Base Load Power Hub (BLPH)

Project Controls Plans Procedures

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1 PROJECT OVERVIEW

1.1 THE HOLLANDSE KUST NOORD WIND PARK

Crosswind, a Shell and Eneco joint venture, was awarded the tender to develop the offshore Hollandse Kust Noord (HKN) wind farm, located 18.5km off the coast of Netherlands near the town of Egmond aan Zee. The consortium plans to have HKN operational in 2023 with an installed capacity of 759MW generating at least 3.3TWh per year. This is sufficient renewable power to supply more than 1 million Dutch households with green electricity.

Offshore wind farms produce intermittent electricity and balancing these dips and peaks and integrating this electricity into the national energy system requires new technologies. For this reason, the offshore wind farm will include several new technologies that could be implemented at full-scale in the future. The new technologies being explored include a floating solar park, a short-duration battery storage as well as long-term storage via green hydrogen produced by water electrolysis and subsequently consumed in a fuel cell. The combination of these individual measures, herein referred to as the Base Load Power Hub (BLPH) will ensure a continuous power supply regardless of the wind situation.

1.1.1 Project Location

The Hollandse Kust Noord (HKN) wind farm is located 18.5km off the coast of the Netherlands near the town of Egmond aan Zee.



Figure 1 - HOLLANDSE KUST NOORD WIND PARK Location Map



Figure 2 - Wind Park Details

The wind farm will consist of No. 69 x 11.5MW wind turbine generators each to be installed on a dedicated monopile structure. A 70th monopile located on coordinates E 590719.1, N 5841602.3 is reserved for installing the platform accommodating the BLPH. The monopile structure was designed and installed by Van Oord Offshore Wind (VooW) and therefore not part of the BLPH scope.

1.1.2 Project Concept

All components included in the BLPH will be integrated onshore on a topsides and installed in an offshore location within the boundaries of the HKN wind farm. At its simplest, the BLPH will store energy during periods of high electricity generation from renewable sources (a wind turbine generator and the floating solar PV farm) and release it during periods of low generation. In practice. It is expected that the energy stored will supplement generation from renewable sources to ensure that at least 1.0MW of power is exported to the electrical grid regardless of wind/solar availability.

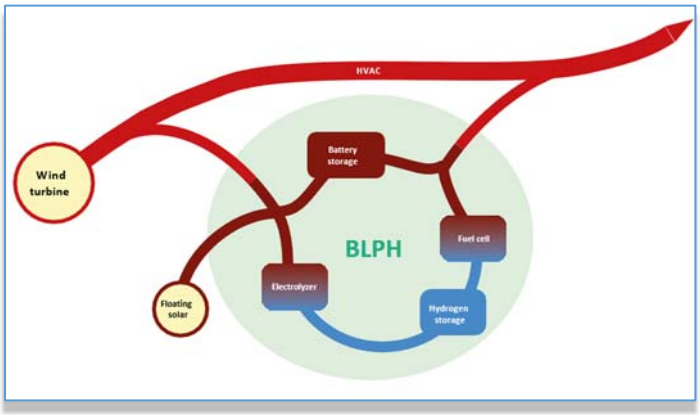


Figure 3 - BLPH Concept

Electricity in the BLPH will be stored in the form of electrons in a battery energy storage system (BESS) as well as converted into green hydrogen via water electrolysis. When the power output from the connecting wind turbine drops to below 1 MWe, the BLPH will return its stored energy to supplement the remaining power output. This will be by discharging the BESS, while stored hydrogen will be converted back into electricity using a fuel cell to extend the discharge duration.

