - FPD develops the estimates of the quantifiable Net Benefits, as required to obtain an accuracy comparable to a Conceptual Cost Estimate.
 - FPD develops the estimates of other expected life cycle costs, as required to obtain an accuracy to a Conceptual Cost Estimate, including:
 - The annual operating and maintenance costs. One acceptable approach at this phase in the planning process is to apply a percentage to the Conceptual Cost Estimate. The percentage should be applicable to the proposed facilities and reflect fully burdened costs to account for overhead costs directly related to its employees. When using this approach, it is particularly important to verify that the resulting costs appear reasonable for the proposed facilities.
 - The annual sustaining capital investments (e.g., maintenance capital). One acceptable approach for estimating these investments is to apply a percentage (generally 1 – 2%) to the Conceptual Cost Estimate.
 - The cost of utilizing existing spare capacity. Generally, the total cost of providing additional capacity (e.g., initial capital investment, annual operating and maintenance costs) should be used, at least initially. If it can be clearly and conclusively demonstrated that there is no foreseeable use for the existing spare capacity, this estimate may be adjusted to reflect the period of time during which the spare capacity is not likely to be used.
 - FPD develops estimates of the total life cycle costs, including the Conceptual Cost Estimate.
 - FPD quantifies, to the extent reasonably possible at this phase of the project planning process, the Conceptual Cost Estimate and the estimates of the total life cycle costs in terms that provide additional perspective about the reasonableness of the project costs (e.g., unit costs, such as \$/beneficial employee, \$/square meter, \$/BBL, \$/MMBTU).
 - FPD compares the quantified Net Benefits to the estimates of total life cycle costs (e.g., Net Present Value (NPV) at the established company discount rate, DCFROR). Generally, it will be useful to determine the NPV over a range of discount rates to assess the sensitivity of the economics.
 - FPD quantifies the value which would have to be attributed to the qualitative Net Benefits to achieve the established company discount rate (e.g., the difference between the Net Present Value of the initial capital expenditures and the Net Present Value of the quantified Net Benefits):
 - Total value
 - In terms that provide added perspective about the reasonableness of the qualitative Net Benefits (e.g., unit benefits), to the extent reasonably possible

- FPD assesses the sensitivity of the preliminary project economics to a change in the Net Benefits, the Conceptual Cost Estimate, and the estimated life cycle costs by:
 - Assuming positive and negative changes, commensurate with the accuracy of the estimates
 - Calculating the extent (e.g., %) to which the initial estimate of a particular parameter would have to change to lower the economics below the established company discount rate
 - FPD determines the extent to which the Business Case is supportive of continued project development and establishes FPD's recommendations accordingly.
 - FPD documents its assessment of the proposed capital project:
 - FPD revises the Proponent's draft Planning Brief, as required to effectively describe the project and FPD's assessment of its Business Case.
 - FPD revises the supporting information provided by the Proponent, as required to reflect FPD's assessment of the project, including FPD's economic evaluation
 - FPD reviews with the Proponent FPD's assessment of:
 - The conceptual project scope
 - The Business Case for the proposed project scopeto:
 - Ensure the Proponent understands:
 - The proposed project scope and the underlying rationale for this scope
 - FPD's assessment of the Business Case for the proposed project, and the extent to which the Business Case is supportive of continued development
 - Identify additional project scope (including additional plot space), and obtain an explanation of the underlying rationale for each additional scope element
 - To identify any other issues and concerns that the Proponent may have
 - FPD qualitatively assesses the extent to which each additional project scope element would incrementally contribute to achieving the stated Business Objective in the anticipated operating environment.
 - FPD reviews with the Proponent FPD's qualitative assessment of each additional project scope element to:
 - Ensure the Proponent understands the corresponding incremental Net Benefits
 - Determine whether a preliminary economic evaluation is warranted
 - FPD independently completes a preliminary economic evaluation of each of the additional project scope elements, as previously described, if warranted or specifically requested by the Proponent.
 - FPD reconsiders FPD's initial recommendation, taking into consideration the results of its evaluations of the additional project scope.
 - FPD reviews with the Proponent FPD's assessment of each additional element of project scope to:
 - Ensure the Proponent understands:
 - The extent to which the Business Case would be impacted by each additional element of project scope
-

- The Net Benefits of each additional element of project scope
 - Advise the Proponent and the Proponent's Business Line of the project scope which FPD does not support
 - Obtain confirmation from the Proponent of the project scope to be presented to Management for inclusion in the Business Plan
 - FPD updates, as required:
 - FPD's assessment of the Business Case
 - The project scope to be presented to Management for inclusion in the Business Plan
 - The draft Planning Brief
 - If the Business Case is not clearly supportive of continued development, FPD reviews with Corporate Staff the updated assessment of:
 - The Business Case for the conceptual project scope, including the additional project scope requested by the Proponent
 - The proposed project scope, and the underlying rationale for this scope
 - The impact of the project scope not supported by FPD on the Business Case
 - to:
 - Ensure Corporate Staff understands:
 - The Business Case for the proposed project, and the extent to which the Business Case is supportive of continued development
 - The extent to which the Business Case could be bolstered (i.e., improved) by reducing the project scope
 - The extent of the Net Benefits which would be forgone if the project scope were reduced
 - Seek agreement regarding the Business Case
 - Identify and discuss any other outstanding issues and concerns
 - FPD completes the assessment of the Business Case by incorporating comments from Corporate Staff and the Proponent which bolster the assessment.
 - FPD reviews with the Proponent and Corporate Staff the presentation of the Business Case in the draft Planning Brief to identify means of bolstering the presentation.
 - FPD completes the Planning Brief by incorporating comments which bolster the presentation of the Business Case.
 - FPD formally archives the work products and underlying analysis completed during the Preliminary Economic Evaluation Phase (i.e., the information required for Gate #3).
- Corporate Staff
 - Corporate Staff provides the economic evaluation bases (primarily Business Analysis Department).
 - Corporate Staff reviews and comments on FPD's assessment of the Business Case.
 - Corporate Staff identifies its outstanding issues and concerns.
 - Corporate Staff reviews and comments on the presentation of the Business Case in the draft Planning Brief.
-

5.3.2 Gate #3 – Business Plan/Study Start Gate

5.3.2.1 Description

- Purpose:
 - For projects scheduled for approval in the second year of the Business Plan, the purpose of this “gate” is to decide whether to recommend their inclusion in the upcoming Business Plan and to initiate the Study Phase of the capital project development process.
 - For projects scheduled for approval in the last three years of the Business Plan, the purpose of this “gate” is to decide whether to include the proposed project in the Business Plan
 - Requirements
 - A Business Case that is supportive of continued project development, documented
 - Clearly defined Business Objective (i.e., the project’s purpose in terms of Saudi Aramco’s Strategic Direction and Business Plan objectives)
 - Clear description of the anticipated operating environment in which the stated Business Objective would be achieved (i.e., the environment at the Kingdom level, the Saudi Aramco level, the Operating System level and the Operating Plant level)
 - Completed preliminary economic evaluation, in accordance with these Guidelines
 - For those projects with a Business Case which may not be supportive of continued project development, a Corporate Staff review to confirm this conclusion
 - Completed Planning Brief and supporting information
 - All work products and underlying analysis completed during the Preliminary Economic Evaluation Phase (i.e., the information required for Gate #3) formally archived
 - Decisions/Actions
 - If the Business Case is supportive of continued project development:
 - For projects scheduled for approval in the second year of the upcoming Business Plan, FPD recommends
 - Their inclusion in the initial draft of the Business Plan, for Management’s consideration
 - Initiating the Study Phase of the capital project development process
 - For projects scheduled for approval in the last three years of the upcoming Business Plan, FPD recommends their inclusion in the initial draft of the Business Plan, for Management’s consideration
- Projects scheduled for approval in the first year of the upcoming Business Plan (i.e., the Capital Budget) will generally have already gone through this portion of the capital project development process.
- Otherwise (i.e., if the Business Case is not supportive of continued project development):
 - FPD identifies and evaluates more cost effective alternatives, with assistance from the Proponent, and/or

- FPD recommends to the Proponent that the project not be included in the upcoming Business Plan
- FPD documents its Business Case assessment in an issue sheet for Management's consideration, if the Proponent specifically requests that the project be included in the Business Plan
- Responsibility/Approval Authority
 - FPD Coordinator, with participation of FPD's Advisory Council

5.3.2 Gate #3 – Business Plan/Study Start Gate

5.3.2.2 Approval Form

BI No.: :	BI Title:
Project Location:	

Proponent	Facilities Planning Department (FPD)
Business Line:	Division/Group:
Administrative Area:	Coordinator:
Department:	Work Director:
Proponent Contact	FPD Planner
Name:	Name:
Tel. No.:	Tel. No.:
Email:	Email:

Gate Requirements	Satisfied ⁽¹⁾	Comments ⁽²⁾
● Business Case supportive of continued project development		
● FPD's updated assessment of Business Case		
– Clearly defined Business Objective		
– Clear description of operating environment		
– Preliminary economic evaluation		
● Corporate Staff review, if Business Case is not clearly supportive of development		
● Completed Planning Brief and supporting information		
● All Gate #3 work products and underlying analysis formally archived		

Decision/Action: ⁽³⁾
--

Approval Authority	
Name:	
Title: FPD Coordinator	Division:
Signature	Date

Notes to Gate #3 Approval Form:

1. e.g., Yes, No, Partially
2. e.g., Summary explanation, Reference to an explanation, Location of archived information, Reason requirement is not applicable
3. i.e., If Business Case supports continued development: For projects scheduled for approval in the second year of the upcoming Business Plan, recommend their inclusion in the Plan and initiation of the Study Phase; for projects scheduled for approval in the last three years of the Plan, recommend their inclusion in the Plan. Otherwise, either identify and evaluate more cost effective alternatives, or recommend that project be dropped.

5. PROJECT PLANNING PROCESS

5.4 STUDY PHASE

5.4.1 Planning Guidelines

The primary purpose of the Study Phase is to complete the analysis required for the DBSP and Budgetary Project Scope Definition Start Gate, more specifically to: 1) decide whether to proceed with the development of the DBSP and Budgetary Project Scope Definition (at the DBSP Start Gate), and 2) determine which of the viable alternatives should be further developed during the DBSP and Budgetary Project Scope Definition Phase.

- FPD
 - FPD searches files for previously completed studies of similar facilities, which effectively established the alternative to be further developed during the DBSP and Budgetary Project Scope Definition Phase and confirmed the reasonableness of the Business Case, consistent with these Guidelines, for use as a “go-by”.
 - FPD prepares a plan for developing the Study, which:
 - Is commensurate with the importance of the proposed project (e.g., capital investment, Net Benefits)
 - Identifies and prioritizes the major tasks and deliverables that will be completed during the Study Phase (i.e., the scope of work for the Study Phase)
 - Identifies the major parameters/considerations, which are likely to impact project scope, the corresponding justification, and ultimately Management’s decision regarding the proposed project
 - Identifies and prioritizes the required information, including the product values to be used in the evaluation, and likely sources for this information
 - Identifies the resources, internal and external to FPD, which will likely be required
 - Describes the Study Report (i.e., the final product of the Study Phase) in outline form
 - FPD confirms with the Business Analysis Department, as required, the economic evaluation bases (e.g., the bases for valuing the expected Net Benefits and estimating the expected life cycle costs).
 - FPD develops a preliminary estimate of initial capital investment that could be economically justified at the established company discount rate (i.e., economic hurdle rate), based on rough estimates of the quantified Net Benefits and life cycle costs (if not previously estimated). Note that this estimate, alone, may provide a clear indication of the viable alternatives of achieving the stated Business Objective.
 - FPD independently identifies viable alternatives for achieving the stated Business Objective, taking into account:
 - The initial capital investment that could be economically justified
 - The anticipated operating environment

These alternatives should include alternatives which:

- Would entail deferral of the proposed project
 - May not fully meet the stated Business Objective
 - May not fully meet a Government directive or regulation
 - Would entail changing Saudi Aramco's operating practices to achieve, at least partially, the stated Business Objective
 - Would entail using spare parts obtained from reputable after-market suppliers to sustain the operation of the existing facilities
 - Would entail utilizing "new" proven technologies (e.g., technologies that have been successfully applied elsewhere)
 - Would entail changing Saudi Aramco's typical facility scoping practices
 - Would effectively employ Saudi Arabs, particularly in entry-level capacities
 - Would entail further outsourcing equipment, facilities, and/or services to a third party (e.g., leasing)
- For the viable Saudi Aramco alternatives (i.e., alternatives which would be implemented by Saudi Aramco):
- FPD independently develops a project scope for each viable alternative, in sufficient detail to develop a Study Cost Estimate:
 - FPD develops a preliminary assessment of the facilities required to achieve the stated Business Objective in the anticipated operating environment:
 - The types of facilities
 - The corresponding technical design bases (i.e., the required capabilities)At this early phase of the planning process, this assessment will generally include:
 - A description of the required capabilities for the proposed facility, as a whole
 - Estimates of the conditions at each of the major physical interfaces between the proposed facilities and the existing facilities
 - Descriptions of the required capabilities of the major individual scope elements
 - FPD describes "how" the required facility capabilities could actually be achieved, consistent with the project's stated Business Objective and the anticipated operating environment). This task will generally entail:
 - Establishing the "minimum" project scope (i.e., "how" for the least capital investment) in sufficient detail to develop a Study Cost Estimate (e.g., the number of process trains and each major type of equipment, major engineering design parameters)
 - Documenting the "minimum" project scope
 - FPD develops or obtains a Study Cost Estimate for each viable capital alternative.
 - FPD independently completes an economic evaluation of the alternatives which would be implemented by Saudi Aramco:
 - FPD establishes the scope of the economic evaluation. This evaluation should be commensurate with the importance of the proposed project (e.g., capital

investment, Net Benefits) and the decision to commit the additional resources required to develop a DBSP and Budgetary Project Scope Definition.

