# Cost Management and Performance Measurements for Petroleum Upstream Industry- Part D

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**Abstract**

**Cost management and Balanced Scorecard is not appropriate only for manufacturing and commercial industry; cost management is applied in upstream industry such as Petroleum exploration, development and production cost. Many Petroleum Companies don't pay more attention to cost control or balanced scorecard and especially during exploration phase or small companies except if Companies face financial dilemma, declining production or if they see they cannot meet their planned schedule of Capital program that lead them to not meet their obligation, commitments and required return, therefore, they start considering cost reduction or control. This paper provide management accountant, cost controller, financial controller, financial manager, internal auditor and cost recovery auditor with brief of cost control, how cost is analyzed and managed and performance is measured in Petroleum upstream industry.**

*Keywords: Cost Management and analysis for petroleum exploration, Optimizing production, exploration and development programs, Project Cost Management and Analysis for Petroleum Upstream Industry, Procurement Cost Management, Drilling Cost Management, Production Cost Management, G&A Cost reduction.*

In this paper we cover part of Enterprise Risk Management in Oil and Gas Companies through Balanced Scorecard.

## 9) Balanced Scorecard (BSC)

In the light of business developments of petroleum upstream industry, the integrated Enterprise Risk Management ERM can be achieved through main tools such as Strategic planning, Budgeting and Corporate Governance, and balanced scorecard.

Budgeting was covered in brief in the previous papers and it may occur to minds of many accountants and non-accountants that integrating ERM and measuring performance through balanced scorecard process is more appropriate to manufacturing sector. And some of you may wonder how the Balanced Scorecard can be suitable for Petroleum Upstream Industry. To answer this question, we need to know what is the balanced scorecard first.

Balanced scorecard is management system that enables the Company to track and achieve their main strategies and objectives through many perspectives depends on the industry that Company is operating in.

The Perspectives that we cover in this paper for Petroleum Upstream Industry are as follow:

- Financial perspective that track Company financial requirements and measure its financial performance.
- Internal Process that measures the whole process requirements from start point to sell commodities to customers
- Learning and Growth assesses how Company educate their employees
- Social Responsibilities perspective determines how the Company feel responsibilities toward the community and track the HSE requirements and measure Company's contribution and responsive actions of the social responsibilities

We previously discussed about those four perspectives in brief. We removed customer perspective because, we believe that customer perspective may not be an important under the upstream industry due to uncontrollable for the quality of extracting oil and gas from ground, and reaching the final product to the best quality such as downstream industry.

If Company is ignoring one of those perspectives is like sitting on four-leg chair that has one broken leg.

How Balanced Scorecard can be applied in upstream Industry? and how those four perspectives can be measured, analyzed, and improved together continuously in petroleum exploration and production companies?

Firstly, we need to know if the balanced scorecard can be important for such industry, we need to answer the following few questions.

- Can the profitability of Oil and Gas commodity be improved?
- Can we improve the processes of exploring and producing Oil and gas?
- Are employees are motivated? And Are the level of our employees' skills, knowledge and experience need to be improved?

If your answer of the above questions are "Yes", that means, you need to have balanced scorecard tools that should be designed either by functional departments, whole Company, project/program or by all levels. If your answer is "No", it means you can not apply such tool and you will think it is useless to apply it. Even if your answer is "No", why balanced scorecard, corporate governance and performance measurements disclosures are required in

Management Discussion & Analysis (MD&A) requirements.

## 10) Cost Management and Key Performance Indicators by function

Cost management shall be performed by doing the following steps.

- Specify list of activities or processes
- Determine the cost of each activity or processes
- Select Critical Cost to be managed, controlled or cut.
- Search and think about the associated risks and results of cost cut or cost management.
- Identify Cost Drivers.
- Arrange the cost per their priority (From highest costs to lowest cost)
- Develop Models of "What costs should be" by using Cost Worksheets.
- Working with Technical staff and other department to justify the differences between "Should cost" and the "actual cost" and discuss with them if there is any human errors during running seismic acquisition, processing and interpretation, drilling, producing, marketing and selling, financing or general management support.