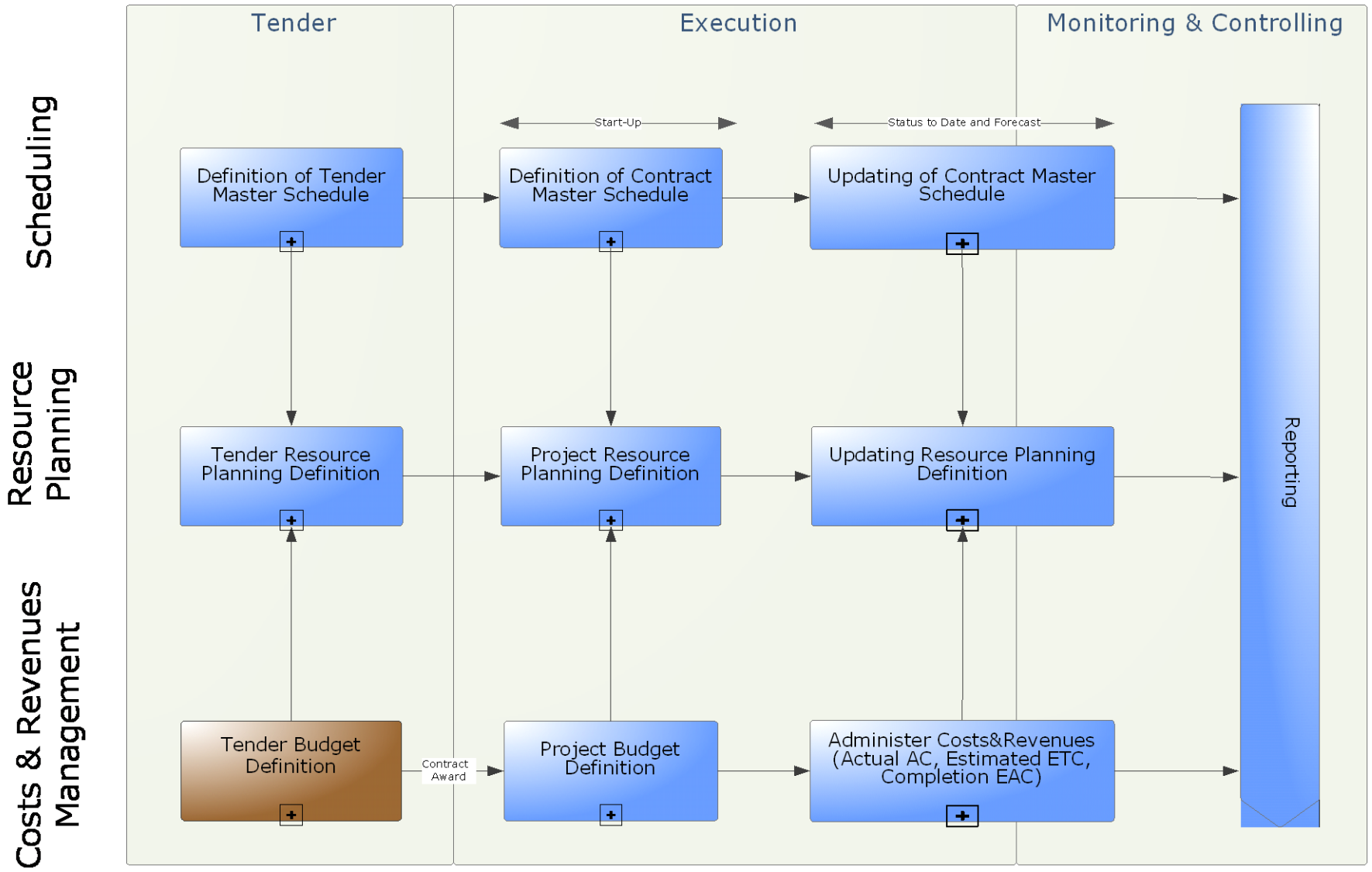
The purpose of the BLPH is to function as a testbed for the integration of energy storage technologies with renewable generation. It is expected that equipment installed on the BLPH will operate as Normally Unmanned Installation for at least two (2) years with no or minimal maintenance and it will have its own independent control room with the ability to communicate with Crosswind's control room.