- FPD incrementally evaluates each alternative, sequentially comparing each alternative with the next lower capital investment:
 - FPD assesses the extent to which each alternative would likely achieve the stated Business Objective.
 - FPD describes the quantifiable and qualitative Net Benefits, which would likely be realized in the anticipated operating environment.
 - FPD refines estimates of the quantifiable Net Benefits, comparable in accuracy to a Study Cost Estimate.
 - FPD develops estimates of other expected life cycle costs, comparable in accuracy to a Study Cost Estimate, including:
 - * The annual operating and maintenance costs. One acceptable approach at this phase in the planning process is to apply a percentage to the Study Cost Estimate. The percentage should be applicable to the proposed facilities and reflect fully burdened costs to account for overhead costs directly related to its employees. When using this approach, it is particularly important to verify that the resulting costs appear reasonable for the proposed facilities.
 - * Sustaining capital investments (e.g., maintenance capital). One acceptable approach for estimating these investments is to apply a percentage (generally 1 – 2%) to the Study Cost Estimate.
 - * The cost of utilizing existing spare capacity. The total cost of providing additional capacity (e.g., initial capital investment, annual operating and maintenance costs) should generally be used, at least initially. If it can be clearly and conclusively demonstrated that there is no foreseeable use for the existing spare capacity, this estimate may be adjusted to reflect the period of time during which the spare capacity is not likely to be used.
 - FPD develops estimates of the total life cycle costs, including the Study Cost Estimate.
 - FPD quantifies, to the extent reasonably possible, the Study Cost Estimate and the estimates of the total life cycle costs in terms that provide additional perspective about the reasonableness of the project costs (e.g., unit costs, such as \$/beneficial employee, \$/square meter, \$/BBL, \$/MMBTU).
 - FPD compares of the estimates of the quantified Net Benefits to the estimates of total life cycle costs. Generally, the NPV at the established company discount rate should be used when comparing alternatives. It may also be useful to determine the NPV over a range of discount rates to assess the sensitivity.

- FPD quantifies the value which would have to be attributed to the qualitative Net Benefits to achieve the established company discount rate (e.g., the difference between the Net Present Value of the initial capital expenditures and the Net Present Value of the quantified Net Benefits):
 - * Total value
 - * In terms that provide added perspective about the reasonableness of the qualitative Net Benefits (e.g., unit benefits), to the extent reasonably possible
 - FPD assesses the sensitivity of the alternative's economics to a change in the each of the major evaluation parameters (e.g., elements of the life cycle costs and Net Benefits) by:
 - * Assuming positive and negative changes, commensurate with the accuracy of the estimate
 - * Calculating the extent (e.g., %) to which the initial estimate of a particular parameter would have to change to achieve the established company discount rate
 - FPD identifies the Saudi Aramco alternative with the best Business Case.
 - For the viable third-party alternatives (i.e., alternatives which would be implemented by a company other than Saudi Aramco)
 - FPD assists the Proponent, as required with:
 - Describing the scope of each alternative (i.e., the equipment, facilities, and/or services to be provided by the third party)
 - Developing estimates of lease payments for each alternative. This may entail developing a bid request to formally request bids from one or more third parties. This bid request should clearly describe:
 - Saudi Aramco's technical/operational and commercial requirements
 - The third-party's obligations
 - Saudi Aramco's obligations
 - The allocation of project risks (e.g., between Saudi Aramco and the third party)
- The Proponent is primarily responsible completing these tasks.
- FPD independently completes an economic evaluation of the alternatives which would be implemented by a third party:
 - FPD establishes the extent to which the third-party alternatives can be effectively evaluated. This will depend on the availability of information regarding these alternatives (e.g., estimates of lease payments)
 - If reasonable estimates of lease payments are available (e.g., previously obtained bids for similar equipment, facilities, and/or services) or could be reasonably obtained (e.g., by having the Proponent issue a bid request), then the evaluation may be conclusive enough to make a decision to pursue a third-party alternative
 - If reasonable estimates of lease payments are not available or can not be reasonably obtained, the evaluation may only be sufficient to decide whether
-

- to continue development of a third-party alternative, along with a Saudi Aramco alternative
- FPD incrementally evaluates each alternative, sequentially comparing each alternative with the next lower capital investment:
 - FPD assesses the extent to which the third-party alternative would achieve the stated Business Objective.
 - FPD describes the quantifiable and qualitative Net Benefits, which would likely be realized in the anticipated operating environment.
 - FPD develops estimates of the quantifiable Net Benefits, commensurate with the accuracy of a Study Cost Estimate.
 - If reasonable estimates of lease payments are available or could be reasonably obtained:
 - * FPD validates the reasonableness of the estimated lease payments
 - For estimates based on previously obtained bids, to determine the extent to which the bids are comparable to the proposed third-party alternative and the lease payments are still valid
 - For estimates obtained from bids, to ascertain the likelihood of the third party being able to economically provide the contracted facility, equipment, and/or service throughout the contract period based on the stipulated lease payments
 - * FPD develops preliminary estimates of the expected life cycle costs of the third-party alternative, including annual lease payments and any other costs to make the third party and Saudi Aramco alternatives comparable.
 - * FPD quantifies, to the extent reasonably possible, the total life cycle costs in terms that provide additional perspective about the reasonableness of the project costs (e.g., unit costs, such as \$/beneficial employee, \$/square meter, \$/BBL, \$/MMBTU).
 - * FPD compares of the estimates of the quantified Net Benefits to the estimates of total life cycle costs. Generally, the NPV at the established company discount rate should be used when comparing alternatives. It may also be useful to determine the NPV over a range of discount rates to assess the sensitivity.
 - * FPD quantifies the value which would have to be attributed to the qualitative Net Benefits to achieve the established company discount rate (e.g., the difference between the Net Present Value of the initial capital expenditures and the Net Present Value of the quantified Net Benefits):
 - Total value
 - In terms that provide added perspective about the reasonableness of the qualitative Net Benefits (e.g., unit benefits), to the extent reasonably possible

- * FPD assesses the sensitivity of the alternative's economics to a change in the each of the major evaluation parameters (e.g., elements of the life cycle costs and Net Benefits) by:
 - Assuming positive and negative changes, commensurate with the accuracy of the estimate
 - Calculating the extent (e.g., %) to which the initial estimate of a particular parameter would have to change to achieve the established company discount rate
 - If reasonable estimates of lease payments are not available or can not be reasonably obtained:
 - * FPD determines the lease payments required to make a third-party alternative economically attractive, as compared to the Saudi Aramco alternative which has the best Business Case (e.g., most economical).
 - * FPD assesses the reasonableness of the required lease payments qualitatively and/or quantitatively to the extent reasonably possible (e.g., using rough estimates of comparable lease payments).
 - FPD identifies the third-party alternative with the best Business Case
 - FPD compares the total life cycle costs of the best Saudi Aramco alternative and the best third-party alternative. Generally, NPVs at the established company discount rate should be used.
 - FPD assesses the relative uncertainties inherent in the estimates of the expected life cycle costs and the Net Benefits of the viable alternatives.
 - FPD selects one of the following options, depending on the results of the economic evaluation and the certainty of the conclusions:
 - The Saudi Aramco alternative which should be further developed during the DBSP and Budgetary Project Scope Definition Phase (i.e., the alternative that most strengthens the Business Case)
 - The third-party alternative
 - The continued development of both the selected Saudi Aramco alternative and the third-party alternative
 - FPD determines whether the Business Case is still supportive of continued project development, based on the selected alternative.
 - FPD reviews with the Proponent the alternative recommended by FPD for further development and each of the other viable alternatives identified and evaluated by FPD to:
 - Ensure the Proponent understands the recommended alternative, the underlying rationale for its selection, and the extent to which the Business Case is supportive of continued project development
 - Identify and discuss other possible alternatives identified by the Proponent, and the underlying rationale for each alternative
 - Identify and/or obtain the information that would be required to evaluate each alternative (e.g., information on project scope and benefits)
-

- FPD qualitatively assesses the extent to which each additional alternative would incrementally contribute to achieving the stated Business Objective in the anticipated operating environment.
 - FPD reviews with the Proponent FPD's qualitative assessment of each additional alternative to:
 - Ensure the Proponent understands the corresponding incremental Net Benefits
 - Determine whether a study economic evaluation is warranted
 - FPD independently completes a study economic evaluation of each additional alternative, as previously described, if warranted or specifically requested by the Proponent.
 - FPD reconsiders its initial recommendation, taking into consideration the results of its evaluations of the additional alternatives.
 - FPD reviews with the Proponent FPD's assessment of each additional alternative and its final recommendation regarding the alternative(s) to be further developed to:
 - Ensure the Proponent understands:
 - The bases for the recommended alternative and the underlying rationale
 - The extent to which the Business Case would be impacted by each additional alternative
 - The Net Benefits of each additional alternative
 - Confirm whether Proponent agrees with FPD's recommendation
 - If the Proponent agrees:
 - For a Saudi Aramco alternative, FPD proceeds with the development of the recommended alternative (i.e., an alternative that is supportive of continued project development) during the DBSP and Budgetary Project Scope Definition Phase
 - For a third-party alternative, the Proponent proceeds to implement this alternative with assistance from other Saudi Aramco organizations (e.g., Contracting, Legal, Finance). FPD will likely only be involved in Saudi Aramco's obligations would involve the installation of additional Saudi Aramco facilities.
 - If the Proponent does not agree:
 - Obtains confirmation from the Proponent of the alternative to be further developed
 - Formally advises the Proponent and the Proponent's Business Line that it does not support the requested alternative, and the underlying rationale
 - If the selected alternative involves the installation of additional Saudi Aramco facilities, proceeds with the development of the specifically requested alternative during the DBSP and Budgetary Project Scope Definition Phase
 - FPD updates its assessment of the Business Case, as required, to confirm whether the Business Case is still supportive of continued project development.
-

- FPD documents in a Study Report:
 - The proposed project's Business Objective
 - The anticipated operating environment
 - The extent to which the selected alternative achieves the stated Business Objective
 - The economic evaluation bases agreed by the Business Analysis Department (e.g., the bases for valuing the expected Net Benefits and estimating the expected life cycle costs)
 - The expected quantifiable and qualitative Net Benefits
 - The incremental evaluation of each alternative
 - The alternative recommended by FPD for further development, and the underlying rationale
 - The alternative specifically requested by the Proponent, if different than FPD's recommendation, together with:
 - The Proponent's underlying rationale for its request
 - FPD's assessment of the impact of the requested alternative on the proposed project's Business Case, including the major issues and concerns
- FPD formally archives the work products and underlying analysis completed during the Study Phase (i.e., the information required for Gate #4).
- The Proponent
 - For each viable third-party alternative, the Proponent obtains third-party bids for the applicable equipment, facilities, and/or services.
 - The Proponent reviews FPD's description of each alternative identified and evaluated by FPD.
 - The Proponent suggests other alternatives, and explains the rationale for each alternative.
 - The Proponent provides additional information, as reasonably required, for FPD to complete its evaluation of each alternative.
 - The Proponent formally confirms the alternative to be further developed during the DBSP and Budgetary Project Scope Definition Phase.

5.4.2 Gate #4 - DBSP/Budgetary Project Scope Definition Start Gate

5.4.2.1 Description

- Purpose
 - To decide whether to advance to the DBSP and Budgetary Project Scope Definition Phase of the project planning process
- Requirements
 - A Business Case that is supportive of continued development of a Saudi Aramco project (as opposed to a third-party project)
 - A completed Study Report, which includes:
 - A clearly defined Business Objective (i.e., the project's purpose in terms of Saudi Aramco's Strategic Direction and Business Plan objectives)
 - A description of the operating environment in which the stated Business Objective would be achieved (i.e., the environment at the Kingdom level, the Saudi Aramco level, the Operating System level and the Operating Plant level)
 - A complete review of the economic evaluation bases agreed by the Business Analysis Department (e.g., the bases for valuing the expected Net Benefits and estimating the expected life cycle costs)
 - A list of viable alternatives for achieving the stated Business Objective, taking into account the anticipated operating environment, including alternatives which:
 - Do not fully meet this Business Objective
 - Would entail changing the existing operation
 - Would entail further outsourcing of equipment, facilities, and/or services to a third party
 - For alternatives which would be implemented by Saudi Aramco
 - A Study Cost Estimate
 - An assessment of the extent to which the stated Business Objective would be achieved
 - An economic evaluation, commensurate with the importance of the proposed project (e.g., capital investment, Net Benefits) and the decision to commit the additional resources required to develop a DBSP and Budgetary Project Scope Definition, in which each alternative is sequentially compared to the alternative with the next lowest initial capital investment:
 - Quantification of the Study Cost Estimate and the estimates of the total life cycle costs in terms that provide additional perspective about the reasonableness of the project costs (e.g., unit costs, such as \$/beneficial employee, \$/square meter, \$/BBL, \$/MMBTU)
 - A comparison of the quantified Net Benefits with the alternative's estimated total life cycle costs (i.e., initial capital investment plus subsequent life cycle costs)
 - An estimate of the value which would have to be attributed to the qualitative Net Benefits to achieve the established company discount rate

- An assessment of the sensitivity of the alternative's economics to a change in the each of the major evaluation parameters
 - Conclusion regarding the Saudi Aramco alternative with the best Business Case
 - For alternatives which would be implemented by a third party
 - Estimates of the lease payments, together with an assessment of certainty and reasonableness
 - An assessment of the extent to which the stated Business Objective would be achieved
 - An economic evaluation:
 - Quantification of the total life cycle costs in terms that provide additional perspective about the reasonableness of the project costs (e.g., unit costs, such as \$/beneficial employee, \$/square meter, \$/BBL, \$/MMBTU)
 - A comparison of the quantified Net Benefits with the alternative's estimated total life cycle costs (i.e., initial capital investment plus subsequent life cycle costs)
 - An estimate of the value which would have to be attributed to the qualitative Net Benefits to achieve the established company discount rate
 - An assessment of the sensitivity of the alternative's economics to a change in the each of the major evaluation parameters
 - Conclusion regarding the third-party alternative with the best Business Case
 - Recommendation regarding the alternative to be further developed during the DBSP and Budgetary Project Scope Definition Phase
 - All work products and underlying analysis completed during the Study Phase (i.e., the information required for Gate #4) formally archived
- Decisions/Actions
 - If the Business Case is supportive of continued development, then FPD recommends:
 - Proceeding with the development of the Saudi Aramco alternative by initiating the DBSP and Budgetary Project Scope Definition Phase of the project planning process,
 - The Proponent proceed with implementing a third-party project, if the evaluation is sufficiently conclusive, or
 - Proceeding with the development of both the Saudi Aramco and third-party alternatives
 - Otherwise, FPD recommends to the Proponent that:
 - A cost effective alternative be developed, or
 - The project be cancelled
 - Responsibility/Approval Authority
 - FPD Work Coordinator, with participation of FPD's Advisory Council
-

5.4.2 Gate #4 - DBSP and Budgetary Project Scope Definition Start Gate

5.4.2.2 Approval Form

BI No.: :	BI Title:
Project Location:	

Proponent	Facilities Planning Department (FPD)
Business Line:	Division/Group:
Administrative Area:	Coordinator:
Department:	Work Director:
Proponent Contact	FPD Planner
Name:	Name:
Tel. No.:	Tel. No.:
Email:	Email:

Gate Requirements	Satisfied ⁽¹⁾	Comments ⁽²⁾
● Business Case supportive of continued development of a Saudi Aramco project		
● Study Report, which includes:		
– Clearly defined Business Objective		
– Clear description of the operating environment		
– A list of viable alternatives		
– Economic evaluation of each alternative		
– Recommendations regarding the alternative to be further developed		
● All Gate #4 work products and underlying analysis formally archived		

Decision/Action: ⁽³⁾
--

Approval Authority	
Name:	
Title: FPD Coordinator	Division:
Signature	Date

Notes to Gate #4 Approval Form:

1. e.g., Yes, No, Partially
2. e.g., Summary explanation, Reference to an explanation, Location of archived information, Reason requirement is not applicable
3. i.e., If the Business Case is supportive of continued development of the Saudi Aramco project and the Study Report is complete, approve the Study Report and recommend initiating the DBSP and Budgetary Project Scope Definition Phase. Otherwise, recommend modifying the proposed project scope, implementing the third-party project, further developing both the Saudi Aramco project and the third-party project, or canceling the project.

