

How to define good O&M to the DB contract

ADB Joint Regional Workshop on
Defining Operations and Maintenance under Design-Build-Operate Contracts
as Applied to ADB Infrastructure Projects

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Session 3: Maintenance

Definition of maintenance

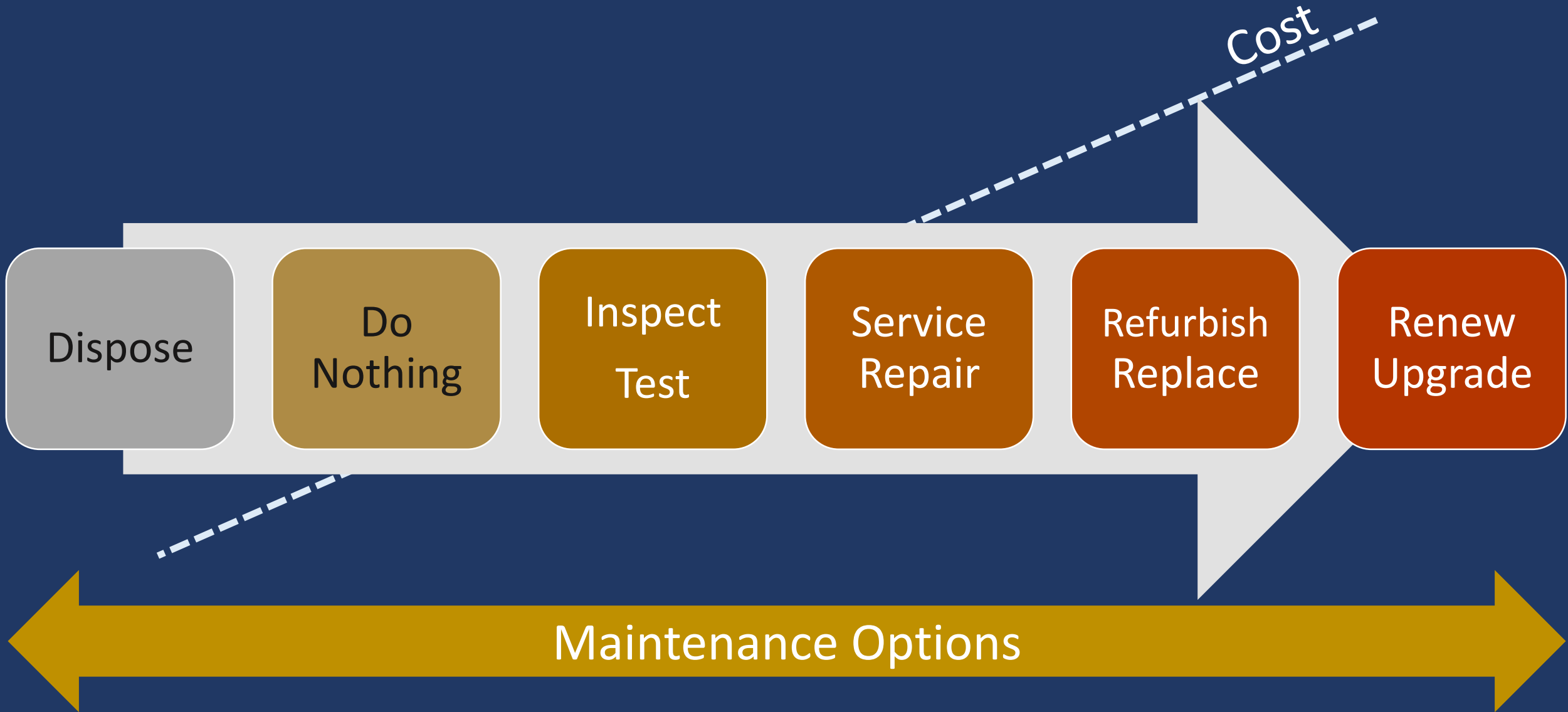
Right level of maintenance

Plants and networks

How to include in DBO contracts

Requirement for potential bidders

Maintenance Definition





Maintenance Definition

“Operations and
Maintenance”

Maintenance

Risk Management
(Likelihood and Consequence)