2 ATTACHMENTS

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Attachment 1 – O-AFC-2L-002 Project Planning, Scheduling and Cost Controlling

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Project Planning, Scheduling & Cost Controlling	**Revision:** 2014-00	Created: M. Zanoni	ROSETTI MARINO SPA
O-AFC-2L-002	**Revision Type:** New Issue	Verified: L. Hochard	
Author: mzanoni	**Status:** Approved	Approved: L. Giorgini	
	Owner:	Approval Date: 09/06/2014	
		Publishing Date: 09/06/2014	

Attachment 2 – O-AFC-3B-018 Project Resources Updating

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Project Resources Updating

Area SISDOC: 06 – Group Administration, Finance & Control Management

Revision

Rev.	*Date*	*Description*	*Prepared by*	*Checked by*	*Approved by*
2014-00	06/11/2014	New Issue	A. Currà	L. Hochard	L. Giorgini
2018-00	25/09/2018	General Review	M. Ruggi	S. Scolaro	A. Scopetti

PURPOSE AND FIELD OF APPLICATION

The purpose of this procedure is to define responsibilities, interfaces and activities related to the process of updating of the Workload of Project Resources.

This procedure shall be applied to all Energy Projects.

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1. DEFINITIONS AND ABBREVIATIONS

1.1 Abbreviations and acronyms

ETC Estimate to Completion
PM Project Manager
PCM Project Control Manager
CC Cost Controller
PQM Project Quality Manager
CM Construction Manager
PHSEM Project HSE Manager
PPM Project Procurement Manager
BO Business Object

2. ACTIVITIES DESCRIPTION

According to the Project Budget and, afterwards, to the updating of Project economic previsions, the Head of Management Control notifies to the PCM and the CC the actual hours of the project resources that are referred to the previous month and which have been consolidated on SAP.

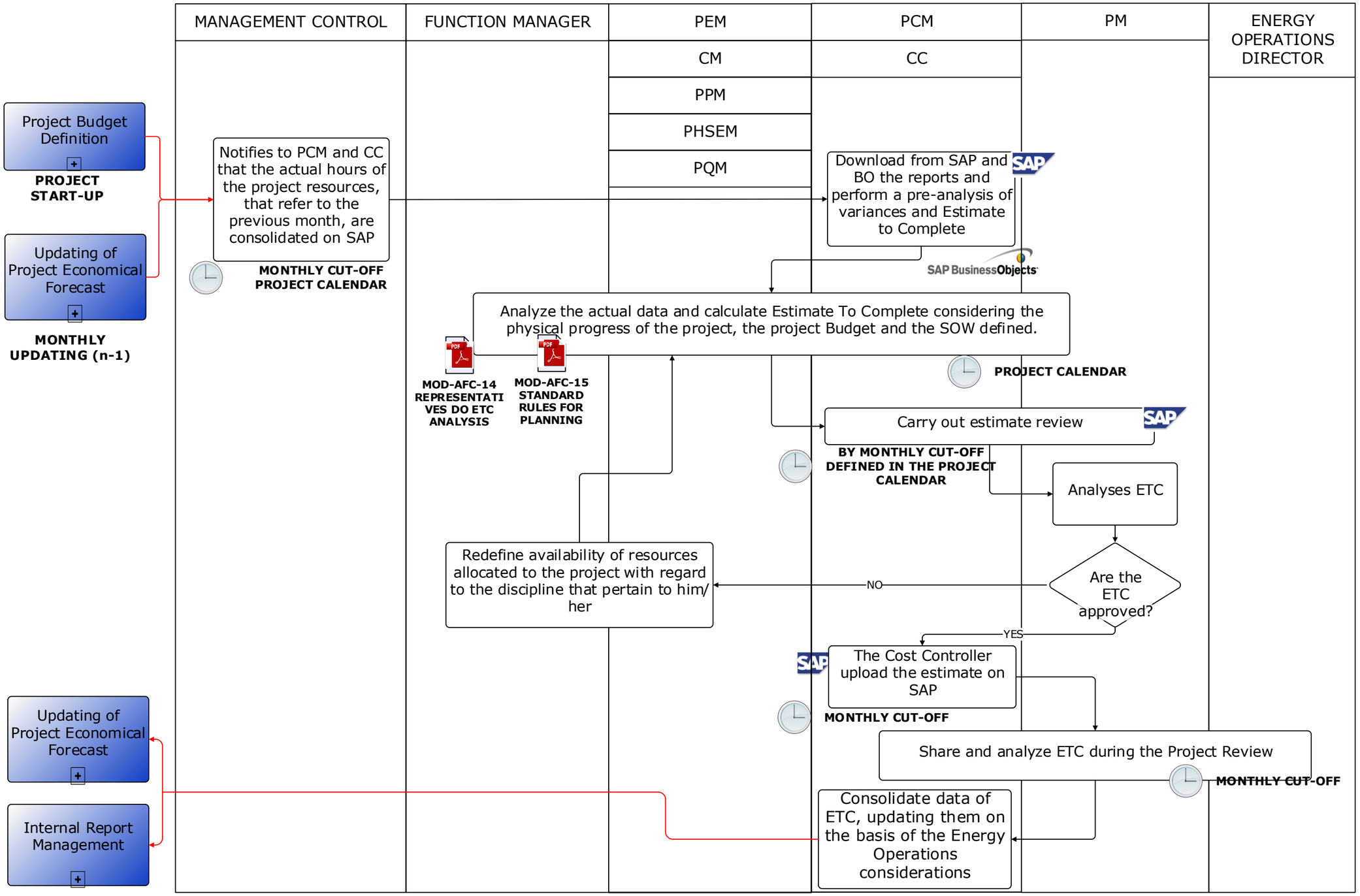
The PCM and the CC download from BO the reports and carry out a pre-analysis of variances and estimates to complete.

