



LEVERAGING BENCHMARKING FOR CONTINUOUS IMPROVEMENT TOWARDS OPERATIONAL EXCELLENCE

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ADNOC REFINING

LEVERAGING BENCHMARKING FOR CONTINUOUS IMPROVEMENT TOWARDS OPERATIONAL EXCELLENCE

Objective

To carry Baseline Assessment of Organizational Performance, leveraging the Benchmarking in a comparative framework and identify the Areas of Improvement towards Operational Excellence

Contents

- Introduction and Overview of ADNOC Refining
- Operational Excellence at ADNOC Refining
- Benchmarking of Organizational Performance
- Benchmarking and Improvement - Key Stages
- ADNOC Refining Benchmarking Efforts
 - Maintenance
 - Asset Integrity
 - Operations Integrity
- Benchmarking Assessment & Key Benefits
 - Achievements
 - Conclusions



ADNOC Group

ADNOC Refining

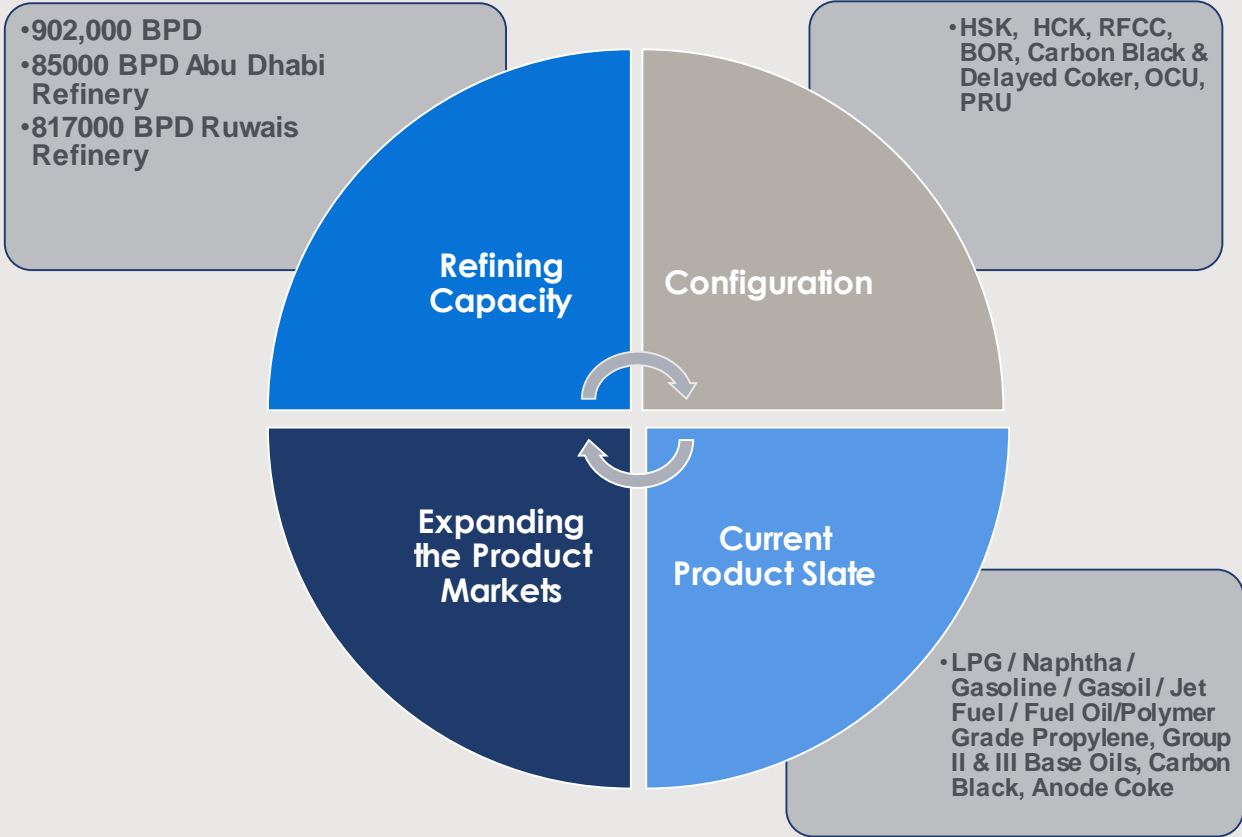
ADNOC Group Company

Operations

Operating in the Emirates of Abu Dhabi in U.A.E.

Business Line

Crude Oil and Condensate Refining

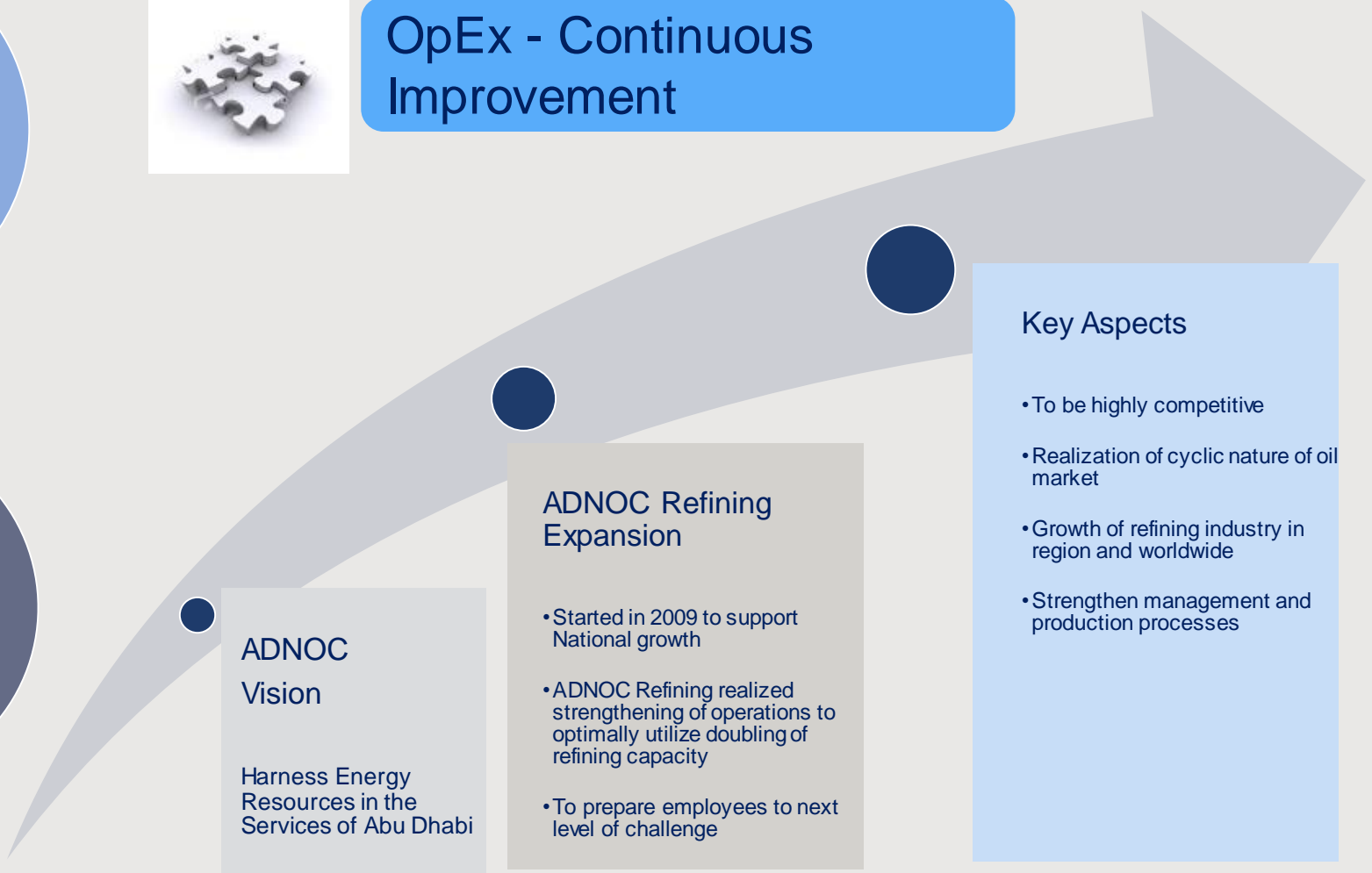
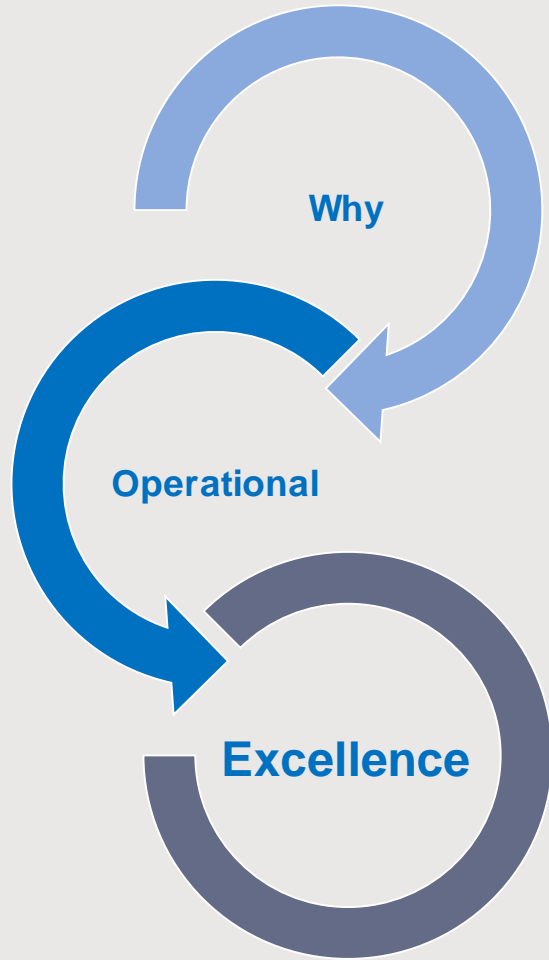