5. PROJECT PLANNING PROCESS

5.5 DBSP AND BUDGETARY PROJECT SCOPE DEFINITION PHASE

5.5.1 Planning Guidelines

The primary purpose of DBSP and Budgetary Project Scope Definition Phase is to develop a Design Basis Scoping Paper (DBSP) and a Budgetary Project Scope Definition, which clearly describe a project scope which would economically (i.e., cost effectively) achieve the proposed project's stated Business Objective in the anticipated operating environment.

The DBSP and Budgetary Project Scope Definition are two related, albeit separate, work products that should generally be developed concurrently. These two work products are required to approve the Capital Budget Cost Estimate Start Gate, the fourth gate.

The DBSP shall:

- Be prepared in accordance with the most recently approved version of SAEP 1350, DBSP Preparation and Review Procedure
- Together with the Saudi Aramco Engineering Standards and the existing as-built drawings provide:
 - The Project Proposal engineering contractor the information required to fully, and, to a large extent, independently develop the Project Proposal
 - The Construction Agency the information required to effectively plan and execute Project Proposal development

The Budgetary Project Scope Definition shall describe “how” the required facility capabilities could actually be achieved (e.g. descriptions of equipment and other facilities, the required facility capabilities, quantities, and major engineering design parameters), consistent with the project's stated Business Objective and the anticipated operating environment. This preliminary description of the actual facilities that might be built shall not be included in the body of the DBSP. Rather, it shall be provided in a separate Appendix to the DBSP (e.g., titled “Budgetary Project Scope Definition”).

The project scope definition in the DBSP and Budgetary Project Scope Definition shall together be sufficient for PS&CD to develop a Capital Budget Cost Estimate.

- FPD
 - FPD performs the tasks required to prepare a DBSP, which complies with the requirements stipulated in SAEP-1350, DBSP Preparation and Revision Procedure:
 - FPD formally notifies the proposed project's Proponent, the Construction Agency, and the Environmental Protection Department:
 - When DBSP development is scheduled to start
 - Of any specific support requirements

- The Proponent, the Construction Agency and the Environmental Protection Department (EPD) assign representatives to work with FPD in the development of the DBSP, on either a part-time or fulltime basis, as required to effectively contribute to the DBSP development.
- FPD describes Project's Business Objective and Operating Environment:
 - FPD clarifies, as required, the definition of the proposed project's Business Objective (i.e., the project's purpose), in terms of Saudi Aramco's Strategic Direction and Business Plan objectives
 - FPD expands and clarifies, as required, the description of the operating environment in which the Business Objective would have to be achieved (i.e., the present situation which warrants consideration of the proposed project)
 - FPD prepares the DBSP Execution Plan:
 - FPD searches its files for previously completed DBSPs for similar facilities, which effectively describe "what" facility capabilities are to be provided, as stipulated in SAEP-1350, Preparation and Revision Procedure, for use as a "go-by".
 - FPD prepares an execution plan for developing the DBSP consistent with the requirements stipulated in SAEP-1350, Preparation and Revision Procedure, which:
 - Is commensurate with the importance of the proposed project (e.g., capital investment, Net Benefits)
 - Identifies and prioritizes the major tasks that will be completed (i.e., the scope of work required to complete each section of the DBSP)
 - Identifies the major parameters/considerations, which are likely to impact project scope, the corresponding justification, and ultimately Management's decision
 - Identifies and prioritizes the required information and likely sources for this information
 - Identifies the resources, internal and external to FPD and Saudi Aramco (e.g., engineering contractor for developing the Budgetary Project Scope Definition), which will likely be required
 - Estimates the amount of time, actual time and calendar time, required to complete the DBSP
 - FPD reviews the DBSP execution plan with FPD Supervision (e.g., Coordinator) to ensure that:
 - The plan is sufficiently well defined to develop a project scope, consistent with the project's stated purpose (i.e., its Business Objective)
 - FPD's supervision is aware of and supportive of the resource requirements
 - FPD further develops the proposed project's scope, more specifically the alternative selected during the Study Phase, to confirm the types of facilities to be provided and the corresponding design bases:
 - FPD establishes the extent to which the project scope needs to be defined in the DBSP to effectively achieve the project's stated purpose (i.e., its Business Objective). This extent will depend in large part on the complexity of the
-

analysis and perspective required to establish economical project scope (i.e., the extent to which an understanding of the operating environment in which the project's stated Business Objective would have to be achieved and the economic evaluation criteria is required). In its simplest form, the project scope definition could be limited to a description of the required capabilities for the project, as a whole, and the conditions at each of the physical interfaces. A more complex definition could include descriptions of each major scope element of the project, consistent with the purpose of a DBSP.

- FPD visits, as required, the site of the proposed project.
 - FPD prepares an approved Land Use Permit (LUP), if required by GI 2.716 (Reference Section 5.1), if a request has not already been submitted (Section 5.2 of GI 2.716 stipulates that an LUP request should be submitted before DBSP start):
 - FPD coordinates request with the Proponent. This request shall either be made by the Proponent or, as a minimum, endorsed by the Proponent.
 - FPD obtains an approved LUP for the proposed project *before* issuing the draft DBSP for review. As a minimum, this LUP shall be tentatively approved to confirm that there is no conflict regarding ownership of the designated site for the proposed facilities.
 - FPD includes the approved LUP, or tentatively approved LUP, in the draft DBSP issued for review.
 - FPD finalizes the LUP request and obtain an approved LUP *before* issuing the DBSP for approval.
 - FPD includes the approved LUP in the DBSP issued for approval.
 - FPD establishes the location of each physical interface between the existing and proposed facilities (e.g., inlet and outlet process streams, inlet and outlet utility streams, entrance and exit roadways), as definitively as reasonably possible.
 - FPD fully characterizes the conditions at each interface (e.g., for process streams - pressure, temperature, and fluid composition). Preliminary characterizations should have already been completed as part of the Study Phase. Note that for some aspects of these characterizations, it may be more appropriate and reasonable to provide ranges.
 - FPD refines, as required, the economic evaluation bases (e.g., the bases for determining the Net Benefits that the Kingdom would realize) to be used to further develop the project's scope, in conjunction with Business Analysis.
 - FPD refines, as required, the assessment of the project's overall capabilities to confirm the capabilities which can be justified, preferably on the basis of economics (e.g., capacities, process capabilities). A preliminary assessment of these capabilities should have been completed during the Study Phase.
 - FPD completes all studies required to confirm "what" is to be provided (e.g., the types of facilities and the corresponding facility design bases).
 - For each element of the proposed project's scope that needs to be defined in the DBSP:
 - FPD describes the element's function
-

- FPD prioritizes its importance relative to other scope elements (i.e., the relative extent to which it contributes to achieving the project's stated purpose (i.e., its Business Objective))
- FPD defines the required capabilities to an extent consistent with the purpose of a DBSP
- FPD independently identifies viable alternatives for performing the scope element's stated function and achieving the required capabilities, taking into account the anticipated operating environment (e.g., for process plants, the number of process trains and the capacity of each train; for equipment, the number and size of each piece of equipment). These alternatives should include:
 - * Alternatives which would not fully provide the required capabilities
 - * The use of existing facilities, modified as and to the extent required
- FPD reviews the alternatives with FPD's Supervision (e.g., Work Director, Coordinator) to ensure that a reasonable range of alternatives has been identified
- For each alternative, FPD independently establishes the minimum scope (i.e., scope with the least initial capital investment), consulting with other appropriate organizations (e.g., Petroleum Engineering, Consulting Services, Safety & Industrial Security, Loss Prevention, Communications, IT, Pipelines, Process & Control Systems, Power Distribution) as required
- FPD documents the scope for each alternative, in sufficient detail to develop a Study Cost Estimate
- FPD incrementally evaluates the economics of each viable alternative for each scope element, sequentially comparing each alternative to the alternative with the next lowest initial capital investment:
 - * FPD assesses the extent to which the stated Business Objective would be achieved.
 - * FPD describes the quantifiable and qualitative Net Benefits that the Kingdom would likely realize, considering the anticipated operating environment.
 - * FPD quantifies the Net Benefits of each alternative, to the extent reasonably possible.
 - * FPD develops or obtains a Study Cost Estimate for the alternative.
 - * FPD develops estimates of other expected life cycle costs, such as operating and maintenance costs (fully burdened to account for the Company's overhead costs directly related to its employees) and sustaining capital investments (e.g., capitalized maintenance).
 - * FPD determines the total life cycle cost, including the Study Cost Estimate of the initial capital investment.
 - * FPD quantifies, to the extent reasonably possible, the Study Cost Estimate of the initial capital investment and the estimates of the total life cycle costs in terms that provide additional perspective about the

- reasonableness of the project costs (e.g., unit costs, such as \$/MMBTU, \$/BBL, \$/Tonne, \$/beneficial employee and \$/square meter).
 - * FPD compares the Net Benefits that can be readily quantified to the corresponding total life cycle cost.
 - * For the qualitative benefits of each alternative, FPD quantifies the value which would have to be attributed to these benefits to achieve the designated economic hurdle rate:
 - Total value
 - In terms that provide added perspective about the reasonableness of the qualitative benefits (e.g., unit benefits)
 - FPD documents its assessment of the most economical alternative for each scope element (i.e., the alternative which most strengthens the Business Case).
 - FPD reviews the selected alternatives with FPD's Supervision (e.g., Work Director, Coordinator) to ensure that the appropriate alternatives have been selected.
 - FPD reviews each of the selected alternatives with the Proponent to:
 - Ensure the Proponent understands each of the alternative's and the underlying rationale for the alternative
 - Identify additional alternatives, and obtain additional information pertaining to these alternatives (e.g., information on project scope and benefits)
 - FPD independently validates the reasonableness of the additional information provided by the Proponent, and, to the extent required, supplement this information with information from other sources (e.g., documented industry practices, consultants).
 - FPD qualitatively assesses the extent to which each additional alternative would incrementally contribute to achieving the stated Business Objective in the anticipated operating environment.
 - FPD reviews with the Proponent FPD's qualitative assessment of each additional alternative for each project scope element to:
 - Ensure the Proponent understands the corresponding incremental Net Benefits
 - Determine whether a preliminary economic evaluation is warranted
 - FPD independently evaluates each additional alternative for each scope element, as required to determine the extent to which it impacts the proposed project's Business Case.
 - FPD reviews with the Proponent FPD's assessment of each additional alternative for each element of project scope to:
 - Ensure the Proponent understands:
 - * The extent to which the Business Case would be impacted by each additional alternative
 - * The Net Benefits of each additional alternative
 - Advise the Proponent and the Proponent's Business Line of the project scope which FPD does not support, and the underlying rationale
-

- Obtain confirmation from the Proponent of the project scope to be included in the DBSP
 - o FPD documents the additional scope to be included in the initial draft DBSP.
 - o FPD documents the project scope as stipulated in SAEP-1350, DBSP Preparation and Revision Procedure.
 - o FPD reviews the initial draft DBSP with FPD Supervision (e.g., Work Director, Coordinator) to ensure that it is consistent with SAEP-1350, Preparation and Revision Procedure.
- FPD identifies the additional studies which Project Proposal engineering contractor needs to perform to further develop the project scope. These evaluations may include:
 - o Additional front-end scope evaluations required to define the types of facilities to be provided (i.e., evaluations which should be completed during DBSP development). Ideally, all reasonable efforts should normally be made to complete all front-end scope evaluations during DBSP development. However, if additional front-end scope evaluations are required, the DBSP shall stipulate that FPD will actively participate in performing these evaluations and establishing the required facility design bases.
 - o Environmental evaluations, other than the Environmental Assessment already stipulated in SAEP-14, Project Proposal). These evaluations shall be identified with the assistance of EPD and listed in the draft DBSP, which is issued for formal review.
 - o More definitive project scope definition studies, such as hydrologic surveys, pipeline route surveys, pipeline surge analyses, and risk assessments, other than the Preliminary Hazard Analysis (PHA) already stipulated in SAEP-14, which FPD, the Proponent and other concerned organizations agree are required during Project Proposal development

For each study, FPD:

- o Defines the objective (i.e., purpose) of the study
 - o Establishes the scope of each study
 - o Establishes the required evaluation parameters, including the economic evaluation bases (e.g., Net Benefits/consequences from the Kingdom's perspective and the bases for valuing these benefits/consequences).
 - FPD assesses the major constructability and logistical issues specific to the proposed project, such as:
 - o Accessibility to the proposed site (e.g., availability and type of roads) and/or the site of the proposed facilities within an existing facility (e.g., limitations due to existing facilities, such as pipe racks)
 - o Load restrictions (i.e., weight bearing capabilities) of access roads and bridges
 - o Height clearances of bridges which extend across access roads
 - o Available sea port and airport facilities, including:
 - Locations, relative to the proposed project
 - Equipment handling capabilities, specific to the proposed project's requirements
-

This preliminary assessment should generally be completed with assistance from the Construction Agency.