The following are examples of cost by management function.

### 10.1) Exploration and Drilling managements

Drilling and Exploration Management should try to not pay much more attention that exceed the reasonable of boundries to unnecessary activities. Health, Safety and Security is important but Company shall not focus on Corporate Social Responsibilities on the account of Company's financial performance, and its employees' learning and growth, Company managements should balance between several four perspectives.

If Company faces liquidity and profitability problem in short and middle term, Company should:

1- reduce its standards of HSES to reasonable boundaries to reduce their associated costs. Because the associated costs sacrifice the profit in the short and middle-term.

2- they should replace high costs of ineffective and inefficient staff (most likely foreign staff) with low cost of high efficient and effective staff (who can be local staff). In other word, Training lower cost employee to become master in their area and replacing expatriates because the middle payment of each expatriate could exceed US$ 35,000 per month. However, local staff in the Middle East or third world countries could not exceed US$ 6000 in average for each. And average costs of training for each efficient local staff to become master could not exceed US$300,000.

3- Decrease all employees' welfare such as traveling in business or first class, living in very luxury palace.

4- Developing payment system to management to be based on their performance of finding proved reserves with low costs and less risk rather than payment based on HSE risk reduction only because finding Oil at low costs is the primary objective of Oil and Gas organization that seek for profit or currently face profitability problem.

5- Mitigating investment from high risks countries to lower risk countries.

6- Investigate and perform due diligence care about the operator partner, whether operator has high experienced technical engineer and the Company's performance is high technically or not in order to maintain joint venture interesting or cease investment by selling their working interests or entering Farmin/farmout agreement with efficient and effective operator to take the operation of the license.

The Departmental KPIs that can be measured to ensure if the drilling and exploration department is in alliance with Company's strategy planning are as follow.

- Number and volume of proved formations correctly assessed to total formations were under study.
- Area of horizon studied during the period
- Number of dry wells to total wells drilled
- Number of lost circulations, junk, stuck pipe to total wells drilled.
- Cost of drilling problems to total drilling costs
- Total dry well costs to total investment in drilling.
- Number of Lessons not learnt from previous well.
- Number of litigations raised due to tender process or contract wordings.
- Total number and amounts of urgent services or items requested during the year.
- Total amount of variation exception payments.
- Total amounts paid for over specification or request of services or equipments or for unnecessary services and equipments.
- Drilling and G&G project cost and schedule variance and indices
- The expected monetary value of well, reservoirs, total productive block.

### 10.2) Procurement and Logistics management

Procurement Department can manage costs by reducing the following costs via good negotiation and not trapping themselves unknowingly with unnecessary specifications.

- Materials cost
- Procurement Labor Cost
- Transportation Cost
- Storage Cost
- Risk of procurement
    - Obsolescence
    - Missing or damages during transportation and in-transit
    - Stealth

The Departmental KPIs that can be measured to ensure if the department is in alliance with Company's strategical goals

- Lead time
    - Time taken to order the item from supplier
    - Time taken to received the item to the requestor
    - Materials damage Issues solved
- Inventory Shortage/overage rate
- Materials & Logistics Cost to Revenue
- Number of incidents or injuries in warehouse
- Stock hold costs to total exploration costs
- Number and amount of finalizing the governmental formalities for importing/exporting/consuming materials and services.
- Total number and amounts of urgent services or items requested during the year

### 10.3) Marketing and Sales management

Marketing and sales costs are not too high like CAPEX and production costs, but it must be managed as follow:

1- If the Company has depended on single or few customer(s), and has ability to produce and sell more. It shall find new customers, and encourage marketing staff by incentives and good payment to find new customers.
2- If the Company has depended on single or few customer(s), and has faced declining production and sales, it is preferred to reduce marketing and sales costs until Company find and produced from new reservoirs.
3- The company shall have Customers Analysis, and try to change their contract terms based on the results of analysis.