OpEx Objective : Achieve Excellence in Organizational Performance leading to Superior Business Results

OpEx Key Elements : Team Effort, Values, Optimization, Effectiveness, Superior Performance Objectives /Targets, Consistent Results



OpEx - Continuous Improvement



ADNOC Vision

Harness Energy Resources in the Services of Abu Dhabi

ADNOC Refining Expansion

- Started in 2009 to support National growth
- ADNOC Refining realized strengthening of operations to optimally utilize doubling of refining capacity
- To prepare employees to next level of challenge

Key Aspects

- To be highly competitive
- Realization of cyclic nature of oil market
- Growth of refining industry in region and worldwide
- Strengthen management and production processes

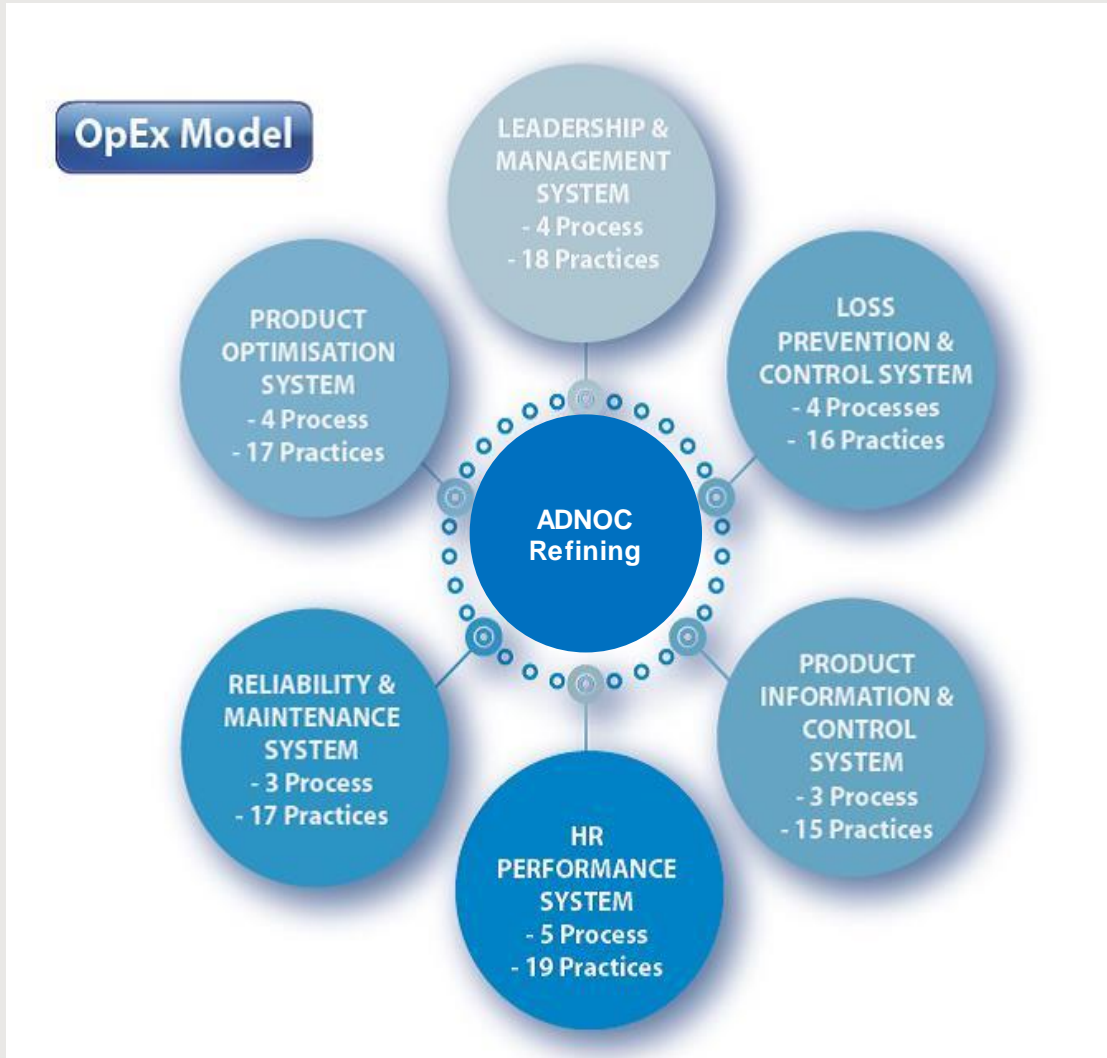
ADNOC REFINING OPEX EFFORTS AND BENCHMARKING WITH PACE SETTER COMPANIES



Key Features

- Corporate Wide Operational Excellence Assessment
- Carried out in close coordination, involvement of External Professional Consultants
- Rigorous Assessment of Operational Facilities /key corporate functions
- Benchmarked with Best Practices of Pace Setter Refineries
- Identified the Areas of Improvements
- Developed an Organizational OpEx Model and Rolled out for Implementation

ADNOC REFINING OPERATIONAL EXCELLENCE MODEL



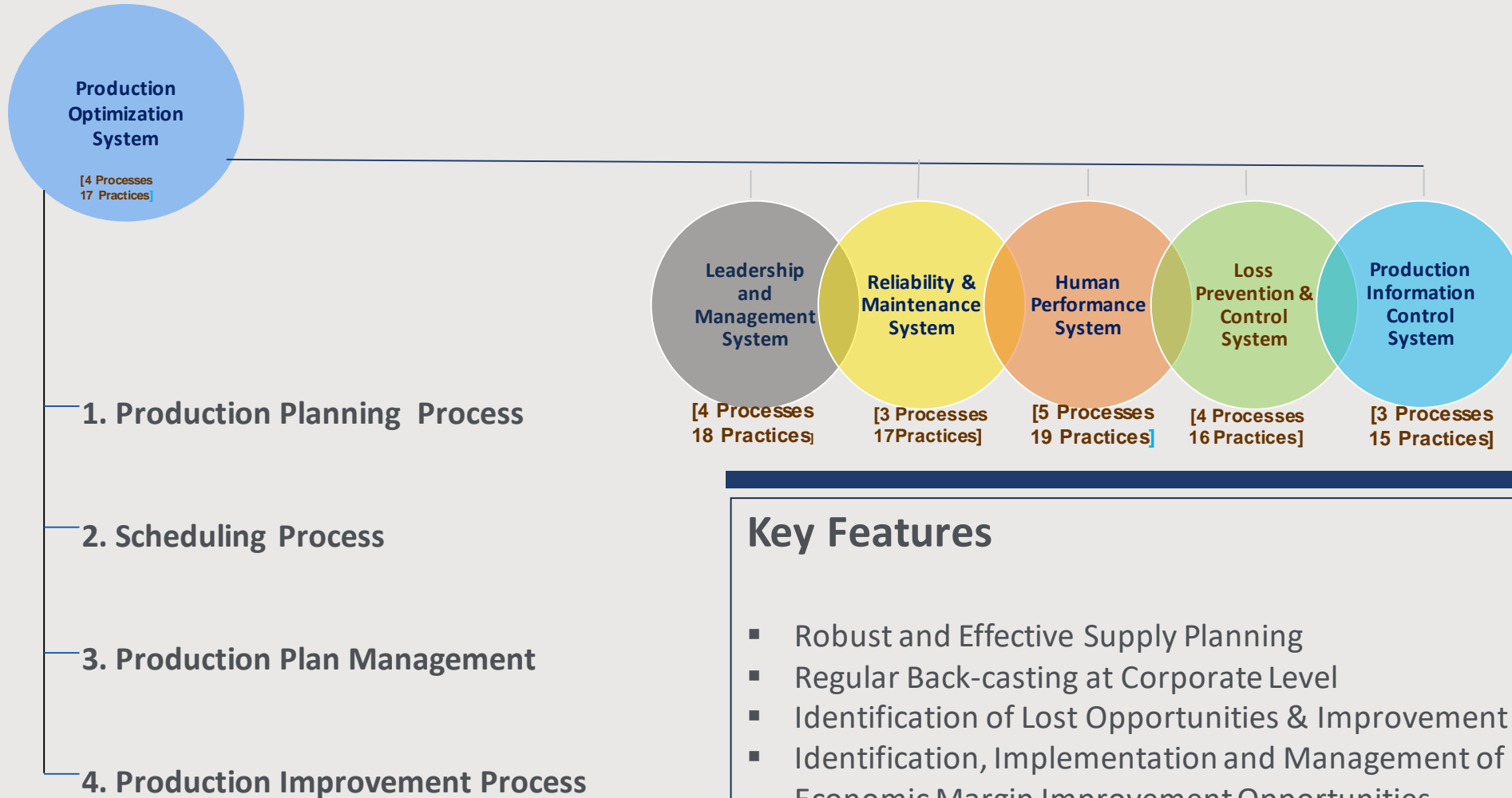
Comprehensive Assessment of Operations & System Definition

