

# IMPROVING RELIABILITY ON BKS PRODUCTION FACILITIES THROUGH NEW MAINTENANCE STRATEGY AND DESIGNING PERFORMANCE MANAGEMENT SYSTEM IN CENTRAL MAINTENANCE TEAM AT O&M SUB-DIVISION PT XYZ

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## Abstract

BKS Productions is an operation unit in Sumatra Oil of PT XYZ, which operation area located in Riau province. The crude oil production unit is more than 25,000 barrels of oil per day (BOPD) in 2015 and produced as much as 1 - 1.3 million barrels water per day (BWPD). The produced water utilized for crude oil secondary production process which known as Enhanced Oil Recovery (EOR). To maintain crude oil production and also compliance to GOI regulations on environmental, the high reliability and availability on facilities is important, The CM team challenges from external are: the fall of global oil prices which reached the lowest point at 29 USD/barrel in February 2016, the natural declining in crude oil production, GOI regulations on environment stewardship and cost recovery, the production sharing contract continuity, the autonomous regions law and others. From internal are: corporate optimization programs, reduction of operating and capital budgets, the efficiency programs in all aspect of operations including in work force of both PT XYZ and business partner. Based on the research methodology that conducted and some focused group discussion resulted the “down scoping” or “cascading” strategy as central maintenance team’s strategy. This strategy is used to establish milestone, time line for execution, key performance indicator (KPI) and performance dashboard based on the balanced scorecard and strategy execution. The design of performance management system could accommodate result of root cause analysis that affected to the reliability and availability performance of critical equipment. Those are: maintenance program, Preventive Maintenance or inspection programs, the equipment performance data accuracy, spare part availability, employee skill improvement.

Keywords: reliability, availability, critical equipment, the balanced scorecard, KPI, dashboard

## INTRODUCTION

### *Background*

BKS Production is an operation unit in Sumatra Oil - Operation and Maintenance (O&M) North that located in Riau province at the center of Rock Block and produced more than 25,000 BOPD of crude oil in 2015 and 1 – 1.3 millions barrel water per day (BWPD) that were injected, disposed and discharged to the jungle. The excess of production water must be handled carefully in order to comply with Government of Indonesia (GOI) regulation on environmental.

The Central Maintenance (CM) team is responsible to ensure BKS Production facilities are reliable and available with minimum downtime. There are around 1,490 units of equipment in the different operation system such as: well head systems, oil treating

system, electrical and control system, safety system, produced water system, air utility system. The Equipment Reliability and Integrity Procedures (ERIP) stated that the minimum required level of the equipment reliability is 97.5%, meanwhile the minimum required equipment availability is 95% refer to Data Input Output Norm (DION) for maintenance management system,

As a PT XYZ's base business, maintenance activities use Equipment Reliability and Integrity Process (ERIP) as a guidance to achieve the goal for sustaining reliability. The figure 1 shows 7 sub-process in work management that appear in ERIP stage 1, 2, and 3 that being a reference procedures and main focused for maintenance activities. those are: Computerized Maintenance Management System (CMMS), Work Order (WO) management, WO prioritization, 7 days planning & scheduling, Equipment Criticality Assesment (ECA), Long Range Planning Scheduling (LRPS) & Forecasting, Turn around & shutdown management. The work management process. The implementation of work management process and other related procedures that support the process in maintenance team could be shown below:

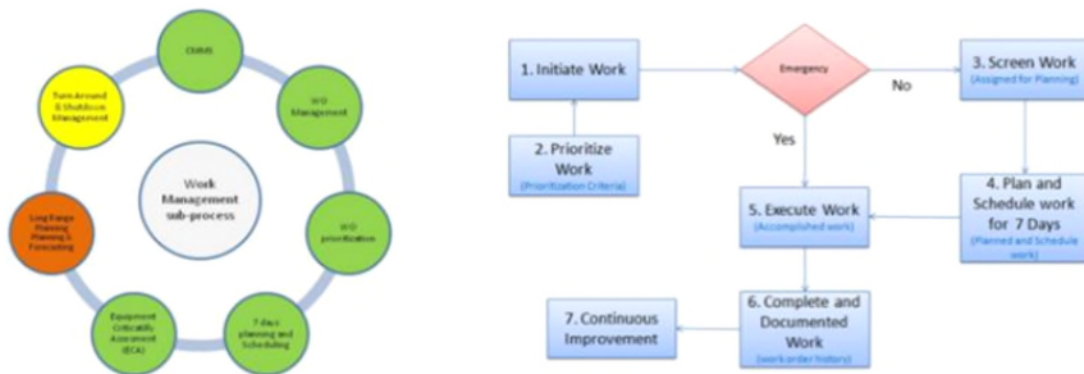


Figure 1 ERIP's Work Management and Prioritization Flow Process

### **Business Situation**

The current global environment in oil and gas industry had directly influence PT XYZ as one the world top 5 in oil and gas industry. The PT XYZ Indonesia Business Unit (IBU) as a subsidiary company in Indonesia changes its operational strategy by restructuring the organization, asset rationalization and cost optimization. Several condition and effort that will drive the strategy: improvement on business processes, PSC Contract expiration, minimize the decline rate and manage the lifting cost, local community issues, asset/equipment reliability and availability, strong law enforcement in environmental stewardships.

### **Business Issues**

There are several business issues that impacted on maintenance activities, especially for CM team to support BKS Production as senn on figure 2, those are: *reduction of maintenance Operational Expenses & Budget (OEB)*, *Currently no maintenance strategy to respond on*

current situation, to align with business unit priorities : “Safety, Compliance, Production /Reliability” and deliver high reliability, availability and efficiencies as a world class company through PT XYZ operational excellence, the availability performance of Water Injection Pumps (WIPs) as critical equipment in BKS Production that still under target.