PEM, CM, PPM, PHSEM, PQM, PCM, CC and the Head of Functions analyze the actual data and calculate the estimates to completion for each area of activity, considering the physical progress of the Project, the Project Budget and the scope of work of each discipline.

The PM carries out the review of the estimate with the PCM and the CC; he analyzes them and, once approved, the CC uploads them on SAP at monthly intervals.

On a monthly basis, the PM, PCM and CC show and discuss with the Energy Operations Director the analysis on the estimate to complete. According to the considerations proposed by the Energy Operations Director, the CC and the PCM update and consolidate the estimate to complete.

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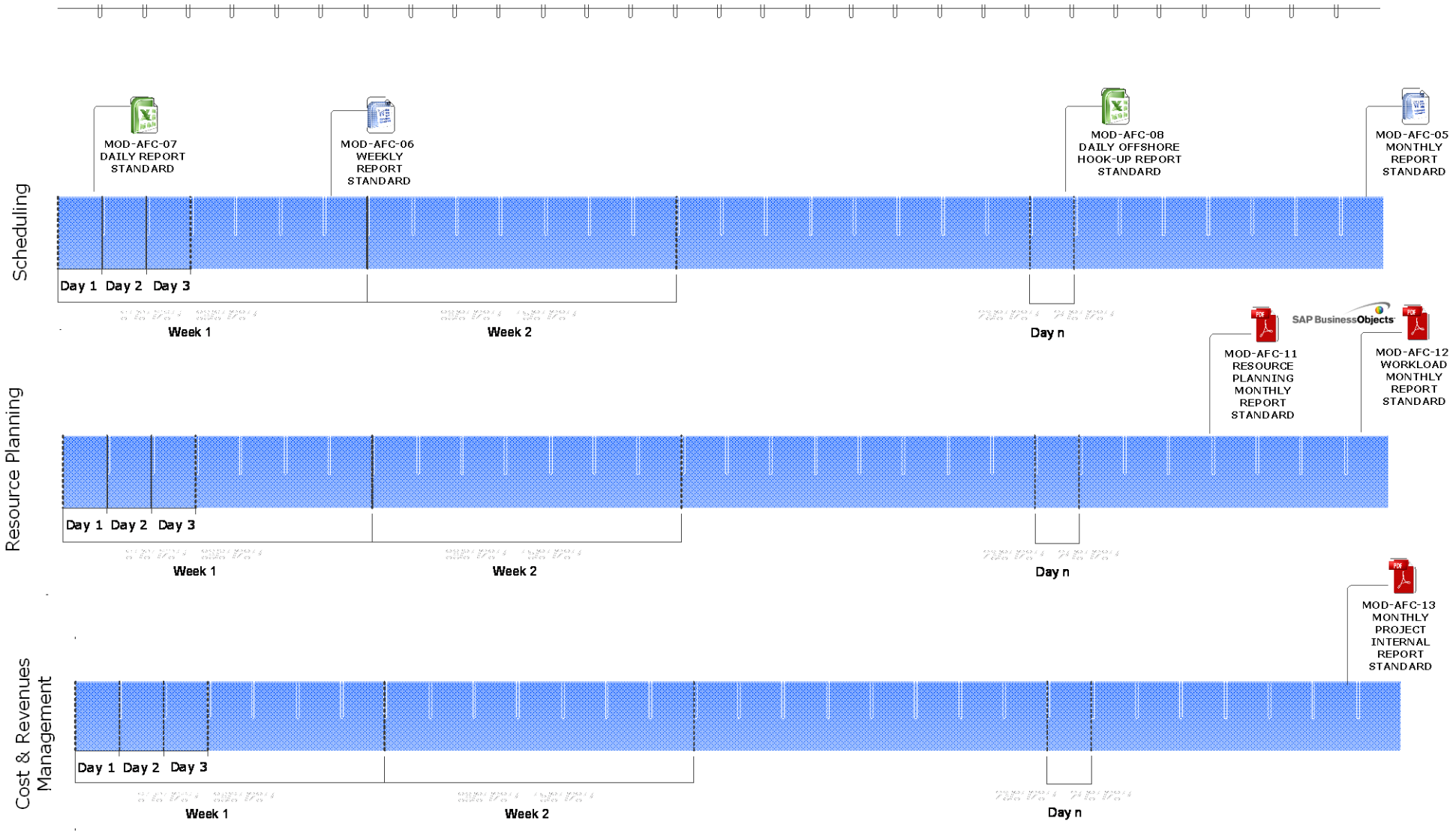