- 6 Systems
- 23 Processes
- 102 Best Practices

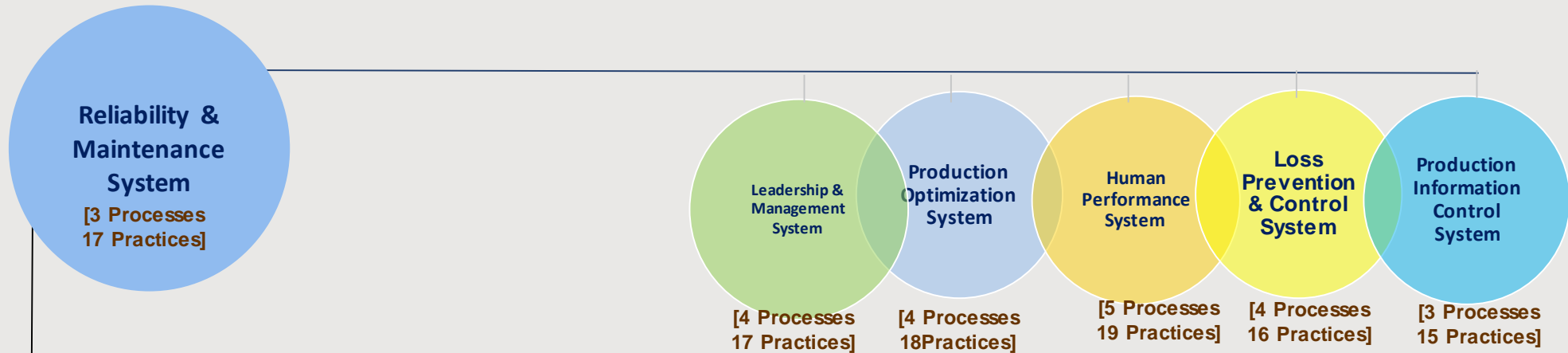
ADNOC REFINING OPEX STATUS REVIEW



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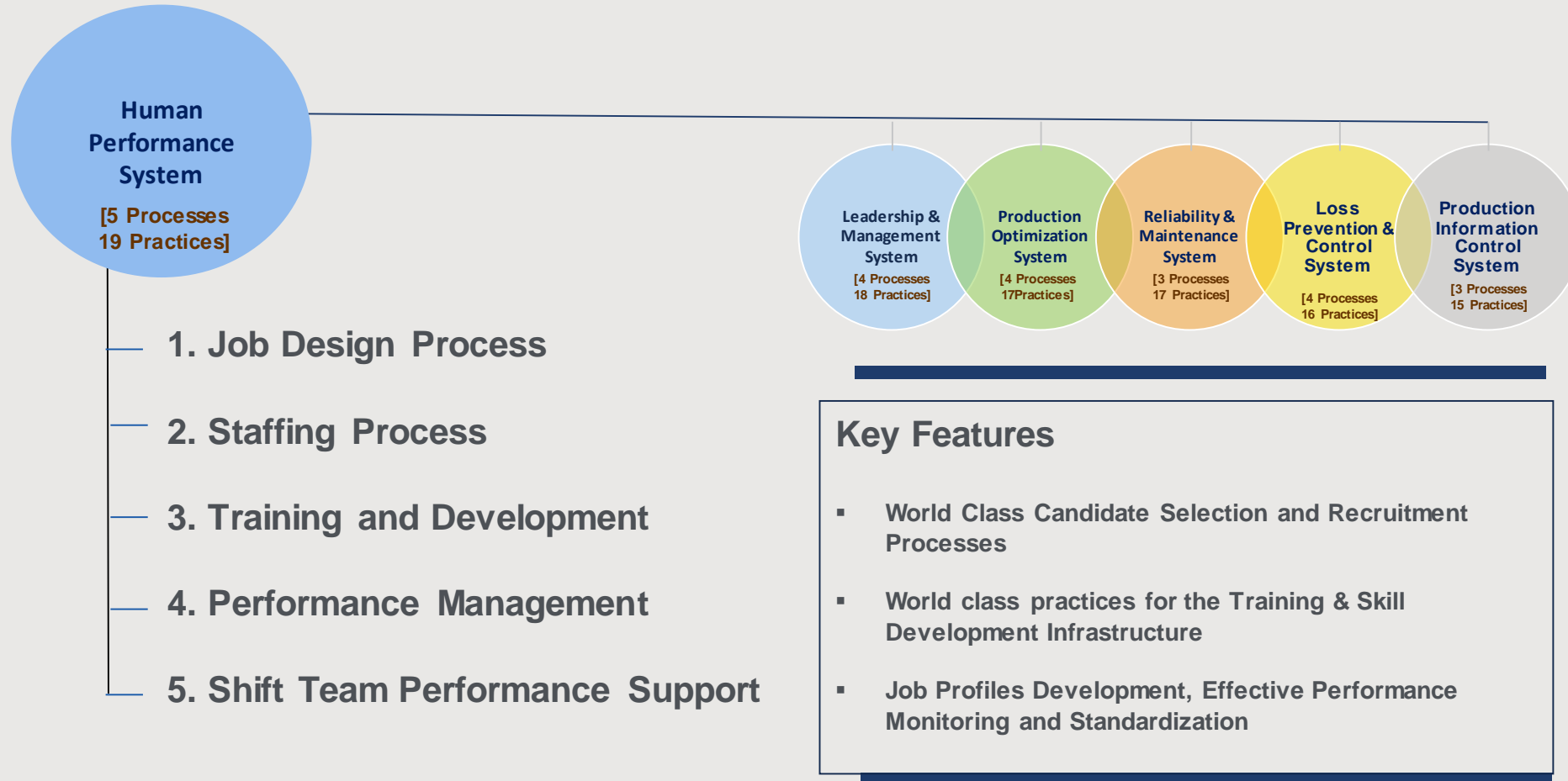