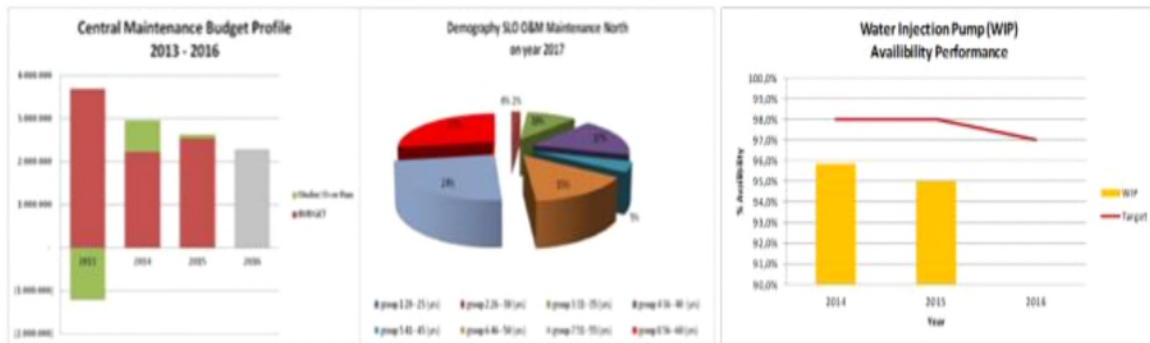


Figure 2 CM team budget profile, employee demography and WIP availability

### **Problem Formulation**

1. How to establish New maintenance strategy in current situation that align with corporate and business strategy to sustain and improve reliability and availability of equipment.
2. How to develop a performance management system to achieve business goal, deliver safe incident free operation, comply to all regulation and provide high reliability asset/equipment in BKS Production facilities/area

## **BUSINESS CASE EXPLORATION**

### **The Strategic Management Process**

A Strategic Management Process framework as shown in Figure 3 was used to explore and indentify the business issues, conduct evaluation or analysis, determine a recommendation and conclude a problem solution of the business. The figure described strategic management process framework that shown steps to align the issues to company’s vision and mission then to find the solution by formulizing the strategy and develop an execution strategy. Fred R. David in *Strategic management concept and cases* stated that

“Strategic management can be defined as the art and science of formulating, implementing, and evaluating cross-functional decisions that enable an organization to achieve its objectives. As this definition implies, strategic management focuses on integrating management, marketing, finance/accounting, production/operations, research and development, and information systems to achieve organizational success” ( 2011: p6).

The author will use a comprehensive strategic management process model where the environmental scanning is a part of strategy formulation.

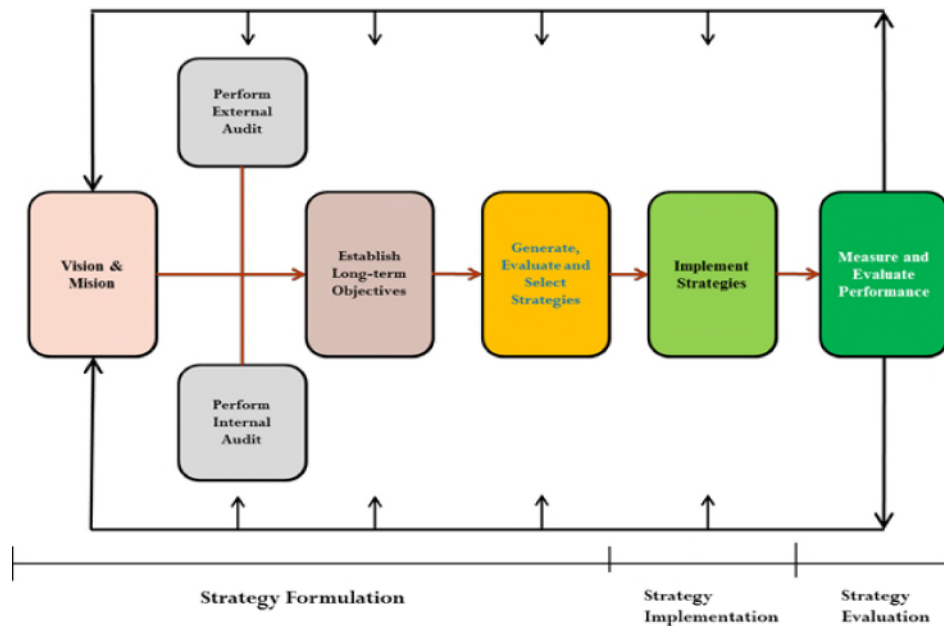


Figure 3. Comprehensive of the Strategic Management Process

Sources: Fred P. David, 2011-p15

### ***External Environment Analysis***

The PESTEL analysis is chosen to identify and examine variations of external environment analysis that affected PT XYZ and its business entity in Indonesia especially in Sumatra Oil Operations. Those aspects are:

### ***Political factors***

Political factors basically are how the government interfering in the economy, especially in oil and gas industry, those factors is:

1. Production Sharing Contract (PSC) contract, the PSC regulated in the law of the
2. Republic of Indonesia for oil and gas No. 22 of 2001 section IV that regulating the upstream business activities.
3. Regional Autonomy, the alignment between central and local government in term of the application of GOI regulations. PT XYZ operation in the Sumatra operations are in 5 districts in Riau province.

### ***Economic Factors***

The economic growth, interest rates, exchange rates and the inflation rate have greatly affect how businesses operate and make decisions, such as:

1. **Fiscal Policy**, The press release from Indonesian Ministry of Finance about “*Anggaran Pendapatan dan Belanja 2016*” on November 3, 2015 has determine basic macro-economic assumptions for 2016 budget are as follows: *Economic growth of 5.3 %; Inflation rate of 4.7%; Rupiah exchange rate average Rp13.900 / USD; Interest rate on 3 month SPN by 5.5 %; Indonesian crude oil price average of USD50/barrel; Lifting*

average oil 830 Thousand Barrel Oil per Day (MBOPD); Lifting average gas 1155 Mils Barrel Oil Equivalent per Day (MBOEPD).