## 10.4) Finance and accounting management

If the Company is small in comparison to its competitors or other peers in the industry, faced production declining, commodity price declining, has problem for financing future Capital program, Company may reduce G&A costs and doing the following:

1) Simplify its organizational structure remove the mid level management and may costs Company too much as Corporate overhead or expatriate costs.
2) Reduce the employees' welfare
3) Review, update and change payment system to executives to be more relevant to their actual and physical performance.
4) Merge the job duties if they can be done by one person but Company shall be care of removing unnecessary position or merge position, Company shall select the most efficient and effective person to occupy the merged positions.
5) Company shall review the level of salaries for each position and comparing to their duties, performance and potential skills they have.
6) Company shall reduce and cut costs that are unnecessary such as villas costs of expatriates and there are no expatriate have visited the villas for one year and there is no probability of residing these villas by expatriates in next years, then reducing the high salaries of ineffective and efficient individual, merge positions, and the last step is employment reduction or layoff.

The Departmental KPIs that can be measured to ensure if the department is in alliance with Company's strategical goals

- Number of cancelled payments to total payments
- Number and amounts of debit/credit notes to total payments
- Number and amount of invoices paid after due date to total payments
- Amount of lost from not obtaining cash discount.
- Number and amount of invoices paid within due date to total payments
- Number and amount of unjustified audit queries
- Number and amount of audit adjustments
- Total non-recoverable costs detected during cost recovery and Joint Venture audit.
- Time of processing invoices
- Cash shortage/overage rate and times of bank account be overdue
- Timely, Accurate and Transparent information provided.
- Number of reclassification entry to total entries posted.

- Total payments that is not supported by Purchase Requisition and Orders (urgent payments)

## 10.5) IT management

IT management department ensure all IT activities, resources of hardwares, softwares and people are properly managed in alignment with Company's strategic goals through the following:

- Reduce IT costs
- Improved IT services and use best practices processes
- Improve productivity of IT

Therefore, The Departmental KPIs that can be measured to ensure if the IT department is in alliance with Company's strategy goals

- Total numbers of helpdesk calls
- Numbers of closed/open helpdesk calls to total helpdesk calls.
- First helpdesk call solved rate = Total number of unsatisfactory resolution ÷ Total number of helpdesk calls.
- Average time to close IT support calls.
- Numbers and costs of external assistance to close IT issues.
- Numbers and saved costs of closing issues without referring to external assistance.
- IT Project Schedule Variance
- IT Project Cost Variance
- Total number and amounts of urgent services or items requested during the year.

## 10.6) Human Resources (HR) management

Human Resources Department participate good role in adding value to long-term utilization of staff by designing proper performance and measurements, promotion, and salary determination system. Human resources can achieve Company's strategic goals by ensuring that Company recruit efficient and high skilled employee, train lower skilled employee, and maintain those experienced staff for longer time. Therefore, The Departmental KPIs that can be measured to ensure if the HR department is in alliance with Company's strategy goals

- Employee turnover = Total number of leavers ÷ total number of employee over period
- Salary competitiveness ratio = Salary offered by your company ÷ Salary offered by your competitor.
- Time to hire = Time to start – Time of posting
- Average employee tenure = Sum of all tenures ÷ number of full time employees

  And it can be for particular job role
- Employee satisfaction index
- Human Capital Value Added
- New discoveries per training hour
- Staff Costs by level of skills, management, and gender.
- Number of issues solved before escalating them to management or court

The below *Exhibit 1: General view of balanced scorecard (BSC), Table 5: Example of Balanced Scorecard* and *Table 6: Strategic Risk Management* show how each department participate in achieving the strategic goals and how company can manage and mitigate the strategic risk through Balanced scorecard technique that track the objective and risks by all perspectives and by each departments.