- FPD assesses existing as-built drawings to determine:
 - The extent to which the existing drawings must be updated to reflect as-built facilities
 - The extent to which existing drawings are available in an appropriate format (i.e., an electronic drawing format supported by Saudi Aramco at the time of DBSP development)
 - The time required to modify existing drawings and the corresponding impact on the project completion schedule

This preliminary assessment should generally be completed with assistance from the Construction Agency.

- FPD identifies and evaluates major surplus equipment and excess materials available within Saudi Aramco (e.g., Saudi Aramco's inventories) for possible use on the proposed project, as an alternative for achieving the proposed project's stated purpose in a more cost effective manner, to the extent deemed necessary to provide the Construction Agency and Project Proposal engineering contractor a sound basis for further developing the proposed project's scope. This preliminary assessment should generally be completed with assistance from the Construction Agency.
- FPD documents the results of the above tasks in an initial draft of the DBSP, in accordance with SAEP-1350, Preparation and Revision Procedure.
- FPD initiates a Value Engineering Study of the project scope, as described in the initial draft of the DBSP. The Value Engineering Study shall be facilitated by PS&CD on:
 - Projects with an initial capital investment of over \$50 million, unless FPD and PS&CD mutually agree that a Value Engineering Study is not warranted
 - Other projects for which FPD determines a Value Engineering Study would be beneficial, subject to PS&CD's agreement

For these projects:

- FPD issues the initial draft DBSP, and if available, the initial Budgetary Project Scope Definition to PS&CD for a Value Engineering Study, along with an explanation of the project scope which FPD does not support.
- FPD constructively contributes to the Value Engineering Study by:
 - Explaining the project's stated purpose (i.e., its Business Objective), and the operating environment in which this Business Objective would have to be achieved (i.e., the framework used to develop the project scope presented in the initial draft DBSP and initial Budgetary Project Scope Definition)
 - Explaining the parameters, including the economic bases, used to evaluate the various alternatives and further develop the project scope
 - Explaining the rationale for the alternative chosen during the Study Phase for further development during the DBSP and Budgetary Project Scope Definition Phase. This explanation shall include a review of the other alternatives that were considered.

- Explaining the rationale for each element of the proposed project scope, as described in the initial draft DBSP and the initial Budgetary Project Scope Definition
- Participating in the establishment of the framework for the Value Engineering Study (e.g., assessing suggested changes to the framework used to develop the proposed project scope)
- Participating in the development and/or evaluation of other alternatives identified during the Value Engineering Study:
 - * Alternatives for achieving the stated Business Objective in the anticipated operating environment
 - * Alternatives for each individual project scope element
- o FPD modifies the initial project scope to reflect the Value Engineering Study recommendations which FPD agrees would strengthen the Business Case.
- o FPD identifies the Value Engineering Study recommendations which were not incorporated in the draft DBSP, and explain the rationale for not incorporating each of them.

This Value Engineering Study shall generally focus on the description of “what” facility capabilities are to be provided, more specifically:

- o The types of facilities
 - o The corresponding facility design bases
 - Technical design bases (i.e., the required capabilities for the proposed facility, as a whole, and individual scope elements)
 - Economic evaluation bases (i.e., project specific economic evaluation bases to be used to further develop the proposed project scope during Project Proposal development)
 - o Specific facility attributes determined during DBSP development as being needed, and therefore not subject to change without FPD’s approval
 - FPD updates the initial draft DBSP to reflect the Value Engineering Study recommendations to which FPD agrees.
 - FPD formally reviews the draft DBSP:
 - o FPD reviews the draft DBSP with FPD Supervision (e.g., Work Director, Coordinator) to ensure that the appropriate Value Engineering recommendations have been properly incorporated.
 - o FPD issues draft DBSP for formal review by all involved organizations.
 - o FPD reviews and addresses comments received from these organizations.
 - o FPD formally reviews its responses to comments with all involved organizations.
 - o FPD documents the changes to be made to the DBSP, along with FPD’s assessment of the extent to which each change is consistent with the proposed project’s stated purpose (i.e., its Business Objective).
 - FPD completes the DBSP by incorporating changes to be made to the project scope definition, including:
 - o The project scope which FPD supports
 - o Any additional project scope which FPD does not support
-

- Note that the DBSP, itself, should not distinguish between the project scope supported by FPD and the project scope not supported by FPD.
- FPD documents the project scope which FPD does not support and the underlying rationale.
 - FPD formally advises the Proponent of:
 - The project scope which FPD supports, together with the underlying rationale
 - The additional project scope which FPD does not support, together with the underlying rationale
 - Any significant issues which could materially impact the Business Case for the proposed project
 - FPD reviews the completed DBSP with the Construction Agency, as required, to ensure that the Construction Agency fully understands:
 - The proposed project scope, and the underlying rationale
 - The bases for evaluating alternatives for achieving the stated Business Objective during Project Proposal development
 - FPD performs all the tasks required to develop the Budgetary Project Scope Definition. The starting point for this Budgetary Project Scope Definition is the facility description provided in the DBSP (i.e. the description of the types of facilities to be provided and the required capabilities). The scope of work required to complete this Budgetary Project Scope Definition is dependent in part on:
 - The extent to which the scopes of individual elements of the proposed project need to be defined in the DBSP to effectively achieve the project's stated Business Objective
 - The level of project scope definition required to obtain a Capital Budget Cost Estimate

The tasks which will generally be required are similar to those required to define the project scope in the DBSP, except, as previously stated, the focus is on developing a preliminary description of the actual facilities that might be built (i.e., a description of “how” the required facility capabilities presented in the DBSP could actually be achieved) in sufficient detail to develop a Capital Budget Cost Estimate. Given the scope of work, the development of the Budgetary Project Scope Definition will generally be a collaborative effort, involving several organizations and individuals within and outside of FPD and Saudi Aramco (e.g., engineering contractor). The FPD Planner assigned the responsibility for the overall DBSP should also generally be responsible for ensuring that the information provided in the Budgetary Project Scope Definition is:

- Sufficient to effectively develop a Capital Budget Cost Estimate, when combined with the information provided in the DBSP
- Organized and formatted so that it can effectively be carried over to the Project Proposal Phase, for use by the engineering contractor charged with preparing the Project Proposal, as a basis for further developing the engineering design.

The specific tasks that will generally be required to develop the Budgetary Project Scope Definition are presented below:

- FPD confirms with PS&CD the level of detail required to develop a Capital Budget Cost Estimate (e.g. descriptions of equipment and other facilities, the required facility capabilities, quantities, and major engineering design parameters).
- FPD identifies individual scope elements, to the extent required to supplement the project scope definition presented in the DBSP, with the objective of providing sufficient scope definition to develop a Capital Budget Cost Estimate.
- FPD develops a preliminary plot plan, which would effectively accommodate the required facilities and allow for the facility spacing requirements stipulated in the SAESs. For projects located within existing facilities (i.e., stand-alone projects or project's which would repair, modify, and/or upgrade existing facilities), a second plot plan showing the relative locations of the proposed facilities and the existing facilities should also generally be developed. These plot plans are particularly important in that the size of the plot plan may have a significant impact on the overall project scope and cost.
- For each element of the proposed project's scope:
 - FPD independently identifies viable alternatives for performing the scope element's stated function and achieving its required capabilities, consulting with other appropriate organizations (e.g., Petroleum Engineering, Consulting Services, Safety & Industrial Security, Loss Prevention, Communications, IT, Pipelines, Process & Control Systems, Power Distribution), as required. These alternatives should include:
 - Alternatives which would not fully provide the required capabilities
 - The use of existing facilities, modified as and to the extent required
 - For each alternative:
 - FPD independently establishes the minimum scope (i.e., scope with the least initial capital investment), consulting with other appropriate organizations, as required
 - FPD documents the scope in sufficient detail to develop a Study Cost Estimate
 - FPD develops or obtains a Study Cost Estimate
 - FPD independently evaluates the incremental economics of each viable alternative for each scope element, sequentially comparing each alternative to the alternative with the next lowest initial capital investment:
 - FPD assesses the extent to which the stated Business Objective would be achieved.
 - FPD quantifies the Net Benefits of each alternative, to the extent reasonably possible.
 - FPD develops estimates of other expected life cycle costs, such as:
 - * Operating and maintenance costs. One acceptable approach at this phase in the planning process is to apply a percentage to the Study Cost Estimate. The percentage should be applicable to the proposed facilities and reflect fully burdened costs to account for overhead costs directly

related to its employees. When using this approach, it is particularly important to verify that the resulting costs appear reasonable for the proposed facilities.

- * Sustaining capital investments (e.g., maintenance capital). One acceptable approach for estimating these investments is to apply a percentage (generally 1 – 2%) to the Study Cost Estimate.
- FPD develops estimates of the total life cycle costs, including the Study Cost Estimate.
- FPD quantifies, to the extent reasonably possible, the Study Cost Estimate and the estimates of the total life cycle costs in terms that provide additional perspective about the reasonableness of the project costs (e.g., unit costs, such as \$/MMBTU, \$/BBL, \$/Tonne, \$/beneficial employee and \$/square meter).
- FPD compares the quantified Net Benefits to the corresponding total life cycle costs. Generally, NPVs at the established company discount rate (i.e., economic hurdle rate) should be used for this comparison.
- For the qualitative benefits of each alternative, FPD quantifies the total value and the unit value (to provide added perspective about the reasonableness of the qualitative benefits) which would have to be attributed to these benefits to achieve the established company discount rate.
- o FPD documents its assessment of the most economical alternative for each scope element (i.e., the alternative which most strengthens the Business Case).
- FPD reviews with the Proponent the selected alternative for each scope element to:
 - o Ensure the Proponent understands each of the selected alternatives and the underlying rationale for the alternative
 - o Identify additional alternatives, and obtain additional information pertaining to these alternatives (e.g., information on project scope and benefits)
- FPD independently validates the reasonableness of the additional information provided by the Proponent, and, to the extent required, supplement this information with information from other sources (e.g., documented industry practices, consultants).
- FPD qualitatively assesses the extent to which each additional alternative would incrementally contribute to achieving the stated Business Objective in the anticipated operating environment.
- FPD reviews with the Proponent FPD's qualitative assessment of each additional alternative for each project scope element to:
 - o Ensure the Proponent understands the corresponding incremental Net Benefits
 - o Determine whether a preliminary economic evaluation is warranted
- FPD independently evaluates each additional alternative for each scope element, as required, to determine the extent to which it impacts the proposed project's Business Case.

- FPD reviews with the Proponent FPD's assessment of each additional alternative for each element of project scope to:
 - Ensure the Proponent understands:
 - The extent to which the Business Case would be impacted by each additional alternative
 - The Net Benefits of each additional alternative
 - Advise the Proponent and the Proponent's Business Line of the project scope which FPD does not support, and the underlying rationale
 - Obtain confirmation from the Proponent of the project scope to be included in the Budgetary Project Scope Definition
 - FPD documents the additional scope to be included in the Budgetary Project Scope Definition.
 - If an engineering contractor is contracted to assist with the preparation of the Budgetary Project Scope Definition:
 - FPD prepares the engineering contractor's scope of work.
 - FPD closely manages the engineering contractor's work to ensure that project scope is consistent with the stated Business Objectives and anticipated operating environment.
 - FPD either performs the economic evaluations required to develop an economical project scope or provides the engineering contractor the required economic evaluation bases.
 - FPD formally archives the work products and underlying analysis completed during the DBSP and Budgetary Project Scope Definition Phase (i.e., the information required for Gate #5).
 - The Proponent
 - The Proponent provides information, as required to develop the project scope.
 - The Proponent reviews the project scope developed by FPD prior to release of the initial draft DBSP.
 - The Proponent identifies additional project scope, and provides explanations of the underlying rationale for this scope.
 - The Proponent decides which of the project scope not supported by FPD to request be included in the proposed project scope.
 - The Proponent participates in developing the Value Engineering Study.
 - The Proponent formally reviews the draft DBSP.
 - PS&CD
 - PS&CD facilitates the Value Engineering Study.
 - PS&CD establishes the project scope definition required to develop a Capital Budget Cost Estimate.
-

- Other involved organizations
 - Assist in developing the project scope, as required
 - Participate in developing the Value Engineering Study
 - Formally review the draft DBSP

5.5.2 Gate #5 – Capital Budget Cost Estimate Start Gate

5.5.2.1 Description

- Purpose
 - To decide whether to request a Capital Budget Cost Estimate from PS&CD
- Requirements
 - A DBSP, completed in accordance with SAEP-1350, Preparation and Revision Procedure
 - A complete description of the Budgetary Project Scope Definition (i.e., the preliminary description of the facilities that might actually be built, in sufficient detail to obtain a Capital Budget Cost Estimate)
 - Documentation of the project scope described in the DBSP and the Budgetary Project Scope Definition which FPD does not support
 - An explanation of the extent to which each major project scope element is consistent with the stated Business Objective
 - All work products and underlying analysis completed during the DBSP and Budgetary Project Scope Definition Phase (i.e., the information required for Gate #5) formally archived
- Decisions/Actions
 - If the requirements are met, then FPD requests Capital Budget Cost Estimates from PS&CD of the proposed project's scope which is agreed to by FPD, and each element of any additional scope specifically requested by the Proponent.
 - Otherwise, FPD first corrects the outstanding the deficiencies, before requesting the Capital Budget Cost Estimates
- Responsibility/Approval Authority
 - FPD Coordinator, with participation of FPD's Advisory Council

5.5.2 Gate #5 - Capital Budget Cost Estimate Start Gate

5.5.2.2 Approval Form

BI No.:	BI Title:
Project Location:	

Proponent	Facilities Planning Department (FPD)
Business Line:	Division/Group:
Administrative Area:	Coordinator:
Department:	Work Director:
Proponent Contact	FPD Planner
Name:	Name:
Tel. No.:	Tel. No.:
Email:	Email:

Gate Requirements	Satisfied ⁽¹⁾	Comments ⁽²⁾
● A completed DBSP, which complies with SAEP-1350, DBSP Procedure		
● A completed Budgetary Project Scope Definition		
● Documentation of the project scope described in the DBSP and the Budgetary Project Scope Definition which FPD does <u>not</u> support		
● An explanation of the extent to which each major project scope element is consistent with the stated Business Objective		
● Value Engineering Study, if required		
● All Gate #5 work products and underlying analysis formally archived		

Decision/Action: ⁽³⁾
--

Approval Authority	
Name:	
Title: FPD Coordinator	Division:
Signature	Date

Notes to Gate #5 Approval Form:

1. e.g., Yes, No, Partially
2. e.g., Summary explanation, Reference to an explanation, Location of archived information, Reason requirement is not applicable
3. i.e., If the Budgetary Project Scope Definition is complete, request Capital Budget Cost Estimates from PS&CD. Otherwise, amend the Budgetary Project Scope Definition, to the extent required to obtain a Capital Budget Cost Estimate.