Project Resources Updating		Revision: 2018-00	Created: M. Ruggi	ROSETTI MARINO SPA
0-AFC-3B-018		Revision Type: General Review	Verified: S. Scolaro	
		Status: Approved	Approved: A. Scopetti	
		Owner: Project Control Manager	Approval Date: 19/09/2018	
			Publishing Date: 19/09/2018	

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Attachment 3 - O-AFC-3L-001 Reporting

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Project Planning and Scheduling Reporting	**Revision:**	**2014-00**	Created: C. Brunelli
O-AFC-3L-001	**Revision Type:**	New Issue	Verified: L. Hochard
Author: cbrunelli	**Status:**	Approved	Approved: L. Giorgini
	Owner:	**Project Control Manager**	Approval Date: 09/06/2014
			Publishing Date: 09/06/2014

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Attachment 4 – PRO-PRM-02 Contract Master Schedule Definition

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CONTRACT MASTER SCHEDULE DEFINITION

Area SISDOC: 08 – Energy Operations

Revision

Rev.	*Date*	*Description*	*Prepared by*	*Verified by*	*Approved by*
2018-00	12/09/2018	General Revision	S. Scolaro	F. Iarocci A. Ceresa	A. Scopetti M.V. Gigante
2020-00	01/08/2020	Merger through incorporation of Basis Engineering into Rosetti Marino. Cancels and replaces O-AFC-3B-005.	S. Scolaro	F. Iarocci	A. Scopetti

SCOPE AND FIELD OF APPLICATION

To define the methods and responsibilities in order to define the Contract Master Schedule.

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1.2 Abbreviations and acronyms 2
2. RESPONSIBILITIES AND ACTIVITIES DESCRIPTION 2
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4. WORKFLOW 3

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1. DEFINITIONS AND ABBREVIATIONS

1.1 Definitions

Contract Master Schedule	It is a schedule, shared by the members of the Project Team and approved by the Client, related to the activities to be performed for the execution and completion of an Energy Project.