1. Maintenance Management
2. Strategic Asset Management
3. Maintenance Work Process

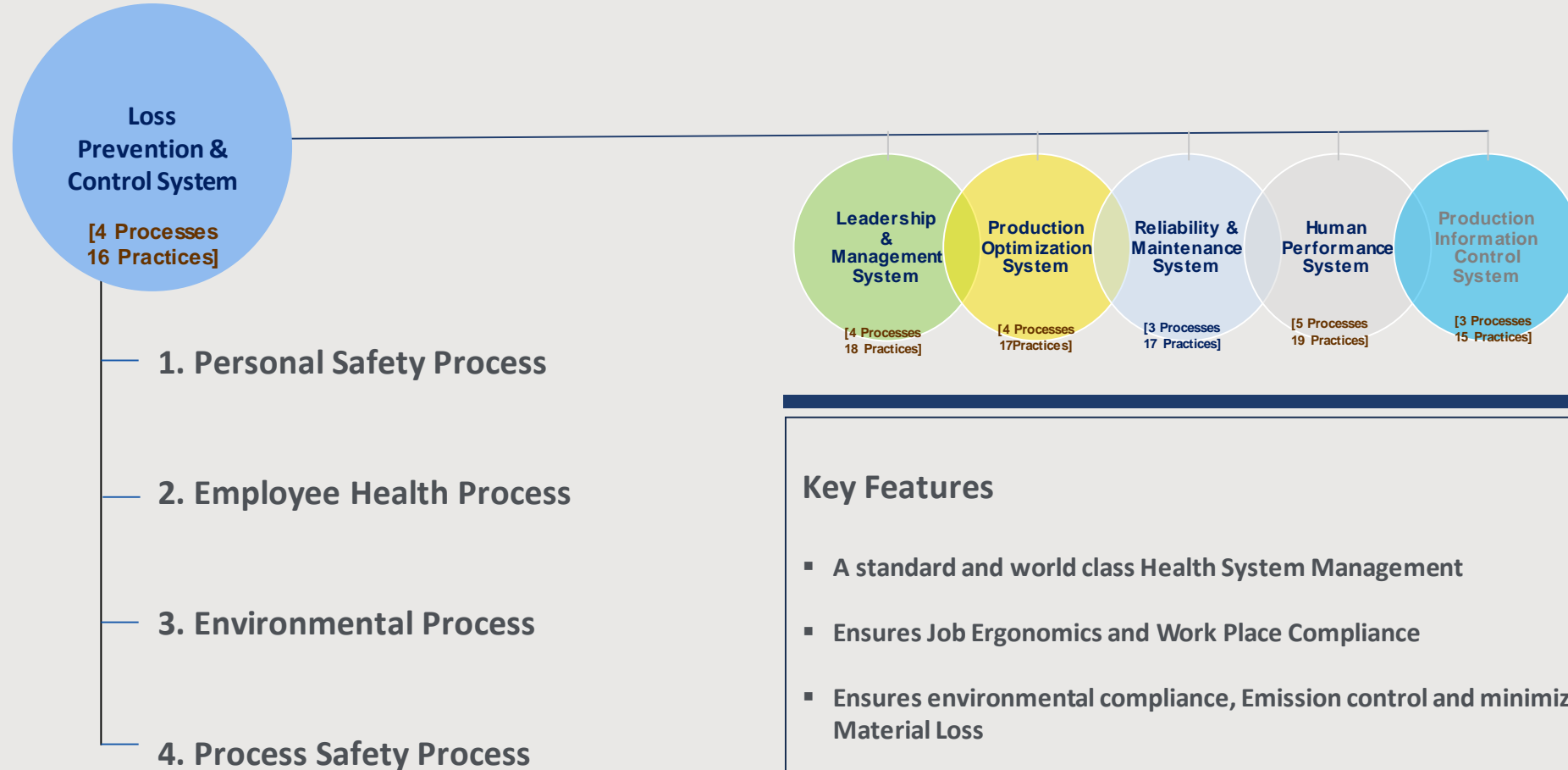
Key Features

- Advanced Computerized Maintenance Management
- Ware house Management and Stock Optimization
- In-house Expert groups for specialized areas
- Work Quality Assurance through CBT
- Turn Around Optimization
- Maintenance Efficiency Improvement

ADNOC REFINING OPEX STATUS REVIEW



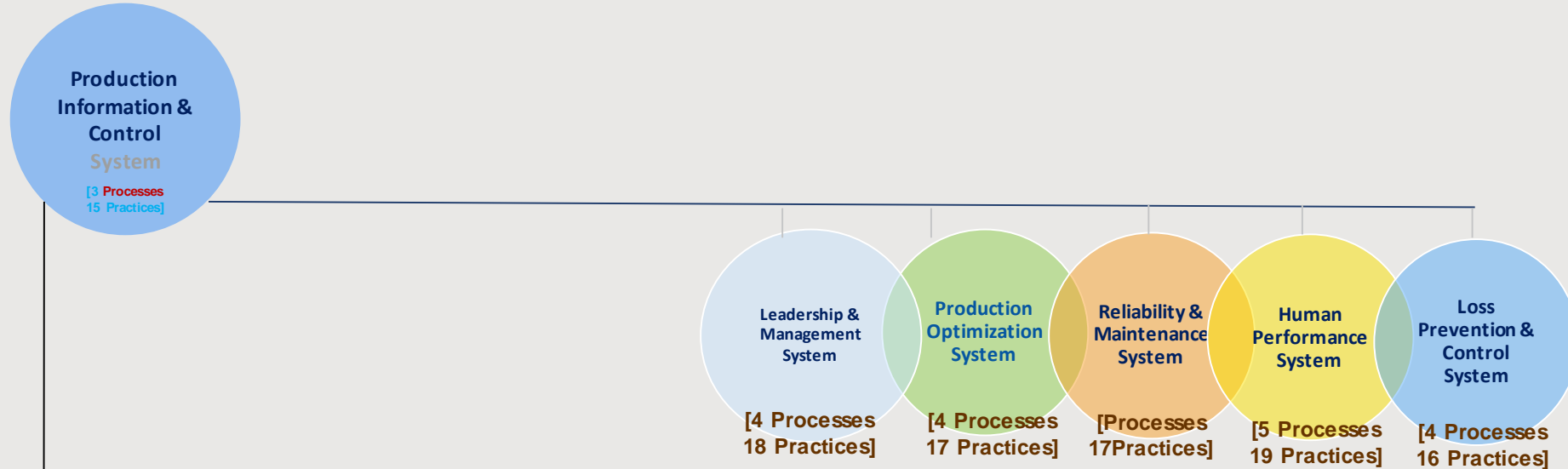
ADNOC REFINING OPEX STATUS REVIEW



Key Features

- A standard and world class Health System Management
- Ensures Job Ergonomics and Work Place Compliance
- Ensures environmental compliance, Emission control and minimizes Material Loss
- Process Safety Function at all sites

ADNOC REFINING OPEX STATUS REVIEW



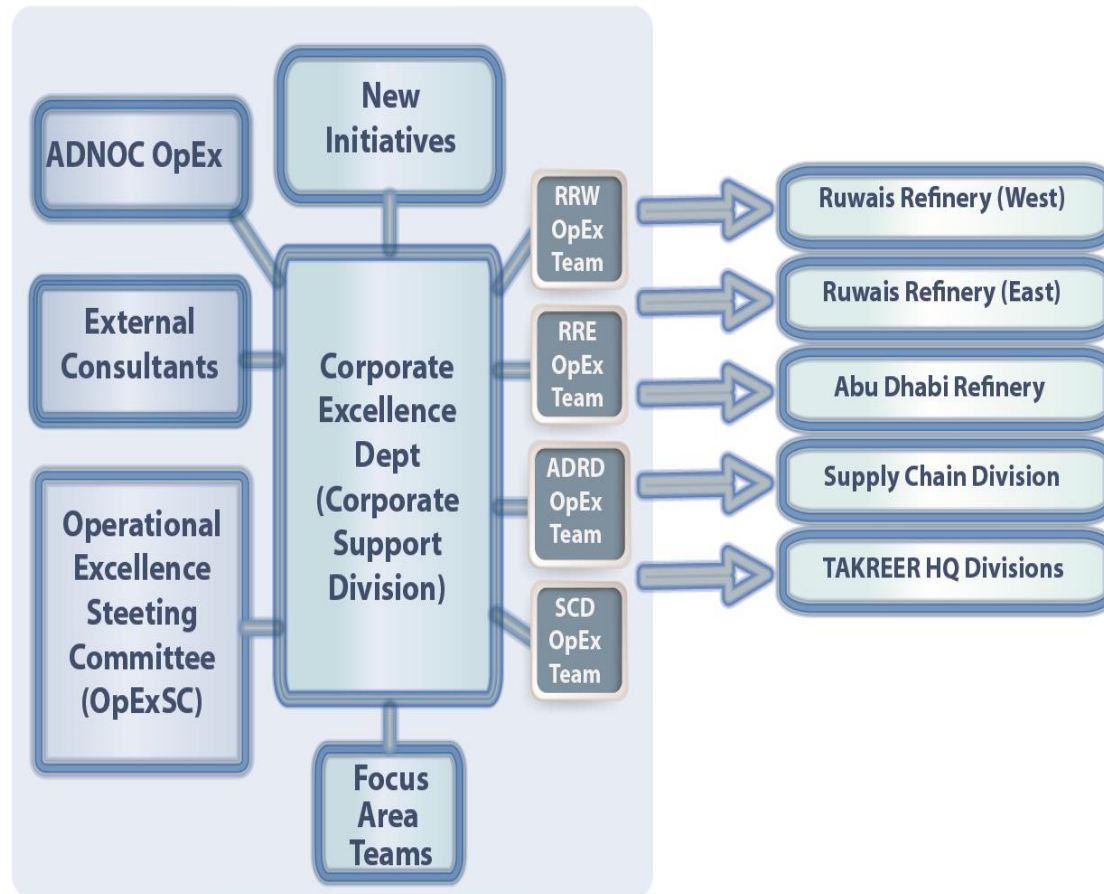
- 1. Process Control Process
- 2. Information Management
- 3. Operating Procedures Process