5. PROJECT PLANNING PROCESS

5.6 CAPITAL BUDGET ECONOMIC EVALUATION PHASE

5.6.1 Planning Guidelines

The primary purpose of the Capital Budget Economic Evaluation Phase is to decide whether to:

- Recommend to the Proponent that the proposed project be included in the Annual Capital Budgets (at the Capital Budget Gate, the fifth gate and the second of three primary gates)
- Seek Approval of the DBSP (at the DBSP Approval Gate)
- Initiate the Project Proposal (at the Project Proposal Start Gate)

- PS&CD

- PS&CD develops, in close coordination with FPD, separate Capital Budget Cost Estimates for:

- The project scope described in the completed DBSP and Budgetary Project Scope Definition
- Each major element of project scope which FPD does not support, as stipulated in the formal request for the Capital Budget Cost Estimate.

The cost estimates for the project scope which FPD does not support shall be comparable to the cost estimate for the project scope described in the DBSP and Budgetary Project Scope Definition (i.e., they should reflect the full cost of the project scope element, so that FPD can reasonably establish the initial capital investment of a project, assuming one or more of the individual project scope elements is deleted from the proposed project's scope).

- PS&CD delivers the Capital Budget Cost Estimates to FPD, with an explanation of the bases for each cost estimate (i.e., a complete breakdown of the cost estimate).

- FPD

- For the Saudi Aramco alternative selected for further development during the DBSP and Budgetary Scope Definition Phase:
 - FPD effectively contributes to the development of the Capital Budget Cost Estimates:
 - FPD issues to PS&CD the Capital Budget cost estimate request, complete with:
 - The updated draft DBSP (i.e., the draft DBSP to be issued for approval), including the Budgetary Project Scope Definition
 - A description of each major element of project scope which FPD does not support, as stipulated in the formal request for the Capital Budget Cost Estimate
 - FPD constructively ensures that PS&CD clearly understands the proposed project scope.

- FPD determines whether the Business Case is still supportive of continued project development, based on the Capital Budget Cost Estimate:
 - FPD fully defines the Business Objective (i.e., the project's purpose in terms of Saudi Aramco's Strategic Direction and Business Plan objectives).
 - FPD comprehensively describes the operating environment in which the stated Business Objective would be achieved (i.e., the environment at the Kingdom level, the Saudi Aramco level, the Operating System level and the Operating Plant level).
 - FPD develops an evaluation plan, commensurate with the importance of the proposed project (e.g., capital investment, Net Benefits). This plan should specifically identify the level of analysis deemed necessary to effectively decide whether to recommend including the proposed project in the Annual Capital Budgets.
 - FPD refines, as required, the descriptions of the quantifiable and qualitative Net Benefits, in part to reassess the extent to which the Net Benefits can reasonably be quantified. At this phase of the planning process, the comprehensiveness of these descriptions should be comparable to the scope definition required to obtain a Capital Budget Cost Estimate.
 - FPD confirms with the Business Analysis Department, as required, the economic evaluation bases (e.g., the bases for valuing the expected Net Benefits and estimating the expected life cycle costs).
 - FPD completes a comprehensive economic evaluation:
 - FPD increases the extent to which the Net Benefits are quantified and refines the corresponding estimates, commensurate with the importance of the decision to include the proposed project in the Annual Capital Budgets.
 - FPD refines estimates of the other life cycle costs, as required to obtain an accuracy comparable to the accuracy of a Capital Budget Cost Estimate, including:
 - * The annual operating and maintenance costs. Preferably, this estimate of operating and maintenance costs should be based on estimates of the additional manpower, utility consumption and invoices. If necessary, the estimate may be derived by applying a percentage to the Capital Budget Cost Estimate. The percentage should be applicable to the proposed facilities and reflect fully burdened costs to account for overhead costs directly related to its employees. When using this approach, it is particularly important to verify that the resulting costs appear reasonable for the proposed facilities.
 - * The annual sustaining capital investments (e.g., maintenance capital). One acceptable approach for estimating these investments is to apply a percentage (generally 1 – 2%) to the Study Cost Estimate.
 - * The cost of utilizing existing spare capacity. An acceptable approach for estimating this cost is to use the total cost of providing additional capacity (e.g., initial capital investment, annual operating and maintenance costs). If it can be conclusively demonstrated that there is

no likely use for the existing spare capacity, this estimate may be adjusted downward to reflect the period of time during which the spare capacity is not likely to be used.

- FPD refines estimates of the total life cycle costs, including the Capital Budget Cost Estimate.
 - FPD quantifies the Capital Budget Cost Estimate and the estimates of the total life cycle costs in terms that provide additional perspective (e.g., unit cost, such as \$/beneficial employee, \$/square meter, \$/BBL, \$/MMBTU).
 - FPD compares the quantified Net Benefits with the cost estimate of the total life cycle costs (e.g., NPV at the established company discount rate, DCFROR). Generally, it will be useful to determine the NPV over a range of discount rates to assess the sensitivity of the economics.
 - FPD refines the estimate of the value which would have to be attributed to the qualitative Net Benefits to achieve the established company discount rate (e.g., the difference between the Net Present Value of the initial capital expenditures and the Net Present Value of the quantified Net Benefits):
 - * Total value
 - * In terms that provide added perspective about the reasonableness of the qualitative Net Benefits (e.g., unit benefits), to the extent reasonably possible
 - FPD expands the supplemental analysis, commensurate with the importance of the proposed project (e.g., capital investment, Net Benefits) and the decision to include the proposed project in the Annual Capital Budgets, to assess the robustness of the project's justification and to provide Management additional perspective, examples of which include:
 - * An assessment of the sensitivity of the alternative's economics to a change in the each of the major evaluation parameters (e.g., elements of the life cycle costs and Net Benefits) by:
 - Assuming a change, commensurate with the accuracy of the estimate
 - Calculating the extent (e.g., %) to which the initial estimate of a particular parameter would have to change to achieve the established company discount rate (i.e., economic hurdle rate)

The results of this sensitivity analysis should be presented in order of descending significance (i.e., impact on the Business Case) to provide additional perspective on which evaluation parameters warrant more consideration. A "Tornado Diagram" is a useful means of graphically presenting the results.

 - * A more in-depth probabilistic analysis of the major evaluation parameters, in which a range of values is assumed for one or more of the parameters, along with estimates of the corresponding probabilities (i.e., a Monte Carlo analysis) to provide Management a more definitive indication of the expected project economics, and the extents of the downside risk and upside potential
-

- * An assessment of the quantifiable and qualitative Net Benefits attributable to one or more potential opportunities, which may be realized if the proposed project is implemented, along with an estimate of the likelihood of the opportunity (i.e., a Real Option analysis)
 - FPD reassess the impact of each element of the project scope which FPD does not support on the Business Case for the proposed project (e.g., initial investment, economics).
- For each viable third-party alternative, for which an evaluation has not yet been completed (e.g., during the Study Phase)
 - FPD assists the Proponent, as required with:
 - Describing the scope of the alternative (i.e., the equipment, facilities, and/or services to be provided by the third party)
 - Developing estimates of lease payments. This will generally entail developing a bid request to formally request bids from one or more third parties to obtain estimates that are comparable in accuracy to a Capital Budget Cost Estimate. This bid request should clearly describe:
 - Saudi Aramco's technical/operational and commercial requirements
 - The third-party's obligations
 - Saudi Aramco's obligations
 - The allocation of project risks (e.g., between Saudi Aramco and the third party)

These tasks are primarily the Proponent's responsibility, and should be completed during the DBSP and Budgetary Scope Definition Phase, to ensure timely receipt of the required estimates.

- FPD independently completes an economic evaluation:
 - FPD assesses the extent to which the third-party alternative would achieve the stated Business Objective.
 - FPD describes the quantifiable and qualitative Net Benefits, which would likely be realized in the anticipated operating environment.
 - FPD develops estimates of the quantifiable Net Benefits, commensurate with the accuracy of a Study Cost Estimate.
 - FPD validates the reasonableness of the estimated lease payments:
 - For estimates based on previously obtained bids, to determine the extent to which the bids are comparable to the proposed third-party alternative and the lease payments are still valid
 - For estimates obtained from bids, to ascertain the likelihood of the third party being able to economically provide the contracted facility, equipment, and/or service throughout the contract period based on the stipulated lease payments
 - FPD develops preliminary estimates of the expected life cycle costs of the third-party alternative, including annual lease payments and any other costs to make the third party and Saudi Aramco alternatives comparable.

- FPD quantifies, to the extent reasonably possible, the total life cycle costs in terms that provide additional perspective about the reasonableness of the project costs (e.g., unit costs, such as \$/beneficial employee, \$/square meter, \$/BBL, \$/MMBTU).
- FPD compares of the estimates of the quantified Net Benefits to the estimates of total life cycle costs. Generally, the NPV at the established company discount rate should be used when comparing alternatives.
- FPD quantifies the value which would have to be attributed to the qualitative Net Benefits to achieve the established company discount rate (e.g., the difference between the Net Present Value of the initial capital expenditures and the Net Present Value of the quantified Net Benefits):
 - Total value
 - In terms that provide added perspective about the reasonableness of the qualitative Net Benefits (e.g., unit benefits), to the extent reasonably possible
- FPD assesses the sensitivity of the alternative's economics to a change in the each of the major evaluation parameters (e.g., elements of the life cycle costs and Net Benefits) by:
 - Assuming positive and negative changes, commensurate with the accuracy of the estimate
 - Calculating the extent (e.g., %) to which the initial estimate of a particular parameter would have to change to achieve the established company discount rate
- FPD compares the total life cycle costs for the third-party alternative with the total life cycle costs for the most economical Saudi Aramco alternative. Generally, NPVs at the established company discount rate should be used for this comparison.
- FPD reassesses the relative uncertainties inherent in the estimates of the expected life cycle costs and the Net Benefits of the viable alternatives
- FPD recommends either:
 - Continued development of the Saudi Aramco alternative
 - Implementation of the third-party alternative
- FPD determines whether the Business Case is still supportive of continued project development.
- FPD documents the Business Case in a draft Budget Brief, consistent with the guidelines.
- FPD documents its assessment of:
 - The Saudi Aramco alternative
 - The third-party alternative
 - The impact of the project scope not supported by FPD on the Business Case. This assessment should be presented for Management's consideration when:
 - Deciding whether to recommend the project for continued development
 - Deciding whether to include the proposed project, as presently scoped, in the Annual Capital Budgets

- FPD reviews internally its:
 - Assessment of the Business Case for:
 - The recommended alternative (i.e., Saudi Aramco alternative or third-party alternative)
 - The other alternative (i.e., third-party alternative or Saudi Aramco alternative), if applicable
 - Assessment of the impact of the project scope not supported by FPD on the Business Case
 - The presentation of the Business Case in the draft Budget Brief
 - FPD's Coordinators and Advisory Council shall contribute to this review.
 - FPD reviews with the Proponent its:
 - Assessment of the Business Case for:
 - The recommended alternative (i.e., Saudi Aramco alternative or third-party alternative)
 - The other alternative (i.e., third-party alternative or Saudi Aramco alternative), if applicable
 - Assessment of the impact of the project scope not supported by FPD on the Business Case
 - The presentation of the Business Case in the draft Budget Brief
 - to:
 - Ensure the Proponent understands:
 - The Business Case for the Saudi Aramco alternative, and if applicable, the third-party alternative, and the extent to which the Business Case is supportive of continued development
 - The extent to which the Business Case could be bolstered (i.e., improved) by reducing the project scope
 - The extent of the Net Benefits which would be forgone if the project scope were reduced
 - Consider reductions in project scope:
 - To bolster the Business Case
 - If required to obtain a Business Case that is supportive of continued development
 - Obtain confirmation of the alternative and project scope to be presented to Management for inclusion in the Annual Capital Budgets
 - Identify means of bolstering the presentation of the Business Case in the Budget Brief
 - FPD reviews with Corporate Staff its:
 - Assessment of the Business Case for:
 - The recommended alternative (i.e., Saudi Aramco alternative or third-party alternative)
 - The other alternative (i.e., third-party alternative or Saudi Aramco alternative), if applicable
-

- Assessment of the impact of the project scope not supported by FPD on the Business Case
- The presentation of the Business Case in the draft Budget Brief
- to:
 - Ensure Corporate Staff understands:
 - The Business Case for the Saudi Aramco alternative, and if applicable, the third-party alternative, and the extent to which the Business Case is supportive of continued development
 - The extent to which the Business Case could be bolstered (i.e., improved) by reducing the project scope
 - The extent of the Net Benefits which would be forgone if the project scope were reduced
 - Identify means of bolstering the presentation of the Business Case in the Capital Budget Brief
- FPD completes the assessment of the Business Case by incorporating comments from Corporate Staff and the Proponent which bolster the assessment.
- FPD completes the Budget Brief by incorporating comments which bolster the presentation of the Business Case.
- FPD formally archives the work products and underlying analysis completed during the Capital Budget Economic Evaluation Phase (i.e., the information required for Gates #6, #7, and #8).
- The Proponent
 - For each viable third-party alternative, the Proponent obtains third-party bids for the applicable equipment, facilities, and/or services.
 - The Proponent reviews and comments on FPD's:
 - Assessment of the Business Case based on the project scope described in the DBSP and Budgetary Project Scope Definition
 - Assessment of the impact of the project scope not supported by FPD on the Business Case
 - Presentation of the Business Case in the draft Budget Brief
 - The Proponent considers reductions in project scope.
 - The Proponent confirms the project scope to be presented to Management for inclusion in the Annual Capital Budgets.
- Construction Agency
 - The Construction Agency establishes Project Management Team.
 - The Construction Agency completes the Abbreviated Project Execution Plan.