1.2 Abbreviations and acronyms

CMS	Contract Master Schedule
CMN	Commissioning Manager
PCM	Project Control Manager
PEM	Project Engineer Manager
PPM	Project Procurement Manager
CM	Construction Manager
PM	Project Manager
P6	Planning Software

2. RESPONSIBILITIES AND ACTIVITIES DESCRIPTION

Following the tender documentation receiving and based on the Engineering and Construction strategy, the Project Control Manager (PCM) starts the analysis of the planning performed during the tender phase, involving the Planner, the Project Engineering Manager (PEM), the Project Procurement Manager (PPM), the Construction Manager (CM) and the Commissioning Manager (CMN).

The PEM, PPM, CM and CMN prepare the schedule related to their discipline in collaboration with the Planner and, the latter, consolidates the data and the contractual milestones on P6 tool.

The Project Manager supervises the schedule preparation and he intervenes in case of criticality.

All the roles involved in the planning analyze the activities included in the Contract Master Schedule, their sequence, the time and they look for the best solutions for the integration of the Project phases.

The PEM, PPM, CM and the CMN together with the Planner, analyze individually the relevant schedules, in order to balance the workloads.

Following the collection of information by all the involved disciplines, the Planner proceeds with the identification of the Project's Critical Path and checks any possible corrective actions, managing the risks and/or opportunities associated.

The Planner calls a meeting in order to finalize the Contract Master Schedule with the Project Team Members.

Once the Planner has finalized the Contract Master Schedule on P6, he requires the Project Manager’s approval.

The Planner prepares the “Contract Master Schedule Narrative” and submits it to the Project Manager and Client final approval.

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3. REFERENCES

3.1 Work instructions

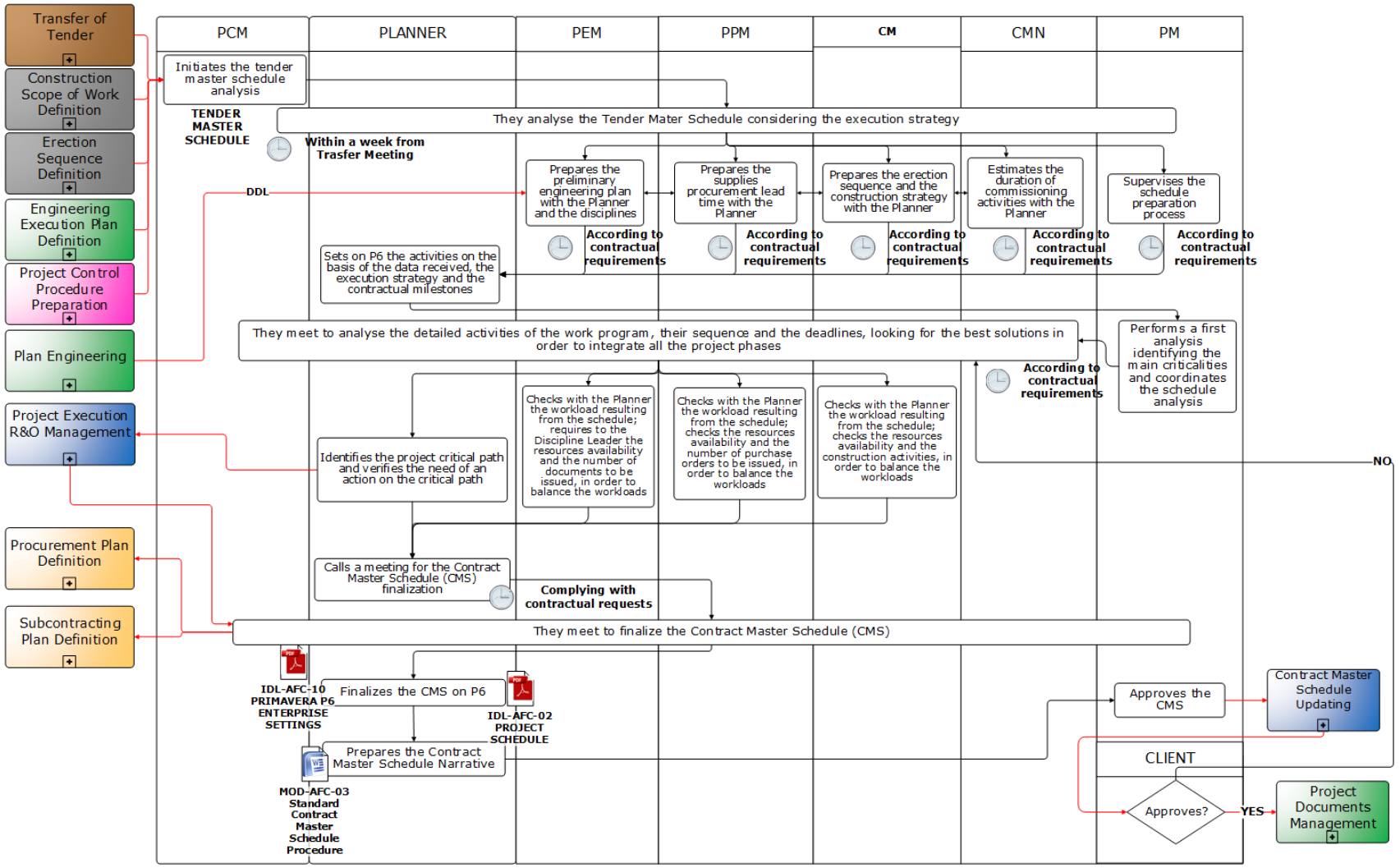
IDL-AFC-02	Project Schedule
IDL-AFC-10	Primavera P6 Enterprise Settings