2. **Global Oil Price.** In the last 2 years the crude oil had been slide from the price level of > 110 USD to <30 USD.

### ***Social and Demographic factors***

The demographic and social data of Riau province conditions as published on the book of *Statistik Daerah Provinsi Riau 2015 (katalog BPS, 1101002,14, 2015)* shows that in 2014 the data are as follows: *productivity ages 65.8%, rate of employment 63.3%, the level open unemployment 6.6%, Human Development Index (HDI) 70.33.*

### ***Technological factors***

Oil and gas industry is a technology-intensive and high capital industry, so that only the company with strong financial capability could enter this industry. PT XYZ had been used a secondary process is called Enhanced Oil Recovery (EOR) technologies in exploration and production of oil and gas to increase the production is known as

### ***Environmental factors***

The strict environmental laws and regulation had drive commitments for oil and gas ccompany to comply with the regulations. There are some risks in exploration and production that could affected ecological and environmental changes, such as: Oil Spill, Emission, Efluent water discharge.

### ***Legal factors***

In the oil and gas industry in Indonesia there are: Law (UU), Government Regulation (PP), President Decisions (kepres), Minister Regulation (Permen), Minister Decisions (Kepmen) and governance guidelines employment and general guidelines (PTK), which affected the pattern of operations strategy in the field due to more variances of stakeholders where each of them require different engagement strategies.

### ***Industy Analysis***

Using a Porter's five forces model as the competitive strategy (Michael E.Porter, 1980: 4) the firms attempts to analyze the level of competition within an industry and business strategy development.

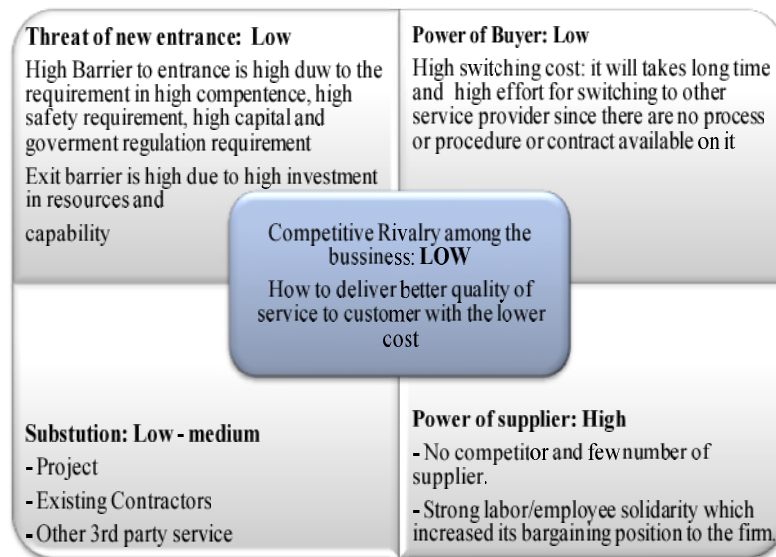


Figure 4. Porter's five forces model of Sumatra Oil - O&M Maintenance North

The attractiveness in this context refers to the overall industry profitability, meanwhile an "unattractive" industry is one in which the combination of these five forces acts to drive down overall profitability.

### ***Internal Factor Analysis***

The competitiveness of PT XYZ resources determine through it resources, capability and competences analysis as follow:

#### 1. Resources

As a world class company PT XYZ had a complete set of tangible and intangible resources that required for its operations: high skill employee, advance technology, reputation and a culture in place.

#### 2. Capability

*"A Capability is the capacity for a set of resources to performe a task or an activity in an integrative manner"* (Hit-Ireland-Hoskinsson, 2011: p16). PT XYZ had been exist in Indonesia for more than 90 years, it proved the capability to survive on its bussiness, the organization capability's strength through Operation Excellence Management System (OEMS) could adapt and deploy the resources to face the organization challenge, such as: low oil price environment, Optimization program and local commonity issues.

#### 3. Competencies

PT XYZ has core competencies that is widespread within the corporation, and is something that the corporation can do exceedingly well. Such as: Safety Performance, OEMS, ERIPs etc.

### ***Strategic Factor Analysis***

The next step is to summarize the identified factors using the Strategic factor analysis. The VRIO (Valuable, Rare, costly to Imititate, Organize to capture value) analysis used to access the importance of each factor that may consider strength or weakness. The External factors, which generate accepted category of opportunity and threat.

Table 1 Strength Weakness Opportunity Threat (SWOT) Matrix

<b><u>STRENGTH (S)</u></b> 1. High safety performance 2. Organization Capability 3. Surface Equipment Reliability and Integration Process (SERIP) 4. Compliance Performance	<b><u>WEAKNESS (W)</u></b> 1. High CPI's Labor Cost 2. Material Delivery
<b><u>OPPORTUNITIES (O)</u></b> 1. Service Contract 2. Implementation of PTK 041-2015 3. Certification Program	<b><u>THREAT (T)</u></b> 1. Wide and Scatter Location 2. Aging Equipment 3. Low oil price 4. Declining of oil production

The Internal and External factors that influence CM team was developed based on the result of survey that conducted on September 2015 and a Focus Group Discussion (FGD) that conducted during CM team workshop on December 17, 2015 attended by Team Manager, Team Leader, Group leaders and Technicians. Summary Factor Analysis (SFA) combined the internal and external factor had been condensed by decision maker are being a SWOT (Strength, Weakness, Opportunity and Threat) are as seen on the table below:

### ***Value Chain Analysis***

The value chain analysis allows the firm to understand the parts of its operations that create value and those that do not, because the firm objective is profit which could happened when the value created is greater than the costs incurred to create that value. There are 2 (two) main activities in CM's value chain analysis:

1. **Primary Activities:** focused into three major's activities, those are: Operation, services: Inbound Logistics
2. **Support Activities,** focus on people development and procurement Support activities, such as: Firm Infrastructure, Human Resource, Technology Development, Supply Chain Management (procurements)

### ***Root Cause Problem Structure***

To elaborate and identified the root cause of the problem and to prioritize the action that should be adress first, the fishbone diagram and current situation analysis as a tool.