- Corporate Staff
 - Corporate Staff confirms the economic evaluation bases (primarily Business Analysis Department).
 - Corporate Staff reviews and comments on FPD's
 - Assessment of the Business Case
 - Presentation of the Business Case in the draft Budget Brief

5.6.2 Gate #6 – Capital Budget Gate

5.6.2.1 Description

- Purpose
 - To decide whether to recommend to the Proponent that the proposed project be included in the Annual Capital Budgets (i.e., the first year of the Business Plan)
- Requirements
 - A Business Case that is supportive of continued project development, either as a Saudi Aramco project or as a third-party project, fully documented
 - Fully defined Business Objective (i.e., the project's purpose in terms of Saudi Aramco's Strategic Direction and Business Plan objectives)
 - Comprehensive description of the anticipated operating environment in which the stated Business Objective would be achieved (i.e., the environment at the Kingdom level, the Saudi Aramco level, the Operating System level and the Operating Plant level)
 - For alternatives which would be implemented by Saudi Aramco
 - A Capital Budget Cost Estimate
 - An assessment of the extent to which the stated Business Objective would be achieved
 - Completed Capital Budget economic evaluation, commensurate with the importance of the proposed project (e.g., capital investment, Net Benefits) and the decision to include the proposed project in the Annual Capital Budgets:
 - Quantification of the Capital Budget Cost Estimate and the estimates of the total life cycle costs in terms that provide additional perspective about the reasonableness of the project costs (e.g., unit costs, such as \$/beneficial employee, \$/square meter, \$/BBL, \$/MMBTU)
 - A comparison of the quantified Net Benefits with the project's estimated total life cycle costs (i.e., initial capital investment plus subsequent life cycle costs)
 - An estimate of the value which would have to be attributed to the qualitative Net Benefits to achieve the established company discount rate
 - A supplemental analysis, commensurate with the importance of the proposed project (e.g., capital investment, Net Benefits), to assess the robustness of the project's justification and to provide Management additional perspective. This assessment may include:
 - * An assessment of the sensitivity of project justification to changes in the major project parameters
 - * A more in-depth probabilistic analysis of the major project parameters
 - * A assessment of the quantifiable and qualitative Net Benefits attributable to potential opportunities, which may be realized if the proposed project is implemented
 - Conclusion regarding the Saudi Aramco alternative with the best Business Case

- For alternatives which would be implemented by a third party
 - Estimates of the lease payments, together with an assessment of certainty and reasonableness
 - An assessment of the extent to which the stated Business Objective would be achieved
 - Completed Capital Budget economic evaluation:
 - Quantification of the total life cycle costs in terms that provide additional perspective about the reasonableness of the project costs (e.g., unit costs, such as \$/beneficial employee, \$/square meter, \$/BBL, \$/MMBTU)
 - A comparison of the quantified Net Benefits with the alternative's estimated total life cycle costs (i.e., initial capital investment plus subsequent life cycle costs)
 - An estimate of the value which would have to be attributed to the qualitative Net Benefits to achieve the established company discount rate
 - An assessment of the sensitivity of the alternative's economics to a change in the each of the major evaluation parameters
 - Conclusion regarding the third-party alternative with the best Business Case
- Recommendation regarding the alternative to be further developed
- A complete review of the economic evaluation bases agreed by the Business Analysis Department (e.g., the bases for valuing the expected Net Benefits and estimating the expected life cycle costs)
- An assessment of the impact of the project scope not supported by FPD on the Business Case for Management's consideration, documented
- Reviews of the conclusions and recommendations with:
 - FPD Coordinators, with participation of FPD's Advisory Council
 - Proponent
 - Corporate Staff
- A completed Budget Brief
- All work products and underlying analysis completed during the Capital Budget Economic Evaluation Phase (i.e., the information required for Gates #6) formally archived
- Decisions/Actions
 - If the Business Case is supportive of continued project development, then FPD recommends to the Proponent that the proposed project be included in the Annual Capital Budgets
 - Otherwise, FPD:
 - Identifies and evaluates more cost effective alternatives, with assistance from the Proponent, or
 - Recommends to the Proponent that the project be cancelled (or perhaps deferred, if circumstances warrant deferral)

- Documents its Business Case assessment in an issue sheet for Management's consideration, if the Proponent specifically requests that the project be included in the Annual Capital Budgets
- Responsibility/Approval Authority
 - FPD Manager

5.6.2 Gate #6 - Capital Budget Gate

5.6.2.2 Approval Form

BI No.:	BI Title:
Project Location:	

Proponent	Facilities Planning Department (FPD)
Business Line:	Division/Group:
Administrative Area:	Coordinator:
Department:	Work Director:
Proponent Contact	FPD Planner
Name:	Name:
Tel. No.:	Tel. No.:
Email:	Email:

Gate Requirements	Satisfied ⁽¹⁾	Comments ⁽²⁾
● Business Case supportive of continued project development, fully documented:		
– Fully defined Business Objective		
– Fully described operating environment		
– Capital Budget economic evaluation		
– Explanation of agreed evaluation bases		
● Assessment of the project scope <u>not</u> supported by FPD on the Business Case		
● Reviews of FPD's assessments with Proponent and Corporate Staff		
● Completed Budget Brief		
● All Gate #6 work products and underlying analysis formally archived		

Decision/Action: ⁽³⁾
--

Approval Authority	
Name:	
Title: FPD Manager	
Signature	Date

Notes to Gate #6 Approval Form:

1. e.g., Yes, No, Partially
2. e.g., Summary explanation, Reference to an explanation, Location of archived information, Reason requirement is not applicable
3. i.e., If the Business Case is supportive of continued project development, based the approved Capital Budget Cost Estimate, recommend that the project be included in the Annual Capital Budgets. Otherwise, either identify and evaluate more cost effective alternatives, or recommend that the project be cancelled (or perhaps deferred if circumstances warrant deferral)

5.6.3 Gate #7 - DBSP Approval Gate

5.6.3.1 Description

- Purpose
 - To decide whether to seek approval of the DBSP
- Requirements
 - A Business Case that is supportive of continued project development, based on the Capital Budget Cost Estimate
 - Completion of all studies required to establish “what” is to be achieved by the project
 - A completed DBSP, which complies with SAEP-1350, Preparation and Revision Procedure. Notably, the completed DBSP shall fully document in a concise and clear manner.
 - The Business Objective of the project and the anticipated operating environment
 - In broad terms, the facilities to be provided to economically (i.e., cost effectively) achieve the stated Business Objectives in the anticipated operating environment (i.e., “what” is to be provided), more specifically:
 - The types of facilities
 - The corresponding facility design bases
 - * Technical design bases (i.e., the required capabilities for the proposed facility, as a whole, and individual scope elements)
 - * Economic evaluation bases (i.e., project specific economic evaluation bases to be used to further develop the proposed project scope during Project Proposal development)
 - Construction Agency’s understanding of the proposed project scope, and the underlying rationale
 - Documentation of project scope not supported by FPD, and the underlying rationale
 - All work products and underlying analysis completed during the Capital Budget Economic Evaluation Phase (i.e., the information required for Gates #7) formally archived
- Decisions/Actions
 - If the requirements are met, then FPD proceeds with obtaining approval of the DBSP.
 - Otherwise, FPD first corrects the outstanding deficiencies before obtaining approval of the DBSP.
- Responsibility/Approval Authority
 - FPD Coordinator, with participation of FPD’s Advisory Council

5.6.3 Gate #7 - DBSP Approval Gate

5.6.3.2 Approval Form

BI No.:	BI Title:
Project Location:	

Proponent	Facilities Planning Department (FPD)
Business Line:	Division/Group:
Administrative Area:	Coordinator:
Department:	Work Director:
Proponent Contact	FPD Planner
Name:	Name:
Tel. No.:	Tel. No.:
Email:	Email:

Gate Requirements	Satisfied ⁽¹⁾	Comments ⁽²⁾
• Business Case supportive of continued project development		
• Completion of all studies required to establish “what” is to be achieved by the project		
• A completed DBSP, which complies with SAEP-1350, DBSP Procedure		
• Construction Agency’s understanding of the project scope, and the underlying rationale		
• Documentation of the project scope <u>not</u> supported by FPD, and the underlying rationale		
• All Gate #7 work products and underlying analysis formally archived		

Decision/Action: ⁽³⁾
--

Approval Authority	
Name:	
Title: FPD Coordinator	Division:
Signature	Date

Notes to Gate #7 Approval Form:

1. e.g., Yes, No, Partially
2. e.g., Summary explanation, Reference to an explanation, Location of archived information, Reason requirement is not applicable
3. i.e., If the requirements are met, proceed with obtaining approval of the DBSP. Otherwise, correct the outstanding deficiencies before obtaining approval of the DBSP.

5.6.4 Gate #8 – Project Proposal Start Gate

5.6.4.1 Description

- Purpose
 - To decide whether to initiate the Project Proposal
- Requirements
 - Approved DBSP
 - Completed Budgetary Project Scope Definition
 - Established Project Management Team
 - Completed Abbreviated Project Execution Plan
 - All work products and underlying analysis completed during the Capital Budget Economic Evaluation Phase (i.e., the information required for Gates #8) formally archived
- Decisions/Actions
 - If the requirements are met, then the Construction Agency initiates the Project Proposal.
 - Otherwise, the Construction Agency first corrects the outstanding deficiencies before initiating the Project Proposal.
- Responsibility/Approval Authority
 - Construction Agency Manager

5.6.4 Gate #8 – Project Proposal Start Gate

5.6.4.2 Approval Form

BI No.:	BI Title:
Project Location:	

Proponent	Construction Agency
Business Line:	Administrative Area:
Administrative Area:	Department:
Department:	
Proponent Contact	Construction Agency Contact
Name:	Name:
Tel. No.:	Tel. No.:
Email:	Email:

Gate Requirements	Satisfied ⁽¹⁾	Comments ⁽²⁾
● Approved DBSP		
● Completed Budgetary Project Scope Definition		
● Established Project Management Team		
● Completed Abbreviated Project Execution Plan		
● All Gate #8 work products and underlying analysis formally archived		

Decision/Action: ⁽³⁾
--

Approval Authority	
Name:	
Title: Manager, Construction Agency	Construction Agency:
Signature	Date

Notes to Gate #8 Approval Form:

1. e.g., Yes, No, Partially
2. e.g., Summary explanation, Reference to an explanation, Location of archived information, Reason requirement is not applicable
3. i.e., If the requirements are met, initiate the Project Proposal. Otherwise, correct the outstanding deficiencies before initiating the Project Proposal

5. PROJECT PLANNING PROCESS

5.7 PROJECT PROPOSAL PHASE

5.7.1 Planning Guidelines

The primary purpose of Project Proposal Phase is to further define the proposed project's scope, consistent with the project's stated Business Objective and the anticipated operating environment, in sufficient detail to obtain an ER Cost Estimate from PS&CD. A completed Project Proposal is required to approve the Project Proposal Approval Gate.

- The Construction Agency initiates the Project Proposal.
- The Construction Agency delivers the DBSP and Budgetary Project Scope Definition to the engineering contractor charged with preparing the Project Proposal, for use as a basis for further developing the engineering design.
- The Construction Agency manages the Project Proposal engineering contractor's preliminary engineering (Project Proposal), consistent with the project scope described in the amended DBSP (i.e., the original DBSP plus the scope modifications during Project Proposal development, which are either agreed to by both FPD and the Proponent, or specifically requested by the Proponent).
- The Construction Agency ensures that the Project Proposal engineering contractor:
 - Completes the Project Proposal in accordance with SAEP-14, Project Proposal
 - Defines the proposed project's scope in sufficient detail to obtain an ER Cost Estimate
 - Fully documents this project scope in the Project Proposal
- For each proposed material modification to the project scope stipulated in the DBSP (generally as required by SAEP-14, Project Proposal):
 - Construction Agency
 - The Construction Agency describes the proposed scope modification, sufficient in detail to obtain a Capital Budget Cost Estimate, together with the underlying rationale.
 - The Construction Agency delivers this description to:
 - FPD
 - PS&CD
 - The Construction Agency either constructively works with PS&CD to develop a Capital Budget Cost Estimate or prepares the Capital Budget Cost Estimate for PS&CD's approval.
 - The Construction Agency seeks approval from FPD and the Proponent (at the Scope Modification Gate).

- PS&CD
 - PS&CD either prepares a Capital Budget Cost Estimate or approves the Capital Budget Cost Estimate prepared by the Construction Agency.
 - PS&CD delivers the Capital Budget Cost Estimate to FPD, with an explanation of the bases for the cost estimate (i.e., a complete breakdown of the cost estimate).
 - FPD
 - FPD assesses the extent to which the proposed project scope modification is consistent with the stated Business Objective.
 - FPD confirms with the Business Analysis Department, as required, the economic evaluation bases (e.g., the bases for valuing the Net Benefits and estimating the expected life cycle costs).
 - FPD performs an incremental economic evaluation, similar to that performed during the Capital Budget Economic Evaluation Phase, including:
 - Assessing the quantifiable and qualitative Net Benefits, considering the anticipated operating environment
 - Developing an estimate of the other life cycle costs
 - Quantifying the Capital Budget Cost Estimate and the estimates of the total life cycle costs in terms that provide additional perspective (e.g., unit costs)
 - Comparing the quantified Net Benefits with the estimate of the proposed scope modification's total life cycle costs (i.e., initial capital investment plus subsequent life cycle costs)
 - Estimating the value which would have to be attributed to the qualitative Net Benefits to achieve the established company discount rate (e.g., the difference between the Net Present Value of the initial capital expenditures and the Net Present Value of the quantified Net Benefits):
 - Total value
 - In terms that provide added perspective about the reasonableness of the qualitative Net Benefits (e.g., unit benefits)
 - Completing a supplemental analysis, commensurate with the importance of the proposed project (e.g., capital investment, Net Benefits), to assess the robustness of the proposed scope modification
 - FPD documents FPD's recommendation regarding the proposed scope modification, and the underlying rationale.
 - FPD reviews with the Proponent:
 - FPD's assessment of the Business Case for the proposed modification
 - FPD's recommendation regarding the proposed scope modification
 - to:
 - Ensure the Proponent understands the Business Case for the proposed project, and the extent to which the Business Case is supportive of proposed scope modification
 - Obtain confirmation of the project scope to be developed in the Project Proposal
 - FPD amends the DBSP to reflect changes in project scope supported by the Proponent.
-

- FPD documents the project scope modifications that FPD does not support.
- FPD formally archives the work products and underlying analysis completed during the Project Proposal Phase (i.e., the information required for Gates #9 and #10).
- Proponent
 - The Proponent reviews FPD's assessment of the proposed scope modification.
 - The Proponent confirms the project scope to be more fully developed in the Project Proposal.