1

Condition Monitoring
(Likelihood)

2

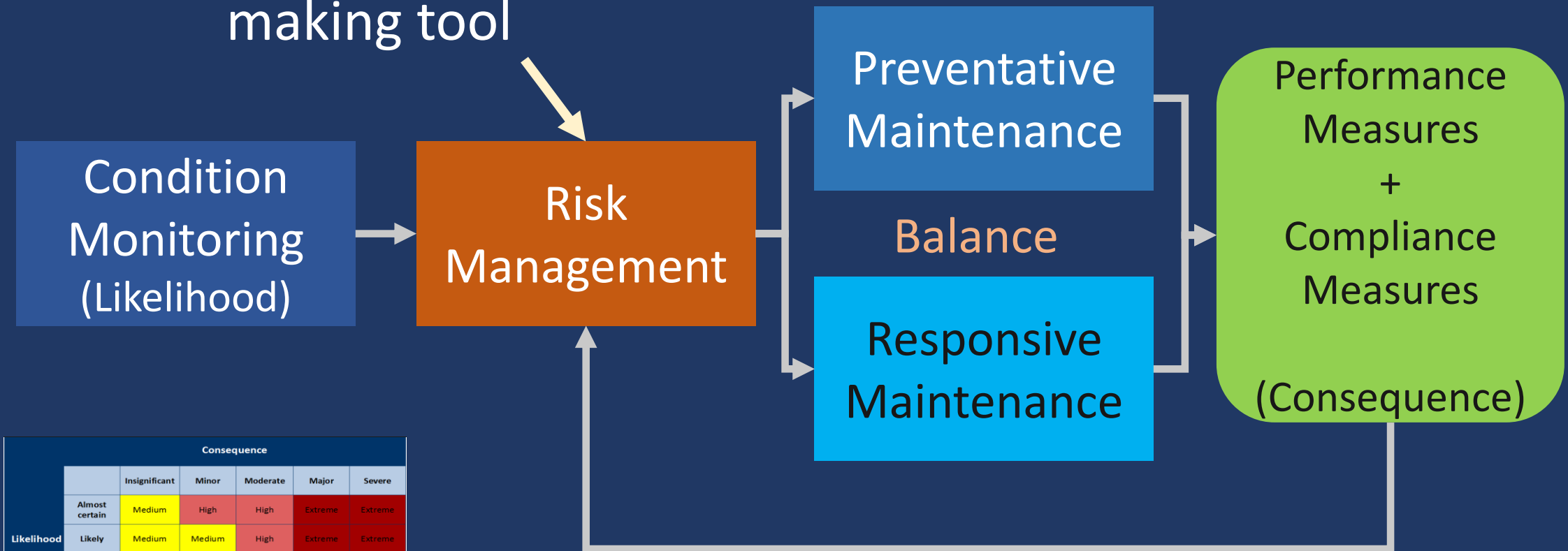
Preventative Maintenance

3

Responsive Maintenance

Maintenance Definition

Decision
making tool



		Consequence				
		Insignificant	Minor	Moderate	Major	Severe
Likelihood	Almost certain	Medium	High	High	Extreme	Extreme
	Likely	Medium	Medium	High	Extreme	Extreme
	Possible	Low	Medium	Medium	High	Extreme
	Unlikely	Low	Low	Medium	High	High
	Rare	Low	Low	Low	Medium	High

Maintenance Definition

Purpose	Preventative	Planned Scheduled Routine	To prevent a fault that, if it occurred, would have an adverse impact on: (1) The performance measures; (2) The compliance measures; and/or (3) The reputation of a water business.
	Responsive	Reactive Breakdown Corrective Emergency	To mitigate the consequences of a fault that has occurred. (‘Bring an asset back online.’)