### *Situation Analysis*

The table 2 shows current analysis to prioritize the problem based on the time, trend and impact so that the solution for the current condition could solve the problem in timely manner.

Table 2 Current situation analysis in CM team

No	Current Situation	Explanation	Priority		
			Timing	Trend	Impact
1	LPO (loss Production opportunity)	a. No significant correlation between current surface pump performance with LPO	L	L	H
		b. Not all facility in SLO O&M North had operated based on Zewadi	L	M	L
2	High pumps availability requirement to support operation	a. Current pumps availability tend to decrease (current performance is 4% below target)	H	H	H
3	Long lead time for major repair of a pump	Depend on other shop for repair	M	H	M
4	Variance in Pump manufacturer	There are 2 type of pumps: HPS (Non API & API)	M	M	M
5	Less CPI employee work on Maintenance North	14 % CPI manpower reduction for next 3 years in Maintenance North team due to natural retirement	H	H	H

### *Fishbone Diagram*

The diagram is to identify controllable problems that affected reliability and availability performance are: maintenance program, PM or inspection program, performance data accuracy (for equipment), spare part availability, employee skill improvement.

## **BUSINESS SOLUTION**

### *Functional Strategy*

The functional level strategy approached in functional area which is to maximize resource productivity by developing and nurturing a distinctive competence to provide a company or business unit with a competitive advantage. The orientation of a functional strategy is driven by its parent business unit's strategy. The CM team had selected **Down Scoping or Cascading** (Kaplan, Norton) as a functional level strategy to align with the corporate strategy, business unit strategy, vision and mission for the current state. The main intention of this strategy is to: **optimize operational cost, increase productivity and emphasis in strategic control**. Following are some perspectives of the selected functional strategy that fit in CM team.

1. **Financial:** maximize the financial value of a firm, those are: Operational Cost Management to achieve sustainably Profitable Operations; Selective investment on aging assets for maximizing profit
2. **Maintenance Operations:** determines how and where a service is to be delivered, should also deal with the optimum level of technology the firm should use in its



operations processes, those are: Deliver high quality of service with safe incident free operation (SIFO) and comply with GOI and CVX regulations through operational excellences; Achieve optimum reliability of asset through excellent implementation of ERIP; Strengthen organizational capability; Enhance applicable technology to optimize operation.

3. **Human Capital:** the related strategies are: Strengthen organizational capability; Focus on core competences, looking for opportunity to outsource and optimize total number of labor

**Business Model Development**

Osterwalder & Pigneur in the book of Business Model Generation, (2010 : 14) defined that “A business model describes the rationale of how an organization creates, delivers, and captures value.” The nine building block of a business model template has been developed by Osterwalder that called as a business model canvas have four main areas of a business: customers, offer, infrastructure, and financial viability. The figure 5 shows a new business model of CM team strategy that based on partnership and resources to deliver high quality of services with competitive service cost to customer through operational excellences.

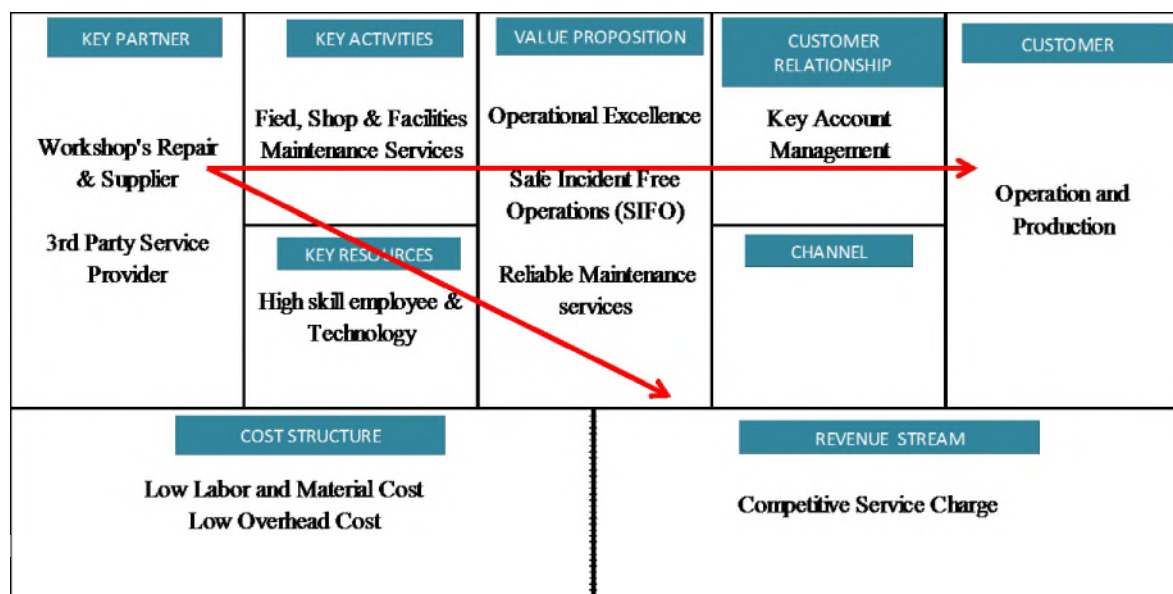


Figure 5. Sumatra Oil O&M - CM team business model

**Strategic Plan**

Refer to Kaplan and Norton in book *the Execution Premium: linking strategy to operations for competitive advantage* (2008: 3) presented a summary after a survey in 1996 about the state of strategy execution.

“...They learned that most of the organization did not have formal system to help them execute their strategy. Only 40% of organizations linked their budget to their strategies, and only 30% linked to incentive compensation to strategy, less than 10%

understood the company's strategy. The employee who do not understand the strategy can not linked the daily activities to its successful execution."