5.7.2 Gate #9 – Project Scope Modification Gate

5.7.2.1 Description

- Purpose
 - To decide whether to modify the project scope during Project Proposal development
 - Requirements
 - Construction Agency's
 - Complete description of the proposed scope modification, together with the underlying rationale
 - FPD's
 - Assessment of the extent to which the proposed project scope modification is consistent with the stated Business Objective, and Saudi Aramco's Strategic Direction and Business Plan Objectives
 - An incremental economic evaluation of the proposed scope modification, based on a Capital Budget Cost Estimate
 - Recommendation regarding the proposed scope modification, and the underlying rationale, documented
 - Review with the Proponent:
 - FPD's assessment of the Business Case for the proposed modification
 - FPD's recommendation regarding the proposed scope modification
 - Proponent's confirmation of the project scope to be more fully developed in the Project Proposal
 - All work products and underlying analysis completed during the Project Proposal Phase (i.e., the information required for Gates #9) formally archived
 - Decisions/Actions
 - If FPD and the Proponent both agree with the proposed scope modification, then FPD amends the DBSP to reflect the change in project scope.
 - If FPD and the Proponent both disagree with the proposed scope modification, then FPD and the Proponent jointly inform the Construction Agency not to include to proposed scope.
 - If FPD alone disagrees and the Proponent specifically requests the proposed scope modification, FPD
 - Amends the DBSP to reflect the change in project scope
 - Documents its disagreement and the underlying rationale
 - Formally advises the Proponent and the Proponent's Business Line that FPD does not support the proposed scope modification
 - Responsibility/Approval Authority
 - FPD Coordinator, with participation of FPD's Advisory Council
 - Manager, Operating Department
-

5.7.2 Gate #9 – Project Scope Modification Gate

5.7.2.2 Approval Form

BI No.:	BI Title:
Project Location:	

Proponent	Facilities Planning Department (FPD)
Business Line:	Division/Group:
Administrative Area:	Coordinator:
Department:	Work Director:
Proponent Contact	FPD Planner
Name:	Name:
Tel. No.:	Tel. No.:
Email:	Email:

Gate Requirements	Satisfied ⁽¹⁾	Comments ⁽²⁾
● Business Case supportive of modification		
● Construction Agency's description of the scope modification, including the impact on the project's on-stream date		
● FPD's		
– Assessment of the extent to which the proposed scope modification is consistent with the stated Business Objective		
– Incremental economic evaluation of the proposed scope modification		
– Documented recommendation regarding the proposed scope modification		
– Review of its assessment with Proponent		
● Proponent's		
– Confirmation of the project scope to be further developed during Project Proposal		
● All Gate#9 work products formally archived		

Decision/Action: ⁽³⁾
--

FPD Approval Authority	
Name:	
Title: FPD Coordinator	Division:
Signature	Date
Proponent Approval Authority	
Name:	
Title: Manager, Operating Department	Department:
Signature	Date

Notes to Gate #9 Approval Form:

1. e.g., Yes, No, Partially
2. e.g., Summary explanation, Reference to an explanation, Location of archives, Reason requirement not applicable
3. i.e., If FPD and the Proponent both agree with the proposed scope modification, then FPD amends the DBSP to reflect the change in project scope. If FPD and the Proponent both disagree with the proposed scope modification, then FPD and the Proponent jointly inform Construction Agency not to include to proposed scope. If FPD alone disagrees, FPD documents its disagreement, and the underlying rationale, and so advises the Proponent and Construction Agency.

5.7.3 Gate #10 – Project Proposal Approval Gate

5.7.3.1 Description

- Purpose
 - To decide whether to seek approval of the Project Proposal
- Requirements
 - A completed Project Proposal, which fully documents the project scope, consistent with the amended DBSP (i.e., original DBSP plus scope modifications agreed to by FPD during Project Proposal development)
 - Approval of each project scope modification
 - All work products and underlying analysis completed during the Project Proposal Phase (i.e., the information required for Gates #10) formally archived
- Decisions/Actions
 - If the requirements are met, then the Construction Agency proceeds with obtaining approval of the Project Proposal and the development of the ER Cost Estimates
 - Otherwise, Construction Agency first corrects the outstanding deficiencies before obtaining approval of the Project Proposal and the development of ER Cost Estimates
- Responsibility/Approval Authority
 - Construction Agency Manager (e.g., Project Management Manager)

5.7.3 Gate #10 - Project Proposal Approval Gate

5.7.3.2 Approval Form

BI No.:	BI Title:
Project Location:	

Proponent	Construction Agency
Business Line:	Administrative Area:
Administrative Area:	Department:
Department:	
Proponent Contact	Construction Agency Contact
Name:	Name:
Tel. No.:	Tel. No.:
Email:	Email:

Gate Requirements	Satisfied ⁽¹⁾	Comments ⁽²⁾
● A completed Project Proposal, which fully documents the project scope, consistent with the amended DBSP		
● Approval of each project scope modification		
● All Gate#10 work products formally archived		

Decision/Action: ⁽³⁾
--

Approval Authority	
Name	
Title: Manager, Construction Agency	Construction Agency:
Signature	Date

Notes to Gate #10 Approval Form:

1. e.g., Yes, No, Partially
2. e.g., Summary explanation, Reference to an explanation, Reason requirement is not applicable
3. i.e., If the requirements are met, proceed with obtaining approval of the Project Proposal and the development of ER Cost Estimates. Otherwise, first correct the outstanding deficiencies before obtaining approval of the Project Proposal and the development of ER Cost Estimates.

5. PROJECT PLANNING PROCESS

5.8 EXPENDITURE REQUEST APPROVAL PHASE

5.8.1 Planning Guidelines

The primary purpose of the ER Approval Phase is to finalize the Business Case development

- Finalize the Business Case development
 - Decide whether to recommend that the proposed project be presented to Management Committee for approval (at the Project ERA Gate, the eleventh gate and the third of the three primary gates)
 - Prepare the necessary documents for presentation to Management Committee for its consideration
-
- Construction Agency
 - The Construction Agency obtains approval of the Project Proposal.
 - The Construction Agency manages the development of ER Cost Estimate for the project's scope consistent with the amended DBSP.
 - The Construction Agency delivers ER Cost Estimates to PS&CD.
 - PS&CD
 - PS&CD reviews and confirms, in close coordination with Construction Agency, the ER Cost Estimates.
 - PS&CD prepares the ER Cost Estimate.
 - PS&CD delivers approved ER Cost Estimate to FPD, with an explanation of the bases for the cost estimate (i.e., a complete breakdown of the cost estimate).
 - FPD
 - FPD determines whether the Business Case is supportive of ER Approval, based on the ER Cost Estimate.
 - FPD finalizes the definition of the Business Objective (i.e., the project's purpose in terms of Saudi Aramco's Strategic Direction and Business Plan objectives).
 - FPD finalizes the description of the anticipated operating environment in which the stated Business Objective would be achieved (i.e., the environment at the Kingdom level, the Saudi Aramco level, the Operating System level and the Operating Plant level).
 - FPD confirms with the Business Analysis Department, as required, the economic evaluation bases (e.g., the bases for valuing the expected Net Benefits and estimating the expected life cycle costs).
-

- FPD completes a comprehensive economic evaluation:
 - FPD updates the project evaluation plan, as required to ensure that the analysis provides Saudi Aramco's Management sufficient information to make a reasonable business decision regarding ER Approval.
 - FPD expands the extent to which the Net Benefits are quantified and refines the corresponding estimates, commensurate with the importance of the proposed project (e.g., capital investment, Net Benefits) and the ER Approval decision.
 - FPD refines estimates of the other life cycle costs, as required to obtain an accuracy comparable to the accuracy of an ER Cost Estimate, including:
 - The annual operating and maintenance costs. This estimate shall be based on estimates of the additional manpower, generally by nationality and grade code, utility consumption and invoices. Notably, the manpower cost estimate shall be based on fully burdened labor rates to account for the Company's overhead costs directly related to its employees.
 - The annual sustaining capital investments (e.g., maintenance capital). One acceptable approach for estimating these investments is to apply a percentage (generally 1 – 2%) to the ER Cost Estimate.
 - The cost of utilizing existing spare capacity. This estimate shall be based on the total cost of providing additional capacity (e.g., initial capital investment, annual operating and maintenance costs), adjusted to reflect the period of time during which it can be conclusively demonstrated there is no likely use for the existing spare capacity.
 - FPD refines estimates of the total life cycle costs, including the ER Cost Estimate.
 - FPD quantifies the ER Cost Estimate and the estimates of the total life cycle costs in terms that provide additional perspective (e.g., unit cost, such as \$/beneficial employee and \$/square meter).
 - FPD compares of the quantified Net Benefits with the estimate of the proposed project's total life cycle costs (e.g., NPV at the established company discount rate, DCFROR). Generally, it will be useful to determine the NPV over a range of discount rates to assess the sensitivity of the economics.
 - FPD refines the value which would have to be attributed to the qualitative Net Benefits to achieve the established company discount rate (e.g., the difference between the Net Present Value of the initial capital expenditures and the Net Present Value of the quantified Net Benefits):
 - Total value
 - In terms that provide added perspective about the reasonableness of the qualitative Net Benefits (e.g., unit benefits), to the extent reasonably possible

- FPD expands the supplemental analysis, commensurate with the importance of the proposed project (e.g., capital investment, Net Benefits) and the ER Approval decision, to assess the robustness of the project's justification and to provide Management additional perspective, examples of which include:
 - An assessment of the sensitivity of the alternative's economics to a change in the each of the major evaluation parameters (e.g., elements of the life cycle costs and Net Benefits) by:
 - * Assuming a change, commensurate with the accuracy of the estimate
 - * Calculating the extent (e.g., %) to which the initial estimate of a particular parameter would have to change to achieve the established company discount rate (i.e., economic hurdle rate)

The results of this sensitivity analysis should be presented in order of descending significance (i.e., impact on the Business Case) to provide additional perspective on which evaluation parameters warrant more consideration. A "Tornado Diagram" is a useful means of graphically presenting the results.

 - A more in-depth probabilistic analysis of the major evaluation parameters, in which a range of values is assumed for one or more of the parameters, along with estimates of the corresponding probabilities (i.e., a Monte Carlo analysis) to provide Management a more definitive indication of the expected project economics, and the extents of the downside risk and upside potential
 - An assessment of the quantifiable and qualitative Net Benefits attributable to one or more potential opportunities, which may be realized if the proposed project is implemented, along with an estimate of the likelihood of the opportunity (i.e., a Real Option analysis)
 - FPD finalizes the assessment of the relative uncertainties inherent in the estimates of the expected life cycle costs and the Net Benefits of the viable alternatives.
 - FPD determines whether the Business Case is supportive of ER Approval.
 - FPD documents the Business Case in a draft ER Brief and BISI.
 - FPD reviews with the Proponent the updated assessment of:
 - The Business Case for the project scope described in the Project Proposal
 - The presentation of the Business Case in the draft ER Brief and BISI
- to:
- Ensure the Proponent understands the Business Case for the proposed project, and the extent to which the Business Case is supportive of ER Approval
 - Consider reductions in project scope:
 - To bolster the Business Case
 - If required to obtain a Business Case that is supportive of ER Approval
 - Obtain confirmation of the project scope to be presented to Management for approval
-

- Identify means of bolstering the presentation of the Business Case in the ER Brief and BISI
 - FPD reviews with Corporate Staff the updated assessment of:
 - The Business Case for the project scope described in the Project Proposal
 - The presentation of the Business Case in the Budget Brief
 - to:
 - Ensure Corporate Staff understands the Business Case for the proposed project, and the extent to which the Business Case is supportive of ER Approval
 - Identify means of bolstering the presentation of the Business Case in the ER Brief and BISI
 - FPD completes the assessment of the Business Case by incorporating comments from Corporate Staff and the Proponent comments which bolster the assessment.
 - FPD completes the ER Brief and BISI by incorporating comments which bolster the presentation of the Business Case.
 - FPD formally delivers the completed ER Brief and BISI to the Proponent for Business Line Head approval.
 - FPD formally archives the work products and underlying analysis completed during the ER Approval Phase (i.e., the information required for Gate #11).
- Proponent
 - The Proponent reviews and comments on FPD's:
 - Final assessment of the Business Case
 - Draft ER Brief and BISI
 - The Proponent considers reductions in project scope, particularly if required to obtain a Business Case which is supportive of ER Approval.
 - The Proponent confirms the project scope to be presented to Management for approval.
 - Corporate Staff
 - Corporate Staff confirms the economic evaluation bases (primarily Business Analysis Department).
 - Corporate Staff reviews and comments on FPD's:
 - Final assessment of the Business Case
 - Draft ER Brief and BISI
 - Corporate Staff documents for the CEO's review any outstanding issues and concerns.
 - Business Line Head approves the ER Brief and BISI.
-