- Operations
- Responsive Maintenance

- Condition Monitoring
- Preventative Maintenance

Maintenance Definition

Preventative Maintenance	Responsive Maintenance
Normal working hours	24/7 response
Known schedule and numbers	Unknown schedule and numbers
Can control job and its impacts	Cannot control job and its impacts
Less expensive	More expensive
Requires less inventory	Requires more inventory
Less hazardous	More hazardous

Maintenance Definition

Maintenance Management

Jobs
Job Codes

Action	Assets
Check	Pipe
Locate	Valve
Calibrate	Meter – Electromagnetic
Inspect	Tank
Repair	Pipe

Job Codes
Maintenance Checklists

Job Code

Raise Work
Order

Issue Work Order

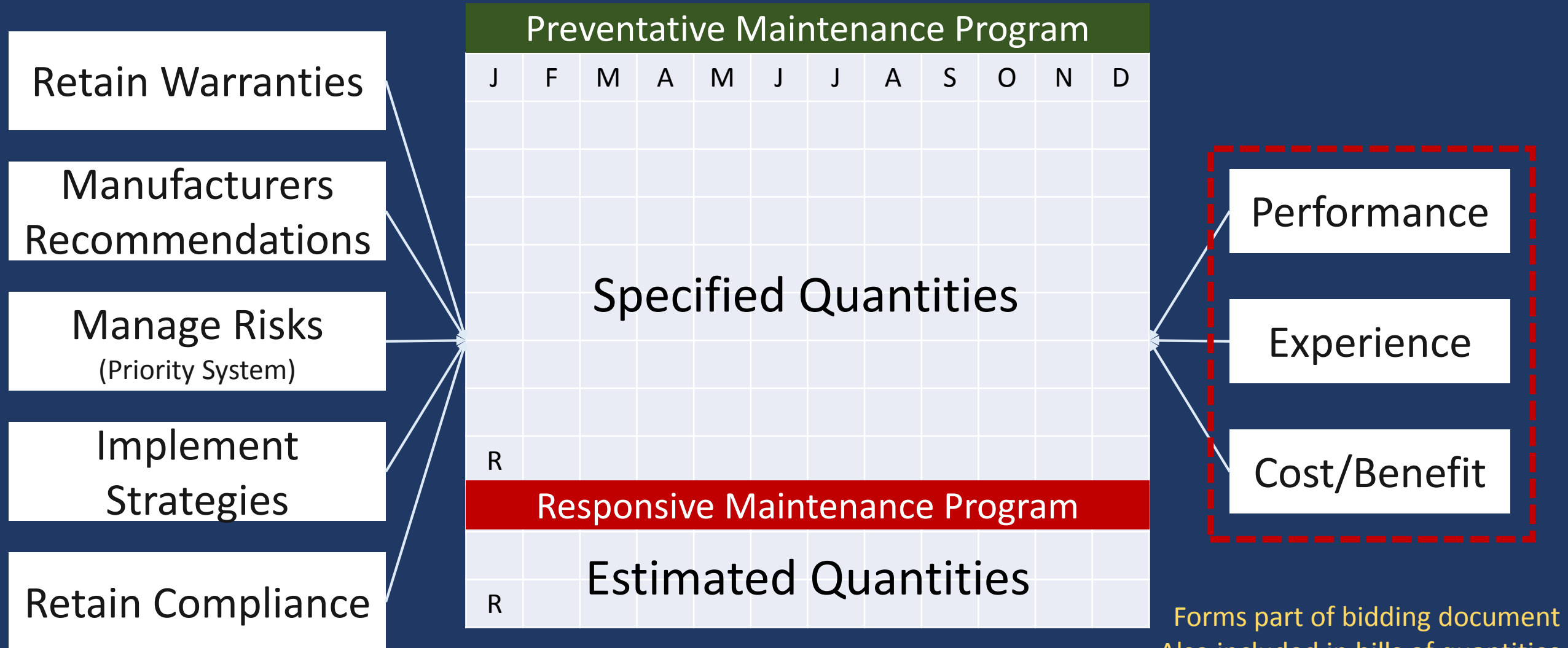
Complete Work
Order

Record Job

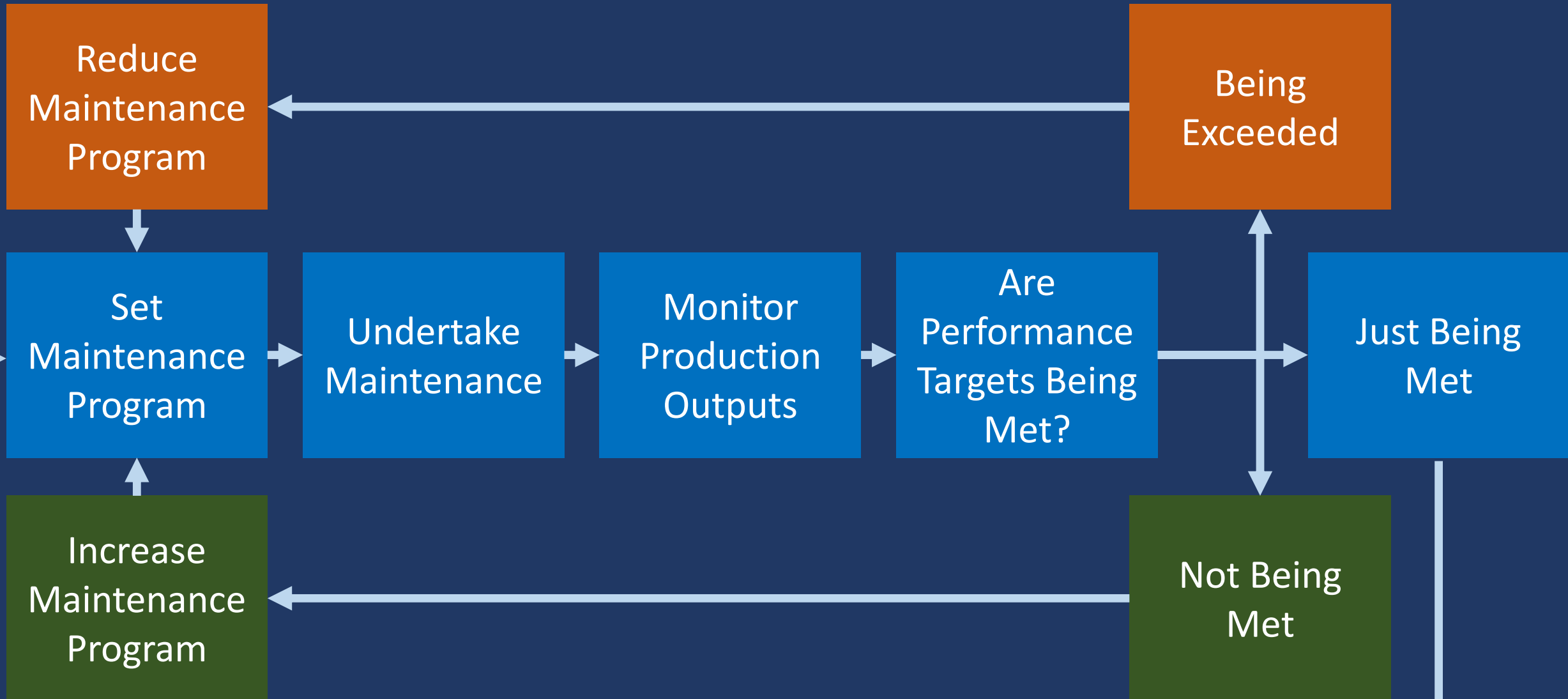
Maintenance Standards

There are a large number
of standards available for
different industries
Subject for future
workshop

Right Level of Maintenance



Right Level of Maintenance



Right Level of Maintenance

What Trade-offs?		What Costs?	What Analysis?
Amount of Maintenance	Level of Service Achieved	Direct Costs	Decision Making Trees
Continue to Maintain	Replace	Indirect Costs	Simple Payback
Reduce Faults (Preventative)	Fix Faults (Responsive)	Third Party Costs	Return on Investment
Utilisation	Redundancy	Externalities	Net Present Value
These can be built into a DBO contract		Capex vs Opex	Life Cycle Cost

Plants and Networks

Networks

Information Management
Systems

Plants

Information Management
Systems

	N	P
Civil Maintenance	X	
Mechanical and Electrical Maintenance	X	X
Process and Control Equipment Maintenance		X
Instrumentation Maintenance	X	X
Site Testing	X	
Laboratory Testing	X	X
Information Management Systems Maintenance	X	X
Buildings and Grounds Maintenance	X	X
Vehicle Maintenance	X	
Security		X

Use the same approach. Use the same systems. Supported by similar software tools.