The focused of strategic plan is to develop strategy mapping and the Balanced Scorecard (BSC) for generating an operating plan which consist of: dashboard, resource requirement, budget etc. The performance of strategic and operating plan implementation shall be measured to monitor the effectiveness and for future evaluation or review. The figure 6 is a management system process that link the strategy to operation:

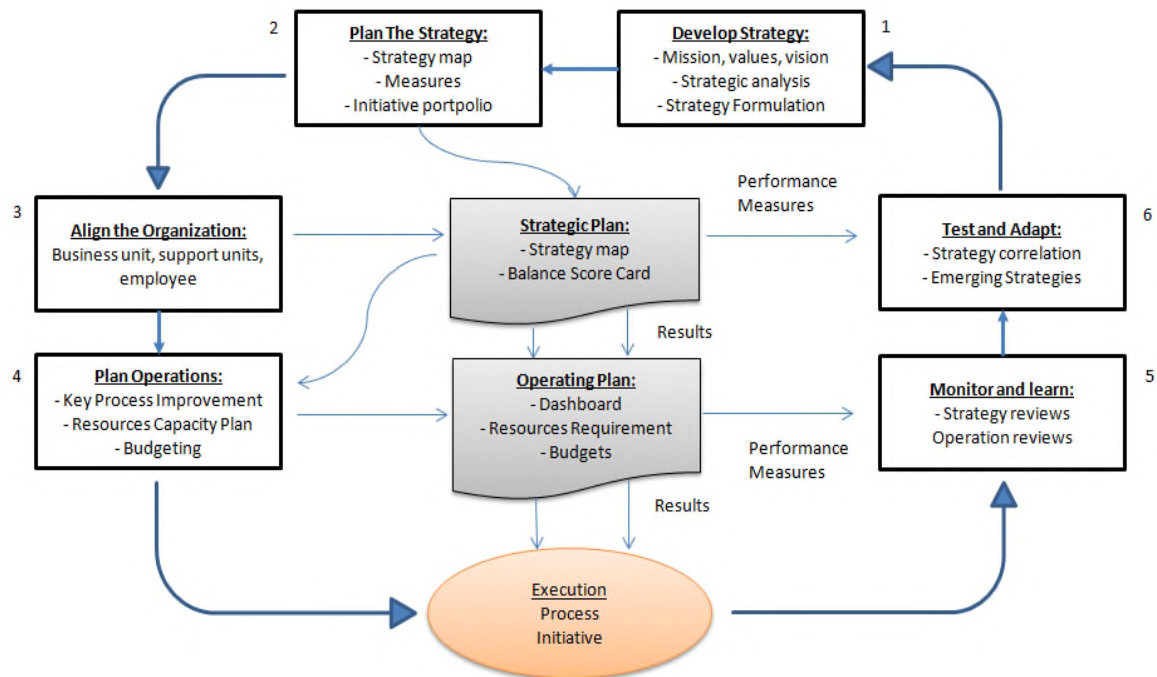


Figure 6. The Management System: linking strategy to operations

Sources: Kaplan & Norton (2008)

### Strategy Mapping

The figure 7 below is CM team strategy map that cover four perspective used to develop the BSC, the strategy map is a value creation process that describes a series of cause and effect linkages among objectives and perspectives.

The CM team strategy formulation are: Reduced operational expenditure (OPEX) and capital expenditures (CAPEX); High availability of asset and customer satisfaction; Operational excellence through safe operation, effective and efficient process; Strengthen organizational Capability