3.2 Forms

MOD-AFC-03	Standard Contract Master Schedule Procedure

4. WORKFLOW

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Contract Master Schedule Definition	Revision:	2020-00	Created: S. Scolaro
PRO-PRM-02	Revision Type:	Merger through incorporation of Basis Engineering into Rosetti Marino	Verified: F. Iarocci
Author: vbetti	Status:	Approved	Approved: A. Scopetti
	Owner:	Planner	Approval Date: 01/08/2020

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Attachment 5 – PRO-PRM-03 Contract Master Schedule Updating

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CONTRACT MASTER SCHEDULE UDATING

SISDOC Area: **08** – Energy Operations

Revision

Rev.	*Date*	*Description*	*Prepared by*	*Verified by*	*Approved by*
2018-00	12/09/2018	General Revision	M. Ruggi B. Sorrentino	S. Scolaro A. Ceresa	A. Scopetti M.V. Gigante
2020-00	01/08/2020	Merger through incorporation of Basis Engineering into Rosetti Marino. Cancels and replaces O-AFC-3B-006.	S. Scolaro	F. Iarocci	A. Scopetti

SCOPE AND FIELD OF APPLICATION

To To define the methods and responsibilities relevant to the Contract Master Schedule update.

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1.2 Abbreviations and acronyms 2
2. RESPONSIBILITIES ANACTIVITIES DESCRIPTION AND PROCEDURE 2
3. REFERENCES 2
3.1 Forms 2
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1. DEFINITIONS AND ABBREVIATIONS

1.1 Definitions

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CMN	Commissioning Manager
PCM	Project Control Manager
PEM	Project Engineer Manager
PPM	Project Procurement Manager
CM	Construction Manager
PM	Project Manager
P6	Planning Software

2. RESPONSIBILITIES ANACTIVITIES DESCRIPTION AND PROCEDURE

Once the Contract Master Schedule has been defined, the Planner regularly requests to the Subcontractors, Fabrication and Assembly Supervisors, PEM, PPM, CMN to provide clarifications on the progress of the Project, in relation to the their disciplines.

The Planner analyzes the progress activities based on the data received and integrates them on the Progress Measurement System (PMS), verifying whether there are significant deviations as against the schedule.

The Planner updates the Contract Master Schedule on P6 verifying the Critical Path.

PEM, PPM, CMN, CM, PM and PCM analyze any delays and propose corrective resolutions, providing also the forecast dates.

The PM validates the proposed actions and the need for re-planning.

After the Planner consolidates the CMS updating.