What to Include in Bidding Document

Operate component requires augmenting

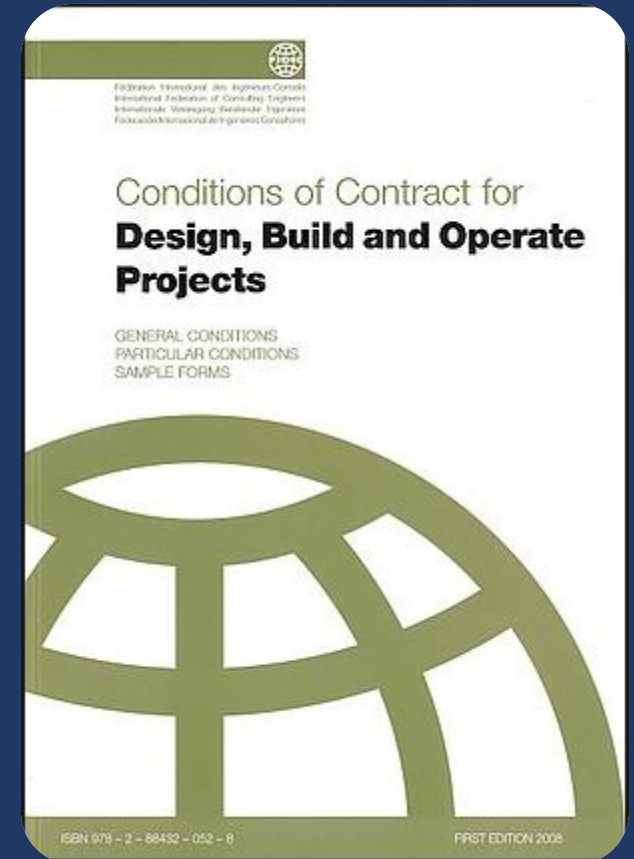
10.6 Delays or Interruptions

10.7 Failure to Meet Production Outputs

14.18 Asset Replacement Fund

14.19 Maintenance Retention Fund

Key here is '**Production Outputs**'



Include in Bidding Document

1. Required Services
2. Safeguards

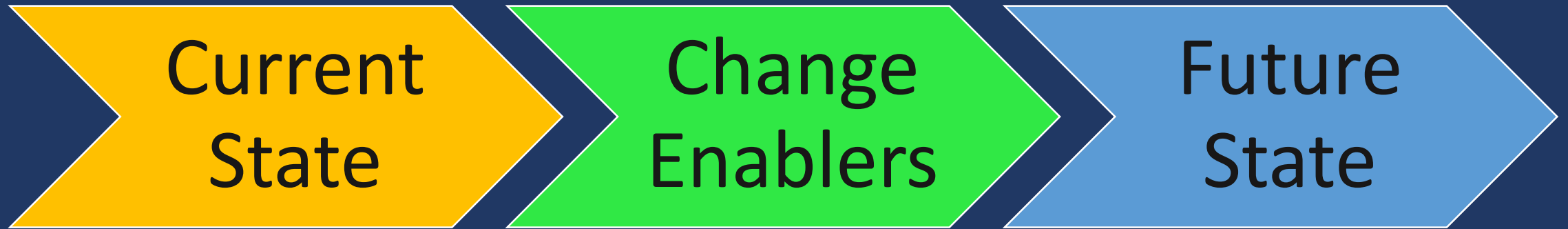
Performance Measures
+
Compliance Measures