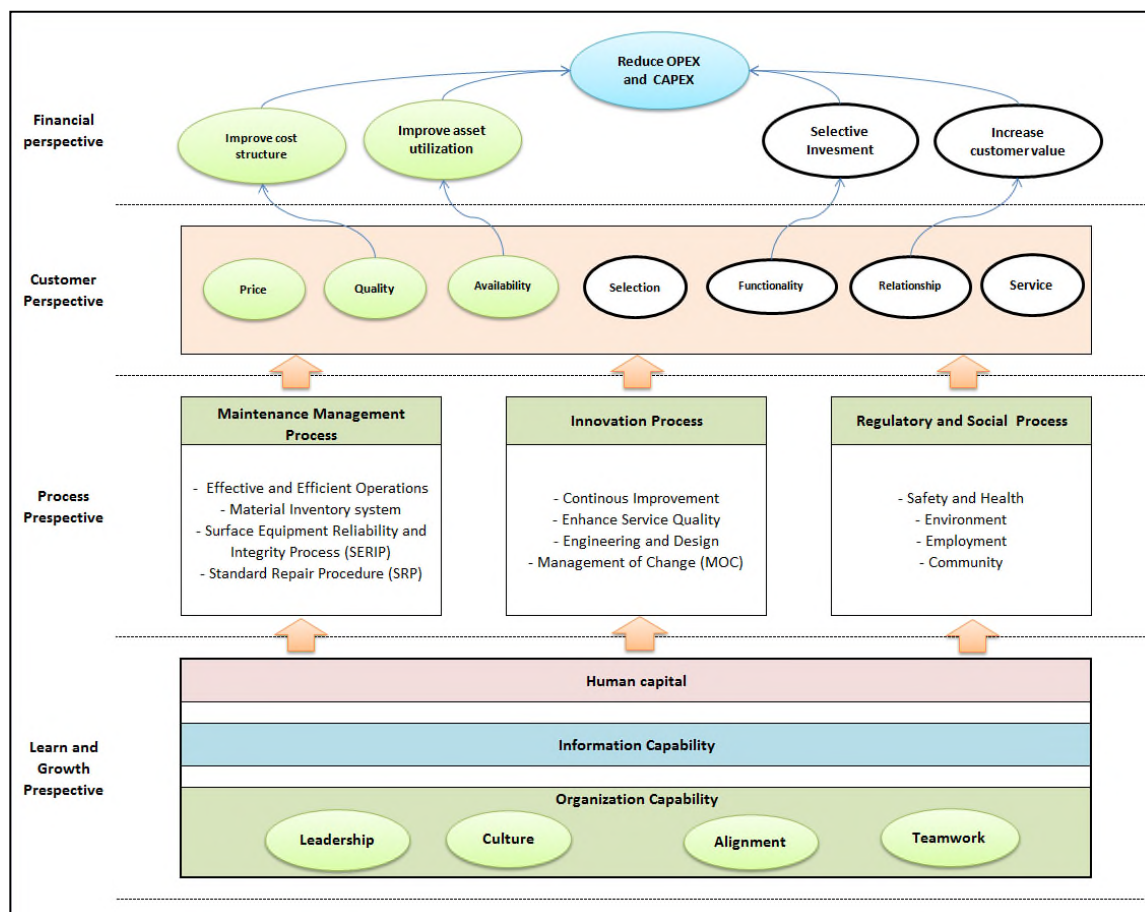


Figure 7. Sumatra Oil O&M - CM team Strategy Map

### ***The Balanced Scorecard (BSC)***

There are two main key process improvement area that become a Balanced Scorecard themes as shown on the above strategy maps, those are: *Optimize Operation Cost* and *Increase Productivity*, which is align with CM missions. The Combination of both themes, the BSC objectives will summary as follow:

1. Financial perspective: reduce operational expenses through efficiency (cost management), simplify process, effective manpower utilization; reduce overhead cost of maintenance operation.
2. Customer perspective: improve service quality by reducing repeated work, unplan downtime, low service charge and asset rationalization; deliver high reliability and availability and minimize unplan work.
3. Internal Process: operational excellence by Safe and Incident Free Operation (SIFO), excellent compliance to GOI regulation and PT XYZ's business process and procedure; deliver effective and efficient maintenance operation through ERIP implementation.
4. Learning & Growth: optimizing internal company resources by enhancing knowledge and skill, empowerment, high information availability; strengthen organization capability through optimum resources management.

Table 3 Balanced scorecard of Optimize Operation Cost's theme

	Strategy Map		Balance Scorecard	
	Theme: Optimize Operation Cost	Objective	Measurement	Target
Financial		Efficiently maintain the facilities using cost management and simple process with effective manpower usage through: - reduced operational expenses include overhead cost - Cost Optimization of maintenance activities that reflected on work order charges - Selective purchasing of spare part, tools or equipment that uses capital budget	Total yearly Budget Spending Total Work Order for preventive Maintenance (PM) Cost/year Total equipment maintenance cost/year Total manpower utilization (time sheet) Total AFB saving cost through Lean sigma Project Total capital budget spending	-10% -10% -10% 90% 500 200 MUSD
Customer		Improve service quality by reducing total number of repeated work, total number of equipment unplan shutdown, delivering lower cost service charge to customer and asset rationalization to reduce maintenance cost of inactive asset	Total number of WO reject by customer (status 75) in JDE system Total number of break in Work Order (WO) Yearly average WO cost: corrective and routine Total no of junk program in a year	<2% <5% -10% 1
Internal Business Process		To deliver operation excellence to production team through: Safe and Incident Free Operation (SIFO) or no incident during operations Comply to: GDI regulation, Chevron business process and procedure.	Fatality Day Away From Work (DAFW) Total Recordable Incidents (TRI) Motor Vehicle Crash (MVC) Total number of Oil Spill incident PROPER: Compliance on waste lube oil handling CVX compliance dashboard	0 0 0 0 0 100% 100%
Innovation & Learning		Optimizing the internal company resources to enhance employee knowledge and skill, Empowerment, Ensure information available and received by all employees	% employee with certification Computer Based Training (CBT) completion Career Development Program (CDP) for each employee Number of mentoring program /year Number of Hands on training or on the job training session/year Employee IT accessibility to team database No of Sharing Best practise session/year	100% 100% 100% 4 5 100% 10

Table 4 Balanced scorecard of increase productivity theme

	Strategy Map		Balance Scorecard	
	Theme: Increase Productivity	Objective	Measurement	Target
Financial		Optimum operation through reduction of overhead cost of maintenance operation	CPI Labor Billing rate/hours	90 USD
Customer		Deliver high reliability and availability of critical rotating equipment by minimize unplan work.	Critical Equipment Availability Critical Equipment Reliability Average MTTR for rotating equipment P1 P2 work order Manpower availability based on resources loadin	97% 98.5% 30 days <2% 90%
Internal Business Process		To deliver effective and efficient maintenance operation through implementation of SERiP	SRP/SOP verification and validation Proactive Work Order Critical spare part availability Work schedule compliance Work execution compliance Work Order in Planning & scheduling PM compliance Total number of Work Order Backlog Total no of LS project	12 80% 80% >90% >90% >90% >90% <5% 3
Innovation & Learning		Strengthen organization capability through optimum resource management	Coordination meeting with stake holder (operation, engineering and other)/year Number of team workshop/year Inventories activities/year (tools, critical spare part) No of contract review Employee engagements/year Employee performance review/year	6 2 2 1 1 3

**IMPLEMENTATION**

**Milestone**

The focus item of key process improvement as stated in the BSC for supporting CM's team objectives in 2016 to: increase availability and reliability, optimize workforce productivity and reduces cost. Then the activities are summarized and translated to CM 2016 milestones.

The figure 9 present a time line for execution was developed to ensure all activities had been assigned responsible persons and the target for completion are clear.