5.8.2 Gate #11 - Project ERA Gate

5.8.2.1 Description

- Purpose
 - To decide whether to recommend that the proposed project be presented to Management Committee for approval
 - Requirements
 - A Business Case that is supportive of continued project development, based on the ER Cost Estimate, fully documented in the ER Brief and BISI
 - Fully defined Business Objective (i.e., the project's purpose in terms of Saudi Aramco's Strategic Direction and Business Plan objectives)
 - Comprehensive description of the anticipated operating environment (i.e., the environment at the Kingdom level, the Saudi Aramco level, the Operating System level and the Operating Plant level) in which the stated Business Objective would be achieved
 - Completed ER economic evaluation
 - The ER Cost Estimate
 - Estimates of the other life cycle costs, comparable in accuracy to an ER Cost Estimate
 - Quantification of the ER Cost Estimate and the estimates of the total life cycle costs in terms that provide additional perspective (e.g., unit cost, such as \$/beneficial employee and \$/square meter)
 - Net Benefits, quantified to an extent commensurate with the importance of the ER Approval decision
 - Comparison of the quantified Net Benefits with the proposed project's total life cycle costs (i.e., initial capital investment plus subsequent life cycle costs)
 - Supplemental analysis, commensurate with the importance of the proposed project (e.g., capital investment, Net Benefits) and the ER Approval decision, to assess the robustness of the project's justification and to provide Management additional perspective
 - An assessment of the sensitivity of project justification to changes in the major project parameters:
 - A more in-depth probabilistic analysis of the major project parameters
 - An assessment of the quantifiable and qualitative Net Benefits attributable to potential opportunities, which may be realized if the proposed project is implemented
 - A complete review of the economic evaluation bases agreed by the Business Analysis Department (e.g., the bases for valuing the expected Net Benefits and estimating the expected life cycle costs)
 - Conclusions and recommendations, and the underlying rationale
 - Completed ER Brief and BISI
 - Approved ER Cost Estimate
-

- All work products and underlying analysis completed during the ER Approval Phase (i.e., the information required for Gate #11) formally archived
- Decisions/Actions
 - If the Business Case is supportive of project implementation, based on the ER Cost Estimate, then FPD recommends to the Proponent that the proposed project be presented to Management Committee for approval
 - Otherwise, FPD
 - Recommends to the Proponent that the project be either:
 - Deferred, if circumstances warrant deferral (e.g., consideration of more cost effective alternatives, anticipated increase in Net Benefits), or
 - Cancelled
 - Documents its Business Case assessment in an issue sheet for Management's consideration, if the Proponent specifically requests that the project be presented to Management Committee for approval
- Responsibility/Approval Authority
 - FPD Manager

5.8.2 Gate #11 - Project ERA Gate

5.8.2.2 Approval Form

BI No.:	BI Title:
Project Location:	

Proponent	Facilities Planning Department (FPD)
Business Line:	Division/Group:
Administrative Area:	Coordinator:
Department:	Work Director:
Proponent Contact	FPD Planner
Name:	Name:
Tel. No.:	Tel. No.:
Email:	Email:

Gate Requirements	Satisfied ⁽¹⁾	Comments ⁽²⁾
● Business Case supportive of project implementation, based on approved ER Cost Estimate, fully documented:		
– Fully defined Business Objective		
– Comprehensive description of operating environment		
– ER economic evaluation		
– Conclusion and recommendations		
● Explanation of agreed evaluation bases		
● Reviews of Business Case		
● Completed ER Brief and BISI		
● All Gate #11 work products and underlying analysis formally archived		

Decision/Action: ⁽³⁾
--

Approval Authority	
Name:	
Title: FPD Manager	
Signature	Date

Notes to Gate #11 Approval Form:

1. e.g., Yes, No, Partially
2. e.g., Summary explanation, Reference to an explanation, Location of archived information, Reason requirement is not applicable
3. i.e., If the Business Case is supportive of project implementation, then FPD recommend to the Proponent that the proposed project be presented to Management Committee for approval. Otherwise, FPD recommend to the Proponent that the project be either deferred, if circumstances warrant deferral (e.g., consideration of more cost effective alternatives, anticipated increase in Net Benefits), or cancelled.

Revision Summary

30 November 2005 New Saudi Aramco Engineering Procedure.

ATTACHMENT A

DEFINITIONS

The following definitions clarify the terms used in these Project Planning Guidelines:

<u>TERM</u>	<u>DEFINITION</u>
Budget Item	A discrete project that has been defined and evaluated to the extent required for Management to include it in the Business Plan and commit additional resources to further develop the information required by Management, and if deemed appropriate, the Board of Directors, to make reasonable business decisions regarding the continued development of the project.
Budgetary Project Scope Definition	A preliminary description of the facilities that might actually be built (i.e., “how” the required facility capabilities could be achieved), defined in sufficient detail to obtain a Capital Budget Cost Estimate, when combined with the information provided in the DBSP
Business Case	The information required to make reasonable business decisions regarding a proposed capital project, including its scope, throughout its development. For purposes of the DBSP, it consists of: – A clearly defined Business Objective, in terms of Saudi Aramco’s Strategic Direction and its Business Plan objectives – A comprehensive description of the anticipated operating environment in which the stated Business Objective would be achieved (at the Kingdom level, the Saudi Aramco level, the Operating System level, and the Operating Plant level) – A description of the proposed project, itself – An explanation of the business rationale (e.g., economics) of the proposed project. In the DBSP, this explanation shall generally be limited to an explanation of the anticipated Net Benefits.
Business Line	Saudi Aramco’s basic organization structure. Currently, there are five business lines.

<u>TERM</u>	<u>DEFINITION</u>
Business Objective	The purpose (i.e., what is to be achieved) of the proposed project, broadly stated in terms of Saudi Aramco's Strategic Direction and Business Plan objectives, as opposed to operational considerations at the operating facility level and/or operating system level)
Capital Budget Cost Estimate	An estimate of the initial capital investment, deemed to have an accuracy of +/-40%
Conceptual Cost Estimate	An estimate of the initial capital investment, deemed to have an accuracy of +/-70%
Construction Agency	The organization responsible for design, procurement and construction of facilities covered by an individual budget item (e.g., a department within the Project Management Administrative Area).
Corporate Staff	Representatives from the Business Analysis Department and the Capital Program Forecasting & Analysis Division of the Program, Forecasts & Analysis Department (Finance)
DBSP	Design Basis Scoping Paper
EPD	Environmental Protection Department
ER Cost Estimate	A definitive estimate of the initial capital investment, deemed to have an accuracy of +/-10%, prepared in support of the ER Brief and BISI. Project Support & Controls Department (PS & CD) is primarily responsible for preparing this estimate, with assistance from the Construction Agency, and ensuring that the ER Cost Estimate satisfies all Company standards for format and quality. If the ER Cost Estimate is prepared by the Construction Agency, it must be reviewed and endorsed by PS&CD.
ERA	Expenditure Request Approval
FPD	Facilities Planning Department
Net Benefits	The benefits after taking into account other actions which could contribute to partially or wholly achieving the project's stated Business Objective (i.e., other mitigating actions). For example, the Net Benefit of a project which would increase the reliability of a particular facility would take into account the capabilities of other related facilities to also contribute to achieving the stated Business Objective.

<u>TERM</u>	<u>DEFINITION</u>
Operating Plant	A facility which is capable of contributing to achieving a Business Objective on a stand-alone basis
Operating System	A group of related facilities that contribute to achieving a common Business Objective
Project Proposal	A document prepared by the Construction Agency which defines the actual facilities to be built, in sufficient detail to obtain an ER Cost Estimate from PS&CD. The Project Proposal scope also provides the baseline for measuring Project Change Requests (PCRs) after funding approval.
Proponent	Organization responsible for the operations of, or owner of, facilities covered by the DBSP. Normally, this will be an Administrative Area within a Business Line.
PS&CD	Project Support & Controls Department
Study Cost Estimate	An estimate of the initial capital investment, deemed to have an accuracy of +/-50%

ATTACHMENT B

DEVELOPMENT APPROACH

The first two tasks completed to establish the Project Planning Guidelines (Guidelines) were:

- Define the objectives of the Guidelines
- Define the operating environment in which the objectives would be achieved

The actions required to achieve the stated objectives were then broadly defined. This broad definition provided the framework in which the specific analysis was completed.

OBJECTIVES

The primary objectives of these Guidelines are to:

- Ensure that each capital project included in the Business Plan and Annual Capital Budgets is consistent with Saudi Aramco's Strategic Direction and Business Plan Objectives
- Improve productivity of the organizations involved in the capital project development process, by ensuring that the capital planning process is effectively implemented and that decisions regarding capital projects are made as early in the planning process as reasonably possible.

PRESENT OPERATING ENVIRONMENT

The present operating environment in which capital projects are developed has the following attributes:

- The responsibility and authority for developing each individual capital project passes sequentially from one organization to another:
 - Proponent
 - Generally initiates the capital project
 - Provides basic information regarding the conceptual scope and purpose of the project
 - Facilities Planning
 - Develops, documents and presents the Business Case to Saudi Aramco's Management
 - Establishes and documents in the DBSP the facilities to be provided to cost effectively achieve the stated Business Objective in the anticipated operating environment (i.e., "what" is to be provided by the proposed project)
 - Develops sufficient project scope to sequentially obtain a Conceptual Cost Estimate, a Study Cost Estimate and a Capital Budget Cost Estimate

- Construction Agency (e.g., Project Management)
 - Works with other organizations, notably Contracting, to engage an engineering contractor to prepare the Project Proposal, or more specifically the preliminary engineering needed to obtain an ER Cost Estimate of the initial capital investment
 - Manages the preliminary engineering to obtain sufficient scope to obtain an ER Cost Estimate
- Facilities Planning
 - Develops the ER Brief and BISI for presentation to Management Committee and subsequently to either the Board of Directors or EXCOM
- Proponents are not presently held accountable for their capital investments
- Experience amongst the employees responsible for the development of capital projects varies considerably, and is inadequate in some instances
- The project scope definition required to obtain capital investment estimates at three stages in the development process was recently increased to better ensure that the presently stipulated accuracies are attained:
 - Conceptual Cost Estimate, at the time the capital project is first added to the Business Plan
 - Study Cost Estimate, at the time alternatives for achieving the project’s stated Business Objective are being evaluated
 - Capital Budget Cost Estimate, at the time the project is considered for inclusion in the Annual Capital Budgets

REQUIRED ACTIONS

To achieve these objectives, and thereby strengthen Saudi Aramco’s capital project development process:

- Decisions to commit additional resources to the development of a proposed capital project must be made in a timely manner throughout the development process. The number of decisions which must be explicitly stipulated is primarily dependent on the operating environment in which the stated objectives would be achieved.
- The information required at these decision-making “gates”, more specifically the extent to which the business case for the proposed project, must be clearly defined and documented.
- An individual at the appropriate level in the responsible organization must be held accountable for making each decision.
- The specific tasks required to develop this information must be clearly documented.

ASSESSMENT OF THE PRESENT PLANNING PROCESS

The first specific task was to evaluate the present planning process, paying particular attention to the decisions that are made and the bases for these decisions. This analysis generally concluded:

- Project development often progresses from one planning phase to another without effectively completing the previous phase, or reassessing the Business Case for the project. In other words, the existing decision-making gates are insufficient. There are too few of them, given the present operating environment.
- The gates that do exist are not consistently and effectively applied, in large part because the requirements are not well defined and documented.

As a result, the present planning process does not consistently achieve the objectives.

ATTACHMENT C

DEFINITION OF A BUSINESS CASE

The Business Case consists of the information required to make reasonable business decisions regarding a proposed capital project throughout its development, culminating with the decision to seek Board approval:

- A clear definition of the Business Objectives (i.e., the project's purpose in terms of Saudi Aramco's Strategic Direction and Business Plan objectives)
- A comprehensive description of the anticipated operating environment in which the stated objectives would be achieved (i.e., the environment at the Kingdom level, the Saudi Aramco level, the Operating System level, and the Operating Plant level)
- A comprehensive description of the quantifiable and qualitative Net Benefits that would likely be realized, considering the anticipated operating environment
- A description of the project
 - The project scope
 - The extent to which the stated Business Objective would be achieved
 - The Net Benefits which would likely be realized, considering the anticipated operating environment, quantified to the extent reasonably possible
 - The expected life cycle costs (e.g., initial capital investments, plus subsequent life cycle costs)
 - Impact on Saudi Aramco's manpower and Net Direct Expenditures (NDEs)
- A description of the economic evaluation of the proposed project

Note that the scope of the economic evaluation will vary from project to project, depending on the importance of the proposed project (e.g., the initial capital investment) and the extent to which the Net Benefits can be reasonably quantified.

 - A description of the economic evaluation bases agreed by the Business Analysis Department (e.g., the bases for valuing the expected Net Benefits and estimating the expected life cycle costs)
 - Economic evaluation of proposed project
 - An assessment of the expected costs (e.g., initial investment, life cycle costs) to provide additional perspective regarding the reasonableness of the proposed project
 - Quantification of unit costs (e.g., \$/SM, \$/beneficiary)
 - Comparisons of the proposed project's costs to the costs of like/similar facilities
 - A comparison of the quantified expected Net Benefits with the expected life cycle costs (e.g., NPV at the established company discount rate, DCFROR)
 - An assessment of the value which must be attributed to the qualitative Net Benefits (i.e., the benefits which can not be reasonably quantified) to achieve the established company discount rate

- An assessment of the upside potential and downside risk, e.g.,
 - Simple sensitivities to changes in the major project parameters
 - A more in-depth probabilistic analysis of the major project parameters
- Economic evaluation to establish each major element of the proposed project scope that needs to be defined in the DBSP
 - A list of viable alternatives, which would materially achieve the stated Business Objective
 - A description of each alternative
 - The alternative's scope
 - The extent to which the stated Business Objective would likely be achieved
 - The Net Benefits which would likely be realized, considering the anticipated operating environment, quantified to the extent reasonably possible
 - The expected life cycle costs (e.g., initial capital investments, plus subsequent life cycle costs)
 - A review of the incremental economic evaluation of the viable alternatives performed to determine which of the viable alternatives most strengthens the Business Case
- Economic evaluation to establish which of the viable alternatives to further develop for consideration by Management
 - A list of viable alternatives, which would materially achieve the stated Business Objective
 - A description of each alternative
 - The alternative's scope, including the underlying rationale (i.e., economic evaluations of major scope elements)
 - The extent to which the stated Business Objective would likely be achieved
 - The Net Benefits which would likely be realized, considering the anticipated operating environment, quantified to the extent reasonably possible
 - The expected life cycle costs (e.g., initial capital investments, plus subsequent life cycle costs)
 - A review of the incremental economic evaluation of the viable alternatives performed to determine which of the viable alternatives most strengthens the Business Case
 - An assessment of the relative uncertainties inherent in the estimates of the expected life cycle costs and Net Benefits for each of the viable alternatives



