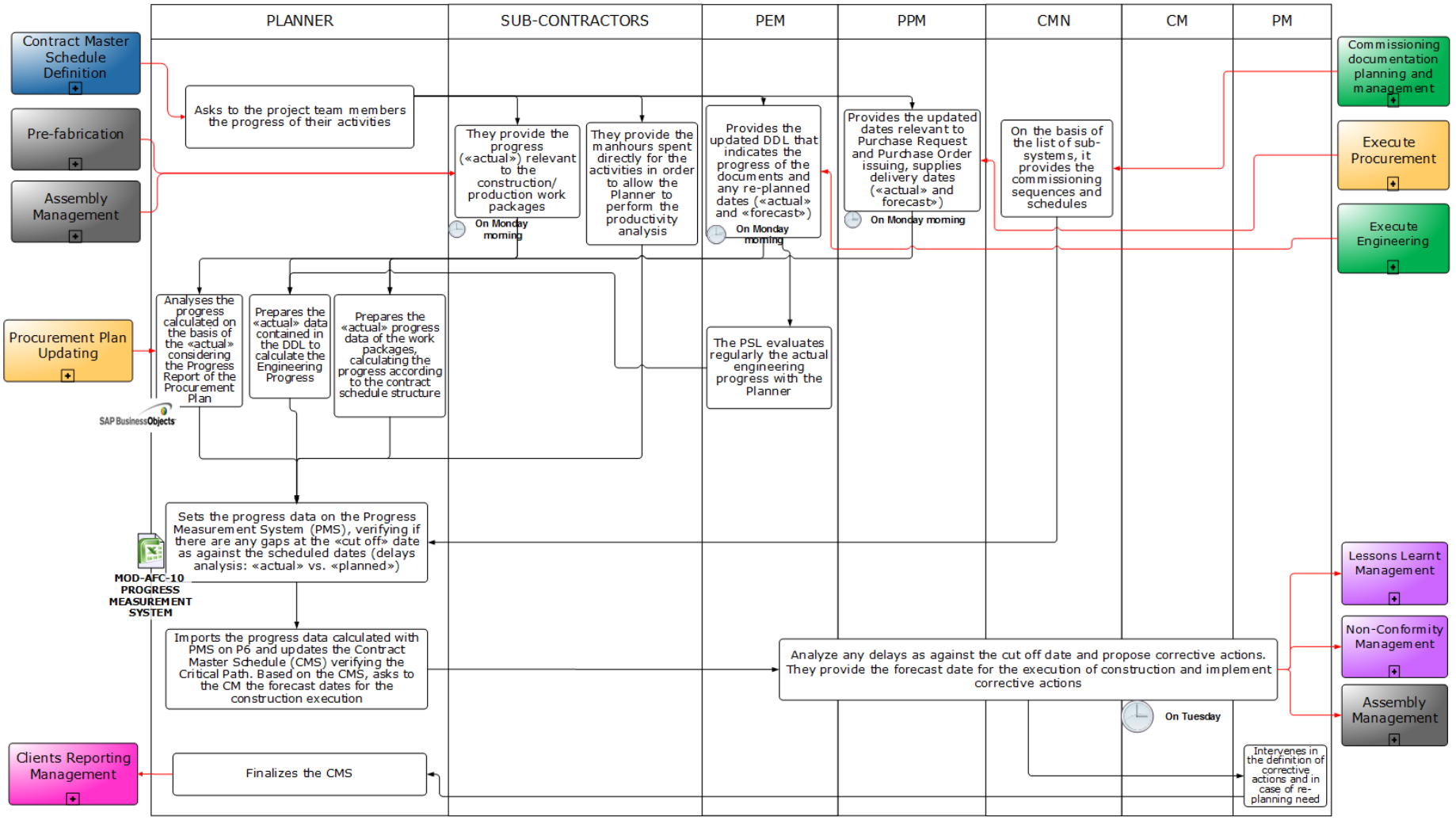
3. REFERENCES

3.1 Forms

MOD-AFC-10	Progress Measurement System

4. WORKFLOW

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Contract Master Schedule Updating	Revision:	2020-00	Created:	S. Scolaro
PRO-PRM-03	Revision Type:	Merger through incorporation of Basis Engineering into Rosetti Marino	Verified:	F. Iarocci
Author: vbetti	Status:	Approved	Approved:	A. Scopetti
	Owner:	Planner	Approval Date:	01/08/2020

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