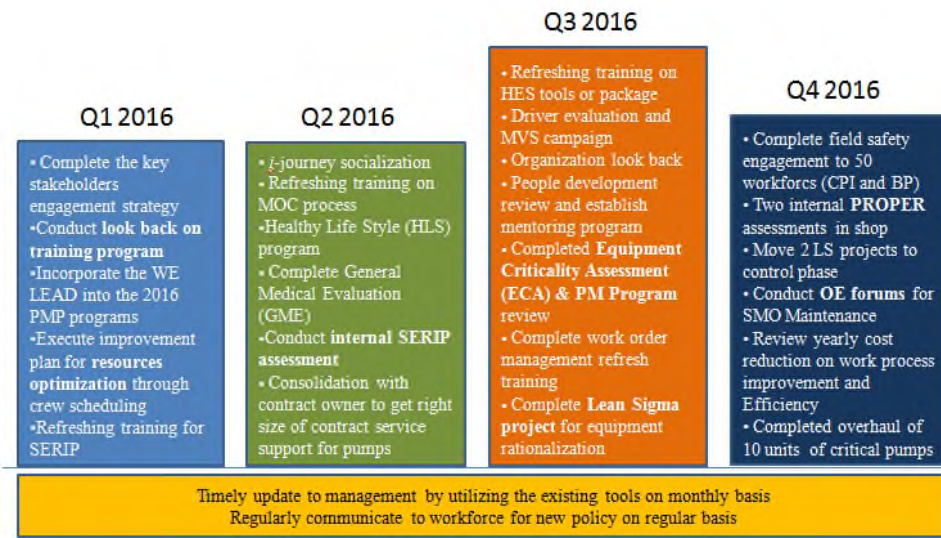


Figure 8. CM team milestone and time line for execution for 2016

**Key Performance Indicator (KPI)**

**Performance Metrics**

All milestone, timeline activities and variable performance as stated in the Balanced Scorecard. Table 5 shows important metrics that supported CM team to achieve the goal:

Table 5 KPI for Operational Excellence (OE) and Financial Metric

No	Metrics	Definition	Unit	Objective	Responsible for tracking	2015		2016			STATUS
						Actual	Min	Target	Max	YTD	
<b>OE Metrics</b>											
<b>1.0 Safe and Incident Free Operation (SIFO)</b>											
1.1	Fatality	Total number of incident that cause the death of workers	#	Achieve Safe and Incident Free Operation	HES Coordinator	0	0	0	0	0	😊
1.2	Day Away From Work (DAFW)	Total number of incident that cause loss of working days	#			0	0	0	0	0	😊
1.3	Total Recordable Incidents (TRI)	Total number of incident that cause worker's injury and required medical treatment	#			0	0	0	0	0	😊
1.4	Motor Vehicle Crash (MVC)	Total number of motor vehicle crash	#			1	0	0	0	0	😊
1.4	Total number of Oil Spill incident	Total number of oil spill to the land and water	bbl	Achieve an environmental compliance		0	1	0	0	0	😊
<b>2.0 Compliance Performance</b>											
2.1	Assessment of used lube oil handling in Shop	Total number of PROPER assessment in lube oil handling shop	#	Achieve an environmental compliance	HES Coordinator	1	1	2	2	1	😊
2.2	Milestone completion	Percentage of milestone completion on 2016	%	Achieve Chevron Business Process and Procedure compliance		99%	95%	95%	100%	94%	😊
2.3	IBU compliances	Percentage of required mandatory IBU compliance	%			99%	95%	97%	100%	100%	😊
<b>3.0 LBA (Leader behaviour Activities): Field Visit and Engagement</b>											
3.1	QSRP Verification Field	Total Number of QSRP verification and validation in the field	#	Achieve Safe and Incident Free Operation	HES Coordinator		110	120	125	0	😞
3.2	MSW engagement	Percentage of quarterly MSW engagement based on requirement	%			14	12	14	16	9	😊
3.3	Driver Engagement (DDE, MVS campaign)	Total number of engagement to driver, CPI and BP employee	#			2	3	5	1	😊	
<b>Financial Metrics</b>											
<b>4.0 Operational Expenditure Budget (OEB)</b>											
4.1	Operation Expenditure Budget/year	Total amount of spending on respected team	MUSD	To meet an budget optimization goal and objective	Planner	-6%	-10%	-15%	-20%	-26%	😞
<b>5.0 Maintenance Operation Cost</b>											
5.1	Total PM cost/year reduction	Percentage of cost reduction on PM activities	USD	Achieve maintenance operation cost reduction and improve work efficiency	Planner	190	100	155	170	117	😊
5.2	Total Corrective Cost/year reduction	Percentage of cost reduction on WO corrective activities	USD			2000	1400	1500	1800	1500	😊
5.2	Total labor Cost/charge to work order (corrective)	Percentage of cost reduction of labor cost on WO	USD			1000	700	800	900	1167	😞
6.0	Total saving of Lean sigma Project	Total cost saving in Accrual Financial Benefit (AFB) of lean sigma initiative /project	MUSD	improve effectiveness efficiency of work process and eliminate waste	Team Leader	1200	500	700	1000	80	😞
7.0	Asset inventory and Junk program	Total number of asset inventory and junk activities/year	#	Asset rationalization and reduce maintenance operation cost		2	1	2	2	1	😊
8.0	CPI Labor Billing rate	Total average of CPI labor billing rate/hour	USD	Achieve optimum charge to customer and increase worker productivity		124	90	100	115	😊	