Key Features

- Regulatory and Advance Control at Various Sites
- Implementation of Alarm Management System
- Information Management Systems
- Deployment of Process Models and Production Accounting System

ADNOC REFINING OPEX IMPLEMENTATION FRAMEWORK

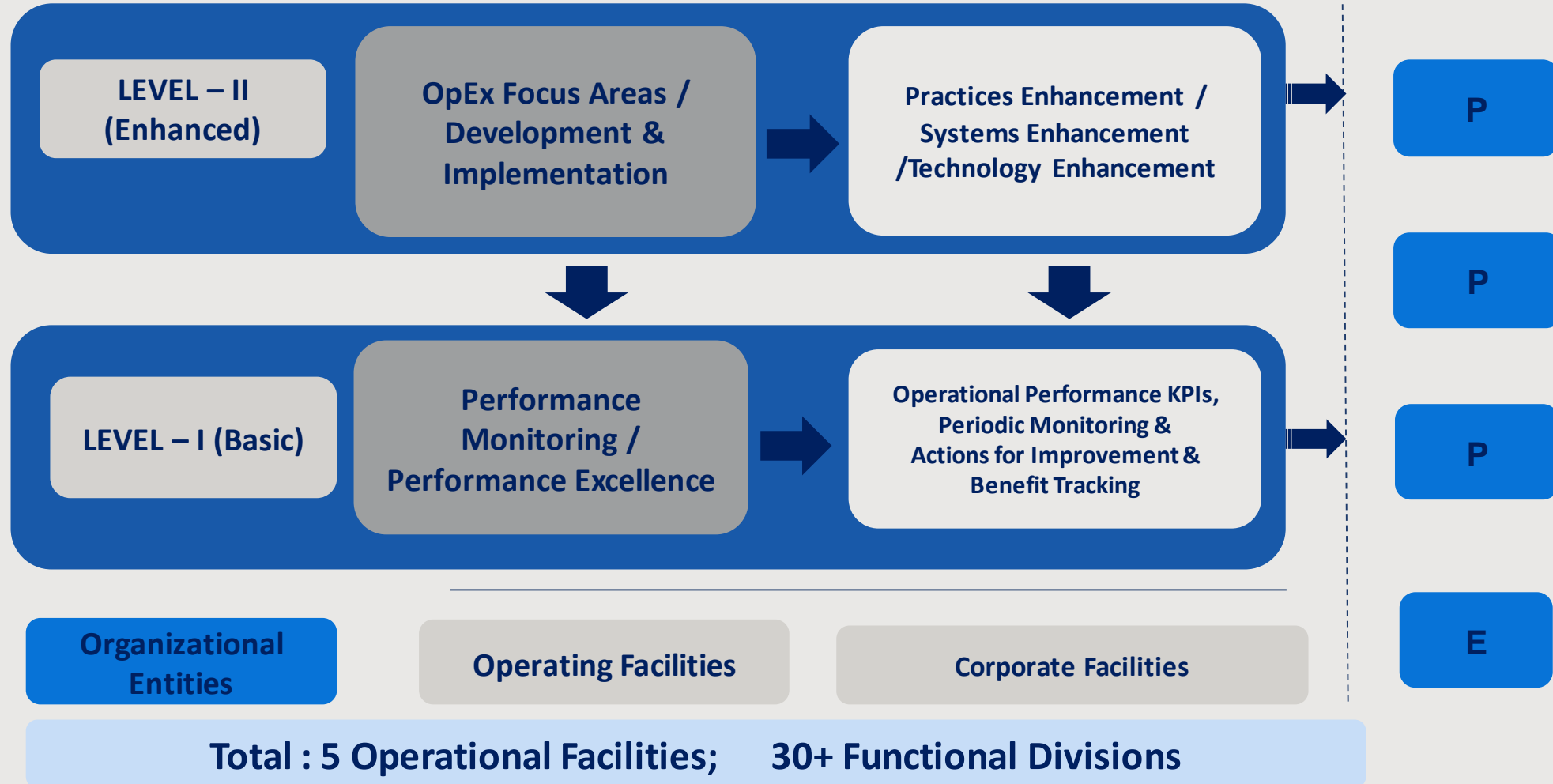
OpEx Implementation Framework



Key Features

- A Corporate Level Structured Framework
- Top Executive Management Driven Implementation
- Defined Focus Areas with dedicated teams
- Ownership of the Initiatives by Higher Management (Sponsors & Champions)
- Company wide coverage for Operational Excellence Implementation

ADNOC REFINING OPERATIONAL EXCELLENCE IMPLEMENTATION



ADNOC REFINING OPEX EFFORTS & FOCUS AREAS

BATCH I Focus Area	BATCH II Focus Areas (...contd.)		<h2>Key Accomplishments - 2017</h2> <ul style="list-style-type: none"> Focus Areas were classified into four batches : Batch-I : 13 /Batch-II : 8/ Batch – III : 3 / Batch-IV: 9 ; Batch-V: 2 A Total of 19 Focus Areas have been completed 16 Focus Area Activities are in Progress (GREEN & Light Blue) 	
Training & Competency Development (5 Nos.)	Bi-directional Management			
CO2 Management & Trading	Establishing & Compelling Reasons for Change and Managing Organizational Change			
Process Modeling & LP Modeling	BATCH III Focus Areas			
Process Alarm Management	Product Optimization System			
Process Technical Information	Production Information and Control System			
Procedure Management & Documentation	HSE & Process Safety System – Material Loss			
Opportunity Management	OpEx Strategic Initiatives			
Energy Management	Catalyst Management System			
Material & Warehousing	Integrity Improvement			
Work Quality Assurance	Batch IV Focus Areas			
BATCH II Focus Area	Turn Around Optimization		Support Functions Optimization	Products Yield Optimization
Work Process Standardization	Maintenance Efficiency Improvement		Integrity Improvement	Blending Optimization
Plant Operating Vision, Operating Philosophy & Daily Plant Operation	Chemicals Consumption Optimization	TDMS Upgrade & e-Doc Integration	Capacity Optimization	Process Models Utilization
Leadership Team Effectiveness		Real-time Decision Systems		

On-going Focus Areas
 New Focus Areas
 Strategic Initiative
 Completed Focus Areas

ADNOC REFINING OPEX PROGRAM – KEY ACCOMPLISHMENTS

Training and Competency Development

- E-Learning System in identified areas
- Specific and Tailored programs for Leadership Development

Maintenance & Reliability Improvement

- Created of specialized maintenance group for Turbo Machinery
- Regular Progress Monitoring of 14 Maintenance KPIs / ensuring enhanced focus for HSECES ;
- Implemented periodic Bench Marking through expert agencies / ADNOC OE Coordinated Benchmarking Assessment
- Action Plan Implementation /Progress Monitoring through Dedicated Teams

Opportunity Management and Optimization

- Implemented and reviewed the opportunity trackers at all sites
- Implemented opportunity management Business Processes at all sites
- Implemented in-house profit improvement program

ADNOC REFINING OPEX PROGRAM – KEY ACCOMPLISHMENTS

Alarms Management

- Identified alarm monitoring/rationalization teams at each of the facility
- Implemented advanced AMS at some of the facilities (SCD, RRW) on trial basis ;

Process Models & Production Models Development / Implementation

- Implemented LP models for all the facilities and integrated model for Planning Optimization (Monthly Rolling Plan; Annual Business Plans)
- Implemented periodic back-casting ; Business processes in to regular practice
- Development of rigorous process models for key plants of operating facilities (ADRD, RRE, RRW) was accomplished.