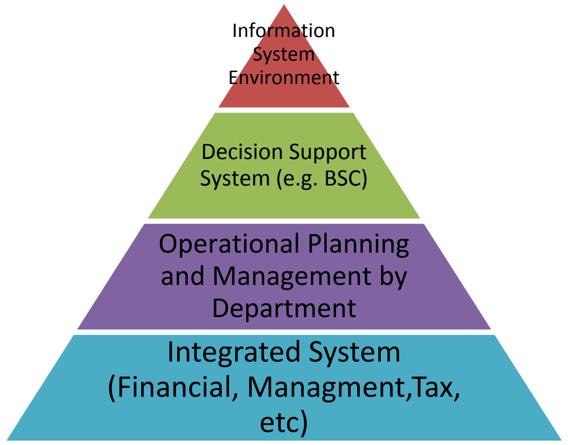
*Exhibit 1: General view of balanced scorecard (BSC)*

**Internal Process**

| Goals | Measures |
|---|---|
| Efficient Project Management Process | - Finding & Development Cost<br>- Replacement Ratio<br>- Cycle time to produce<br>- yield |
| Production Productivity | - Production and Engineering Efficiency |
| Increase sales | - Customer Satisfaction/Image<br>- Products on time in minimum period<br>- Increase proved reserves<br>- Increase production stability |
| Optimize operations and Procurements | - Capital Utilization Rate.<br>- Lifting Cost per barrel |

**Financial Perspective**

| Goals | Measures |
|---|---|
| Create Value | - Increase Profit<br>- Optimize assets value<br>- Increase ROE<br>- Increase Company's market value of stocks and Improve Stakeholders' satisfaction/image |




Strategic Management range the first above two layers of pyramid.
Operating Management start from Operational Planning by department and lower

**Corporate Social Responsibility**

| Goals | Measures |
|---|---|
| Contribution in Social Responsibility efficiently | - Increase the positive results and decrease the negative results (Decrease pollution emissions, and work incident) |
| Optimizing the costs of corporate social responsibility | - Efficiently decrease the current and future costs |

**Learning and Growth**

| Goals | Measures |
|---|---|
| Knowledge Leadership | - Time to develop next generation |
| Develop Strategic skills/innovation | - Training time<br>- New discoveries to training time |
| Information systems | - Ability to apply and adapt to new system.<br>- Able to innovate new system |

*Table 5: Example of Balanced Scorecard*

| Strategic Goals | Perspective | Measure | KPIs and tactical goals by Functional Department | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | **Drilling & Exploration** | **Marketing and Commercial** | **Production** | **Procurement & Logistics** | **Accounting & Finance** | **Administration & Human Resources** | **Information Technology** |
| Increase Shareholders' wealth | Financial | Increase profit | Decrease the finding and development costs<br><br>Decrease total dry well costs to total investment in drilling. | Increase oil and gas sales | Increase produced oil and gas | Decrease procurement and stock hold costs | Total non-recoverable costs detected before cost recovery and Joint Venture audit and find way to reduce such costs<br><br>amounts of debit/credit notes to total payments<br><br>Amount of lost from not obtaining cash discount. | Efficiently decrease personal costs by replacing the inefficient personnel with skilled personnel. | Decrease the costs of external assistance and increase the saved costs |
| | | Optimize Company's assets value | Increase the proved reserves<br><br>Increase the prospects.<br><br>Decrease total dry well costs to total | | Increase the production at lower costs | Decrease procurement and stock hold costs | amounts of debit/credit notes to total payments<br><br>Amount of lost from not obtaining cash discount. | New discoveries to total exploration and drilling hours<br><br>New discovery to total Training hours | Decrease the costs of external assistance and increase the saved costs |