Table 6 KPI for Operation and Organization Capability (OC) Metric

No	Metrics	Definition	Unit	Objective	Responsible for tracking	2015	2016				STATUS
						Actual	Min	Target	Max	YTD	
<b>Operating Metrics</b>											
9.0 Critical Equipment Availability and Reliability											
9.1	WIP Availability	Total average percentage of WIP availability	%	Increase asset utilization and reduce rate downtime by maintain Availability, MTTR & MTBF and improve response time in solve problem	Reliability team	96.2%	95.0%	97.0%	98.0%	98.0%	😊
9.2	WIP Reliability	Total average percentage of WIP reliability	%			98.5%	95.0%	98.0%	99.0%	98.0%	😊
9.3	Average MTTR for rotating equipment	Total average mean time to repair (MTTR) of rotating equipment	days			23.3	25	30	45	45	😊
10.0 Work Order (WO) Management Compliance as required by SERIP											
10.1	P1 P2 WO	Percentage of WO priority 1 & 2 that classified as emergency compare to total WO	%	To ensure each respective team /individu consistently manage and monitor their SERIP performance	Planner	3.7%	1.0%	5.0%	10.0%	1.8%	😊
10.2	Manpower on resources loading	Total average of manpower availability percentage	%			94.8%	90%	95%	100%	92.0%	😞
10.3	Proactive WO	Percentage of WO proactive as result from ORDC, PM etc	%			80.5%	80%	85%	90%	72.0%	😞
10.4	Spare part availability	Percentage availability of critical spare parts	%			79%	90%	95%	100%	92.2%	😞
10.5	Work schedule compliance	Percentage of monthly average schedule compliance compare to total WO in a month	%			90.9%	90%	95%	100%	97.4%	😊
10.6	Work execution compliance	Percentage of complete WO as schedule	%			94.5%	90%	95%	100%	95.8%	😊
10.7	WO in Planning & scheduling	Percentage of PM schedule compliance	%			99.6%	90%	95%	100%	98.2%	😊
10.8	PM compliance	Percentage of PM schedule compliance	%			98.9%	90%	95%	100%	95.8%	😊
10.9	WO Backlog	Percentage of WO that can not be scheduled/complete execution due to various reasons	%			3.0%	2%	5%	6%	1.0%	😊
10.10	WO reject by customer	Percentage of WO in status 75 (reject) due to various reasons compare to total number of WO	%			0.0%	0%	1%		0.0%	😊
<b>Organization Capability</b>											
11.0 Training & Certification program											
11.1	Employee with required certification	Percentage of certified worker in respected team	%	Enhance worker competency level	Team Leader	100.0%	95.0%	100.0%		96.0%	😞
11.2	Computer Based Training (CBT) completion	Percentage of completion of mandatory CBT requirement	%			90.0%	80.0%	90.0%	100%	90.2%	😊
12.0 People Development Program (CDP)											
12.1	Mentoring program /year	Total number of mentoring event to member or other employee	#	To close gaps on competency, skill and knowledge in timely manner, effective and efficient way	Team Leader	4	3	4	5	3	😊
12.2	Hands on Training/ On the Job Training (OJT) session/year	Total number of OJT or hands on training to member or other employee	#			2	2	3	5	2	😊
12.3	Best practise or Lesson Learn sharing session/year	Total number of presentation and conduct sharing session from employee/year	#			2	10	14	16	5	😞
12.4	Individual Performance Discussion to all member (3 times/year) Opening Year, Mid Year and End Year Final	Compliance to schedule of individual performance review between leader and all member (3 times/member/year)	%			100.0%	95.0%	100.0%		100.0%	😊
12.5	Documented Lesson learn or technical paper	Total number of technical paper document	#			0	4	5	6	0	😞

The table 5 & 6 above shows main parameter of CM's team KPI that formulated to align to strategy and objective of the BCS, the set of metrics, objective and target. There are 4 perspectives, those are: Operational Excellences (OE) Metrics, Financial metrics, Operation metrics and Organization Capability.

### Performance Dashboard

The dashboard had been developed to give high level information on the current performance status and gaps of the CM team and an indicator for the achievement in 2016. The figure 9 shows lagging and leading dashboard of CM team performance as 2 main indicators of performance:

- Lagging Indicator consist of following indicators:
  - a Safety performance that support Safe and Incident Free Operations (SIFO):
  - Fatality, Day Away of Work (DAFW), Total Recordable Incident (TRI) and*
  - Motor Vehicle Crash (MVC)*
  - Total number of oil spill incident*
  - IBU compliance*
  - WIP availability and reliability*
  - OEB*
- Leading indicator is a group of activities in the performance metrics that can support management to achieve CM team objectives and goal. The parameter that presented in

the leading indicators chart are: *Compliance Performance, Safety Performance, Financial performance, Organization Capability, Work Management Performance*

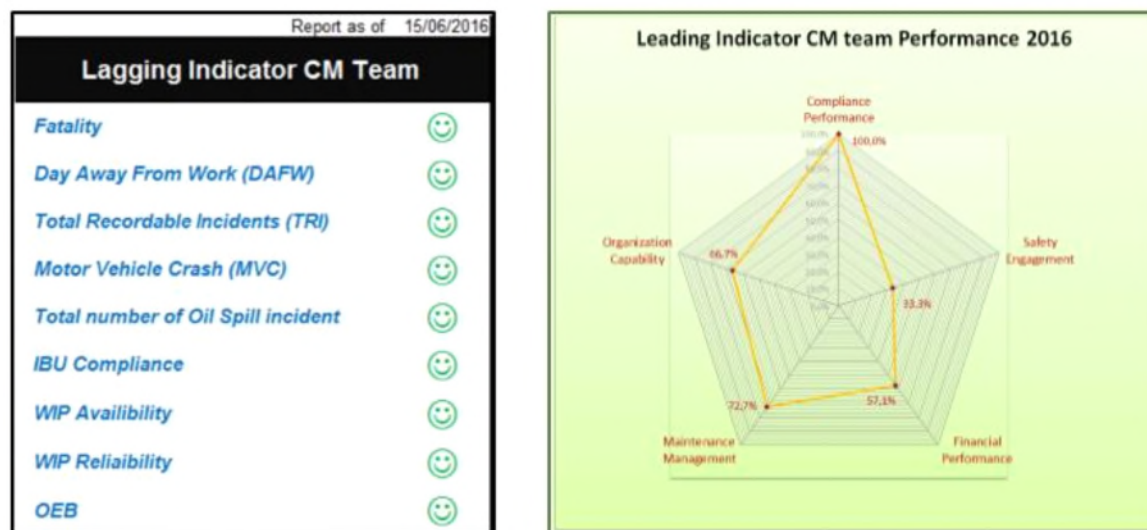


Figure 9. Lagging and Leading Dashboard of CM Team

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