Production Information & Control

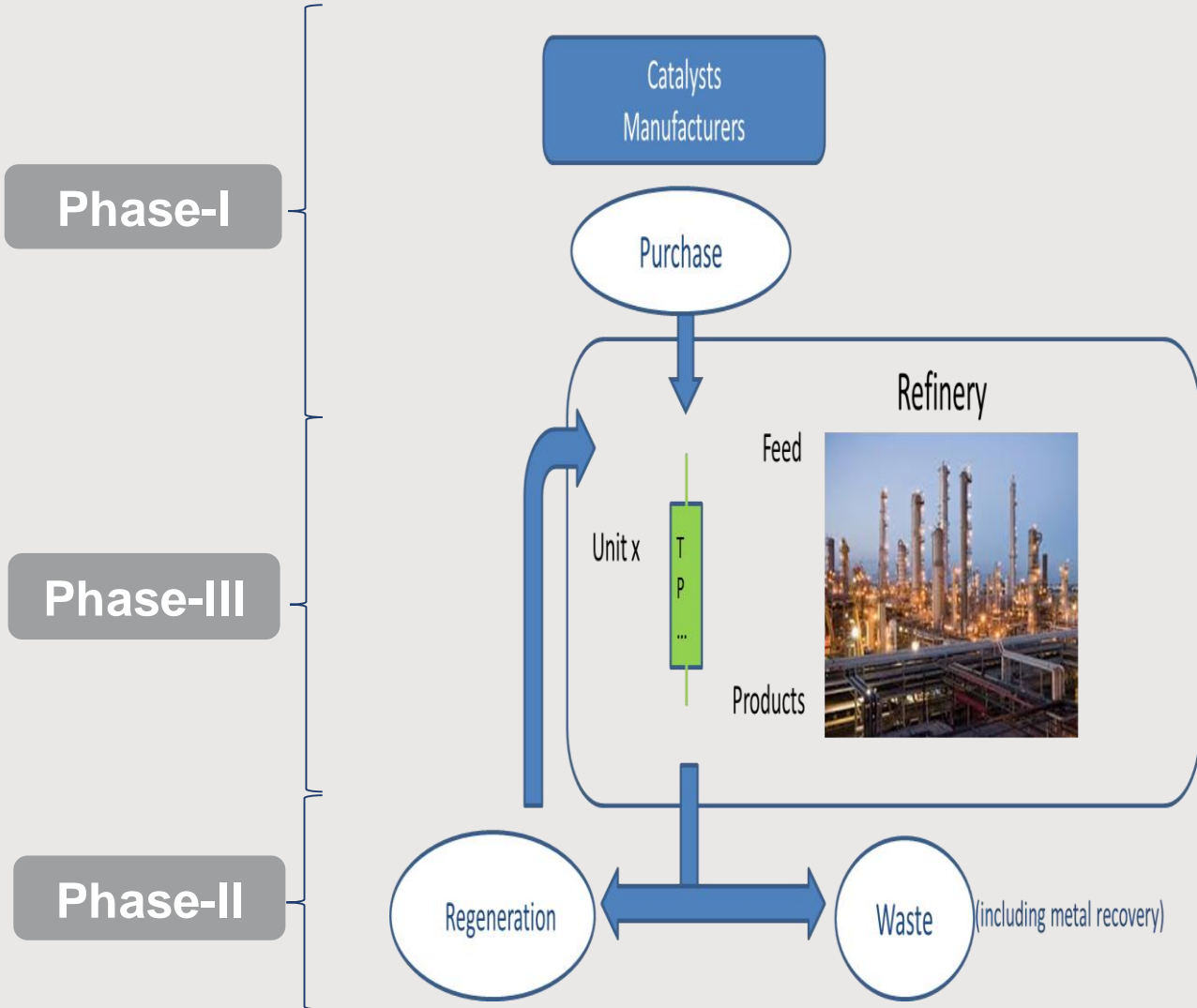
- Advanced process data systems implementation; APC implementation was carried out on identified key plants at various sites (ADR, RRE)
- Yield Accounting Advanced Applications implementation was accomplished.
- Enhanced Digital infrastructure through Applications Integration (RIS), a Corporate Level Project.

ADNOC REFINING OPEX EFFORTS IN CATALYST MANAGEMENT

Benchmarking of Practices for Operational Excellence in Catalyst Management

Key Features

- Catalyst Technology Developments, Market dynamics and Business requirements advocated an opportunity for Catalyst Optimization
- CATMS Development – ADNOC Refining’s strategic initiative and phased approach was undertaken, Overall project spread into 3 Phases
- Bench marked the practices in every phase with ADNOC Group companies /International Premier Companies
- A Collaborative Corporate Level Team Effort with all relevant groups involvement
- A total of 85 Best Practices were identified for Phase-I & Phase-II ; Developed ADNOC Refining Catalyst Management System; A Robust World Class Catalyst Management System for ADNOC Refining Facilities.
- Implementation in Progress through dedicated team efforts