| Strategic Goals | Perspective | Measure | KPIs and tactical goals by Functional Department | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | **Drilling & Exploration** | **Marketing and Commercial** | **Production** | **Procurement & Logistics** | **Accounting & Finance** | **Administration & Human Resources** | **Information Technology** |
| | | | investment in drilling. | | | | | | |
| | Internal Process | Managing the operating costs efficiently | | | Improve the production process to decrease the operating costs per barrel to get the highest level of production | Improve procurement process to decrease procurement and stock hold costs | To improve the invoice process to decrease the cycle time of payments and receipts to get discount and pay invoices appropriately | Training and annual staff costs to costs of external source and total operating costs | Decrease the costs of external assistance and increase the saved costs |
| | | Increase the replacement ratio | Number and volume of protective geological formations correctly assessed to total formations studied.<br><br>Number of successful well to total wells drilled<br><br>Increase proved reserves | | | | | | Appropriate install/analyze /program technical system software |
| | Learning & | Decrease | Number of | | Decrease the | | Detect wrong | New discovery | Numbers of |

| Strategic Goals | Perspective | Measure | KPIs and tactical goals by Functional Department | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | **Drilling & Exploration** | **Marketing and Commercial** | **Production** | **Procurement & Logistics** | **Accounting & Finance** | **Administration & Human Resources** | **Information Technology** |
| | Grow | project/operation pending issues and solving the issues from the first try or before the risk is occured | Lessons learned and not repeated again during the year<br><br>Decrease number and Cost of drilling problems to total drilling costs | | risks of incident, environmental damage and production decline. | | amount, costs, accounting treatments and solve it before it is detected by auditors | to total Training hours | closed/open helpdesk calls to total helpdesk calls.<br><br>First helpdesk call solved rate |
| | Corporate Social Responsibility | Increase the stock price in market | Decrease incident and injuries during drilling and exploration campaign<br><br>Decrease risks of blowout and oil spill. | | Decrease air or water pollution | Decrease incident and injuries in warehouse | Participate in Health, Safety and Environmental culture | Participate in Health, Safety and Environmental culture | Participate in Health, Safety and Environmental culture |

*Table 6: Strategic Risk Management*

| Perspective | Objective | Risk | Indicators | Current practice/processes | Suggested Action/Control Processes | Focus Area | Effectiveness Rating | Comments |
|---|---|---|---|---|---|---|---|---|
| Financial | Increase Profit | High Loss may be occurred over time.<br><br>Distract management from core tasks to branch tasks<br><br>Liquidity solvency problem | High production decline | Bonuses paid to managers is mainly based on the HSE results rather than finding new discoveries. | Improve Management performance and rewards by combining several measures in different and appropriate weights such as level of profit, stock price, proved reserves and HSE. | Human Resources | 10 | |
| | | | No positive reserves replacement ratio over time | Continue hiring high expatriate costs with no positive results for long time | Improve training and recruitment process.<br><br>Train the efficient expatriate<br><br>Efficient expatriate pass knowledge and experience to local staff | Human Resources<br><br>Drilling and Exploration | 8 | |
| | | | Negative operating cash flow and | Increase amounts of urgent payments | Preparing Cash Budget/Forecast by Treasury Dept. | Accounting & Finance<br><br>Procurement | 9 | |

| Perspective | Objective | Risk | Indicators | Current practice/processes | Suggested Action/Control Processes | Focus Area | Effectiveness Rating | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | negative income results | | Getting with good negotiation for extending payment period and shrinking the collection period<br><br>Improve all the controls process | <br><br><br><br><br><br><br><br>All Departments | | |
| | | | | No Drilling and exploration plan for the short and middle term and no appropriate coordination between all departments and levels of managements<br><br>Unnecessary high specification of contractual service equipments<br><br>Or Purchase unnecessary service and equipments | Develop plans and coordinate the plans with several level of management and departments.<br><br>Coordinate or arrange with requesting department to select the appropriate customization standards for services or equipments.<br><br>Mitigate the contractual specifications | Contract Administration of Drilling & Exploration<br><br>Human Resouces<br><br>IT<br><br>Procurement | 8 | |

| Perspective | Objective | Risk | Indicators | Current practice/processes | Suggested Action/Control Processes | Focus Area | Effectiveness Rating | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | | | that are too open or loose. | | | |

***References***


- PMBOK, 3rd edition.
- The Purchasing and Supply Manager's Guide to the C.P.M Exam, Fred Sollish and John Semanik, Publisher: Neil Edde, 2005.