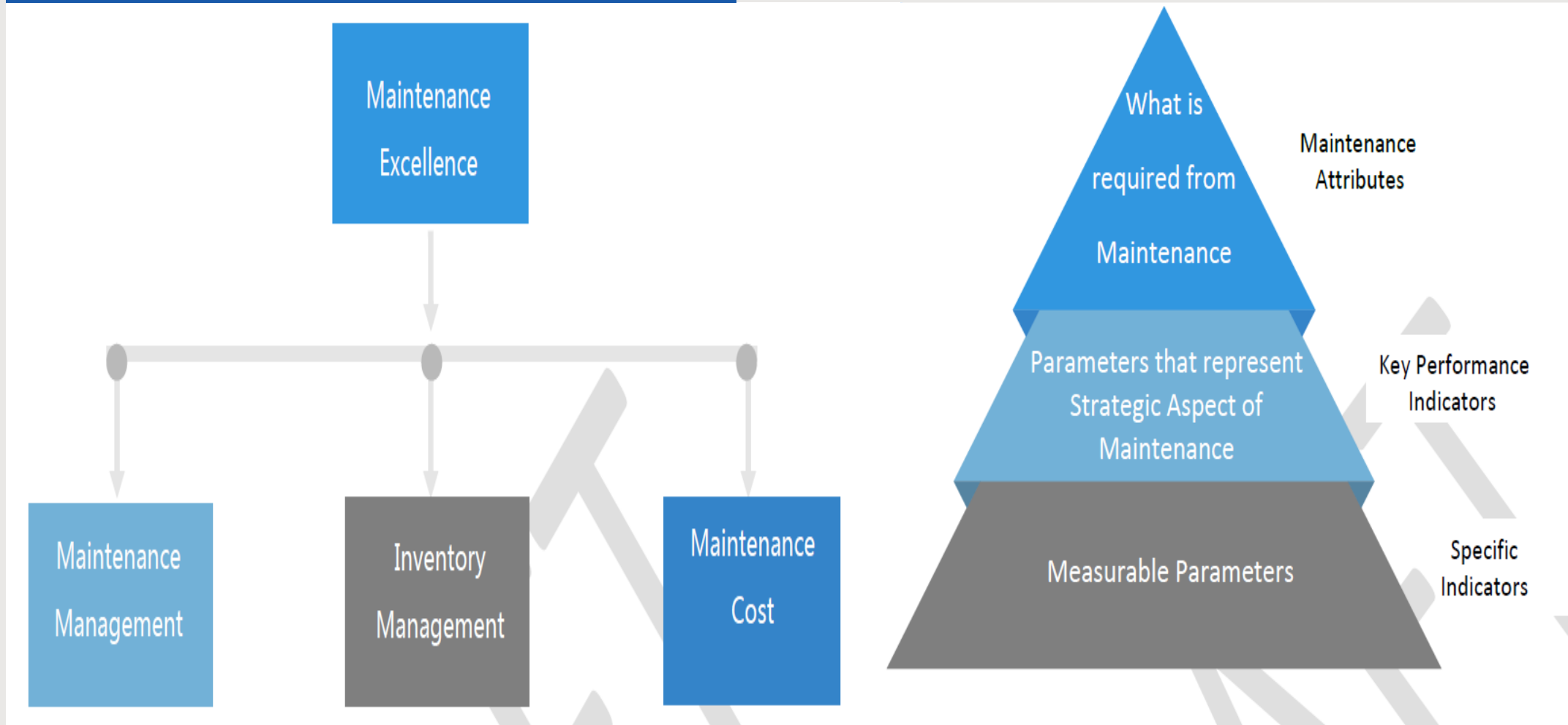


OPERATIONAL EXCELLENCE - BENCH MARKING OF ORGANIZATIONAL PERFORMANCE



OPERATIONAL EXCELLENCE - BENCH MARKING OF ORGANIZATIONAL PERFORMANCE

Key Maintenance Areas & Performance Parameters

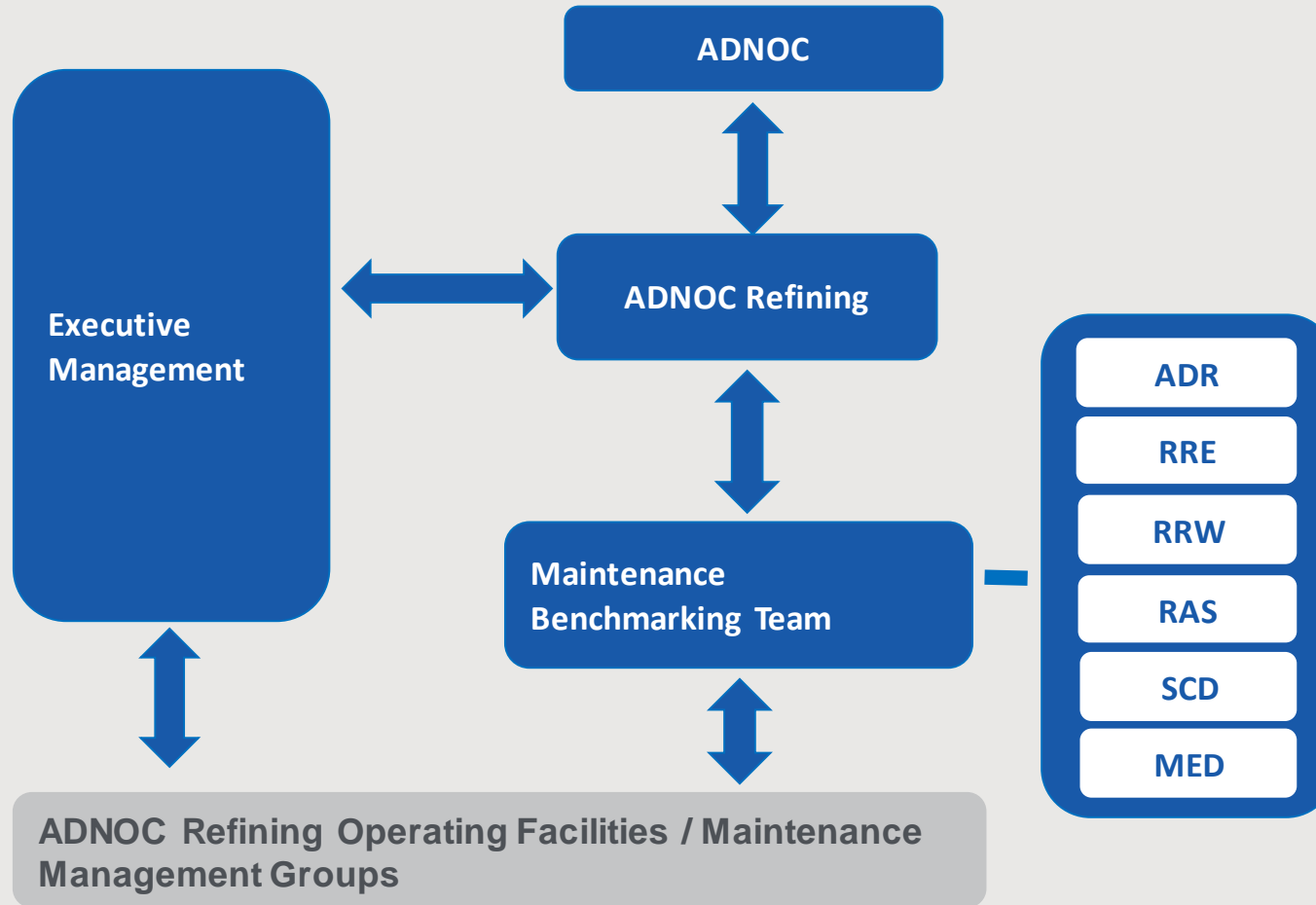


ADNOC OE MAINTENANCE BENCHMARKING - SOME OF THE KPIS

Maintenance Cost	Inventory Management	Maintenance Management
<ul style="list-style-type: none"> ▪ Annual Maintenance Cost ▪ Contractor Cost ▪ Maintenance Shutdown Cost ▪ Maintenance Material Cost ▪ Overtime maintenance Cost 	<ul style="list-style-type: none"> ▪ Stock Inventory Turn Over ▪ Service Level ▪ Inactive Stock 	<ul style="list-style-type: none"> ▪ Operational availability ▪ Planned work ▪ Reactive work ▪ Backlogs ▪ HSECES backlogs ▪ Scheduling Compliance ▪ PM compliance ▪ Rework

A Total of 28 KPIs were used in the Bench Marking Exercise covering the Maintenance Performance Areas

ADNOC REFINING MAINTENANCE BENCHMARKING ACTIVITY IMPLEMENTATION FRAMEWORK & KEY FEATURES



Key Features

- Team Effort/Extensive Coordination
- Documented Guidelines
- Clear Definitions of Indicators
- Milestone Plan
- Strict Adherence to Targets
- Intensive Activity
- Close follow-up
- Re-validation of the Data
- Periodic Reviews
- Progress Reporting to Executive Management
- Results Presentation to Sites Management

The Project was successfully completed as per ADNOC Targets

ASSET INTEGRITY & OPERATIONS INTEGRITY – BENCH MARKING ASSESSMENT KEY PHASES

Phase-I

- Measuring, comparing, and analyzing relevant Performance Indicators

Phase-II

- Management Systems Assessment through Survey Questionnaire and Evidence Review

Phase-III

- Comparative Evaluation among the Group Companies

Extensive efforts were made in Integrity Assessment as part of ADNOC Group Level Activity

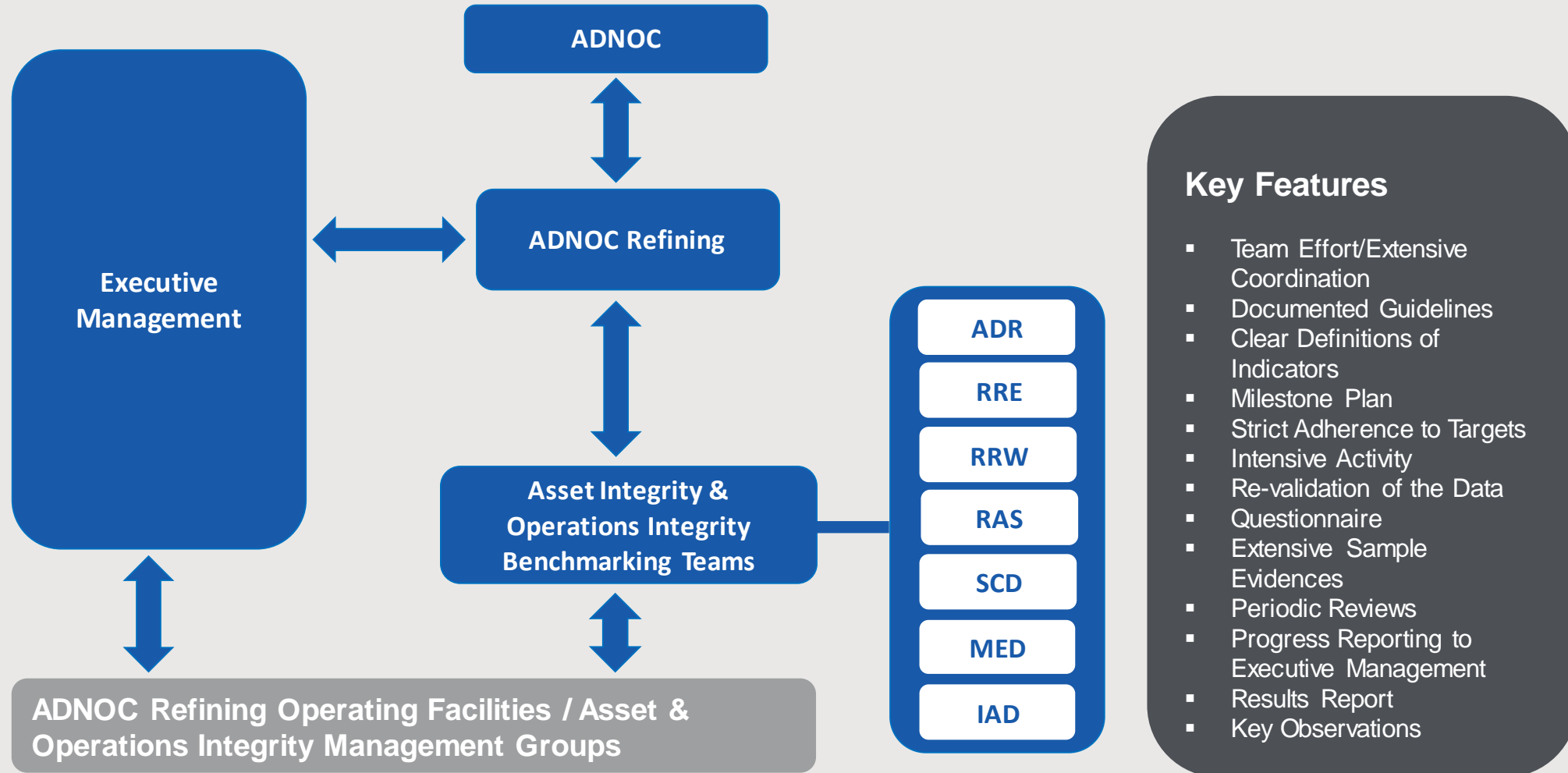
ASSET INTEGRITY & OPERATIONS INTEGRITY BENCHMARKING – SOME OF PERFORMANCE INDICES

Phase-I : Some of the KPIs

Assets Technical Integrity	Operations Integrity
<ul style="list-style-type: none"> ▪ Loss of primary containment ▪ HSECES Compliance ▪ Failure of Emergency Shutdown Systems during tests ▪ Service Level of HSECES Spares ▪ Inspection Backlog 	<ul style="list-style-type: none"> ▪ Plant MOC ▪ Operations Procedures/Documents ▪ Alarm Management-Average alarm rate ▪ Alarm Management- Peak alarm rate ▪ Unscheduled Production loss ▪ Number of Hot Work Permits ▪

Key Performance Indicators Identified & Defined, Evaluated and Assessed through a Systematic Rigorous Activity; A total of 23 KPIs were used in the Assessment

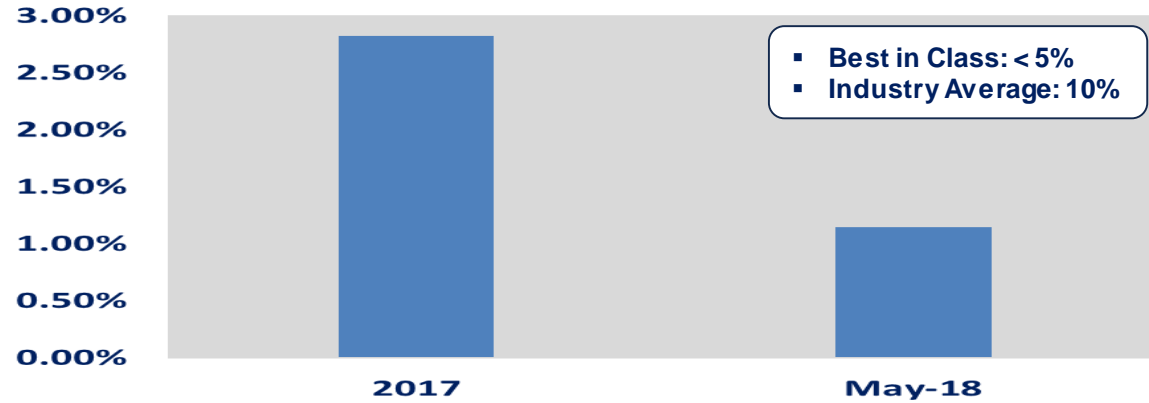
ADNOC REFINING ASSET INTEGRITY & OPERATIONS INTEGRITY BENCHMARKING ACTIVITY IMPLEMENTATION FRAMEWORK & KEY FEATURES



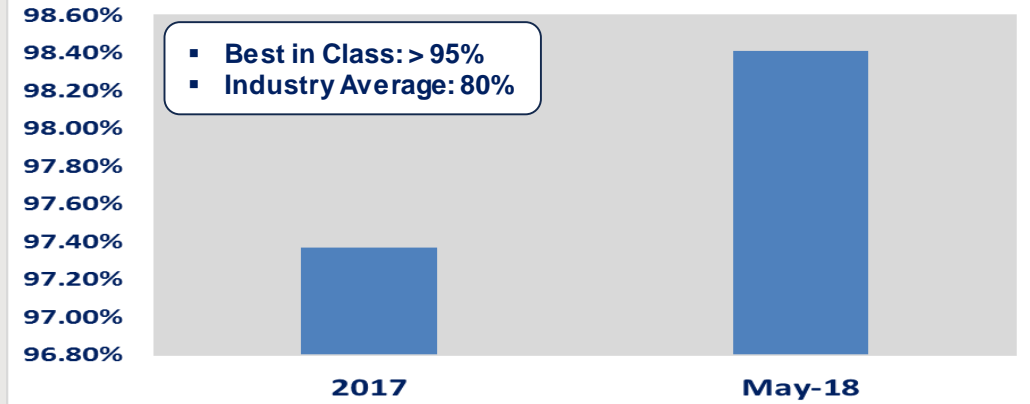
The Project was successfully accomplished as per ADNOC Targets

BENCH MARKING ASSESSMENT ACCOMPLISHMENTS

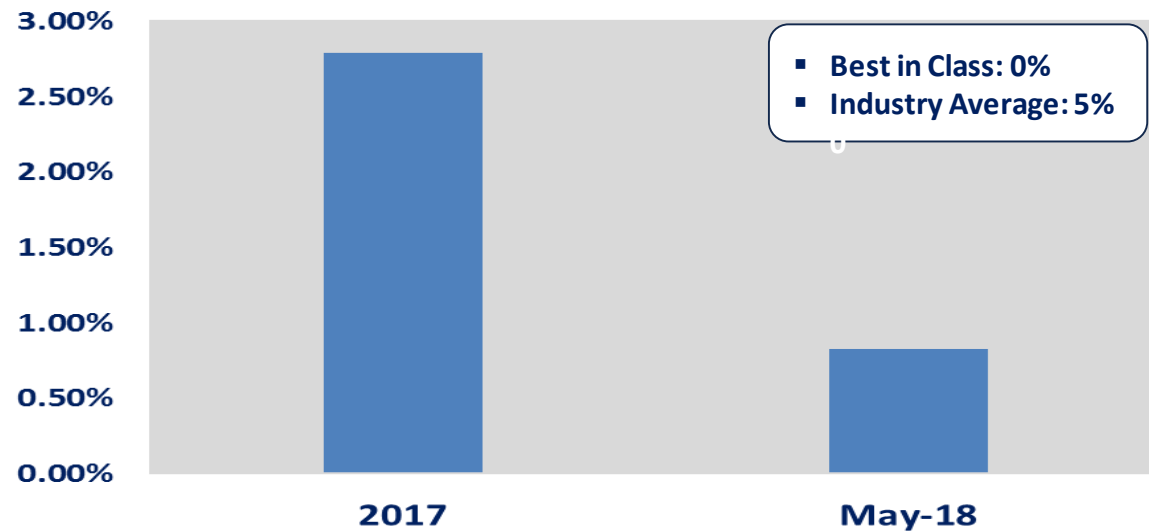
Overtime Maintenance Cost



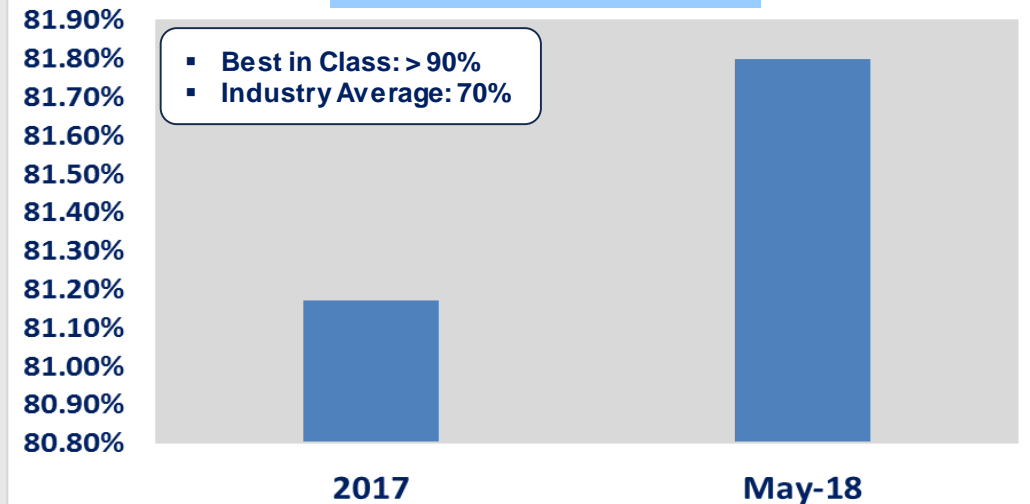
Planned Work (%)



HSECES Backlogs



PM Compliance (%)



BENCH MARKING ASSESSMENTS – KEY BENEFITS

Achievements

- Benchmarking helped for Evaluating the Facility Performance in a comparative framework
- In some cases – provided opportunity for Extensive Evaluation & Health of the organization level Monitoring and Health of the Management Systems
- Helped to identify the areas of Improvement ; Helped to develop and implement world class systems and frameworks
(OpEx Model and CATMS)
- Enhanced the performance consciousness and awareness among the employees

Conclusions

- Provides a mechanism for Improvement Action Plan Development & Further Implementation in a Systematic & Effective
- Organized Framework. ADNOC Refining utilized the opportunity and dedicated teams were entrusted for
- Implementation and Progress Monitoring
- Bench Marking forms the first key steps and provides the Basis for Continuous Performance Improvement towards

Operational Excellence



THANK YOU