Data Collection,
Processing and
Reporting

Operations and
Maintenance

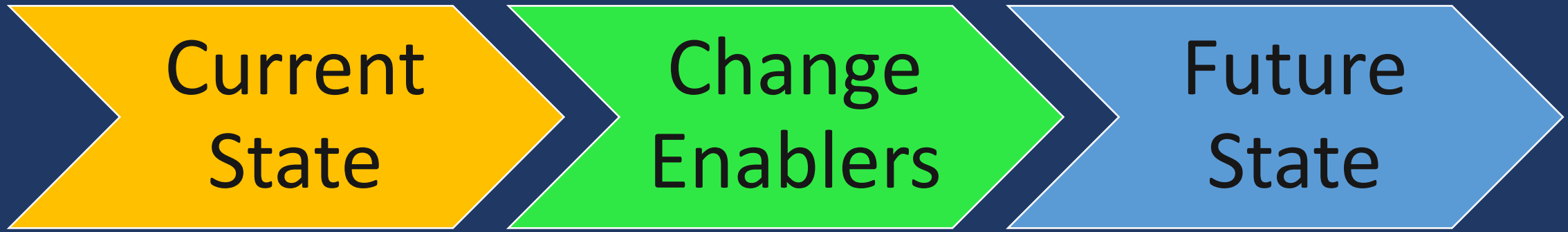
Design and
Construction

Include in Bidding Document



State transition

Include in Bidding Document



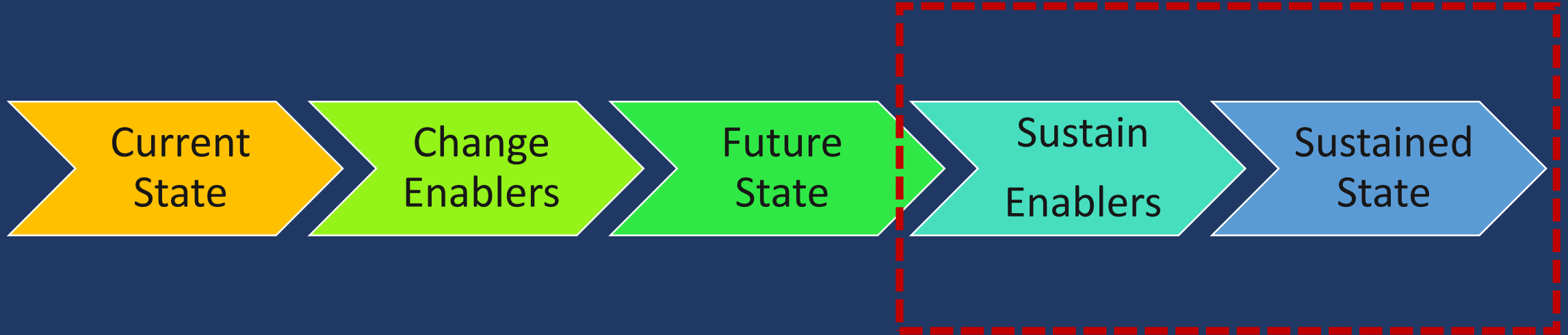
1. State

3. Specify

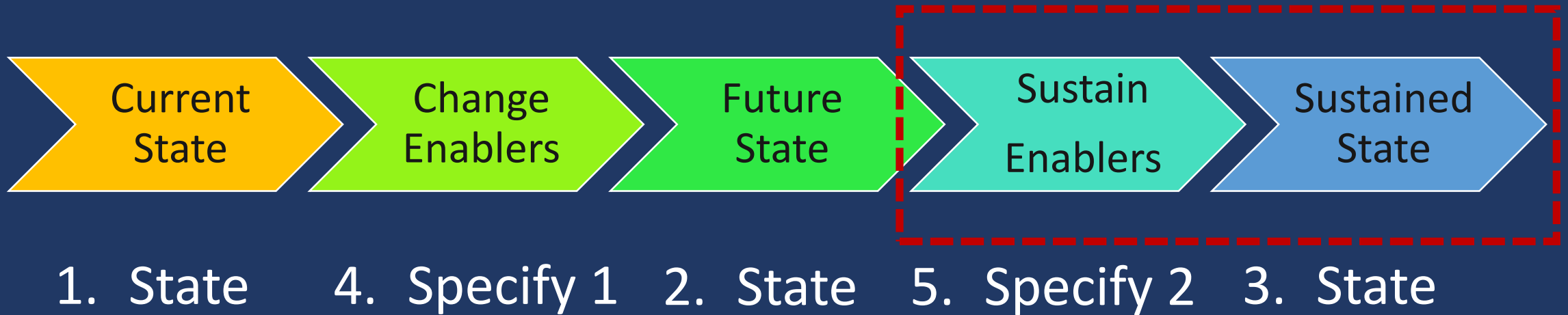
2. State

Design Build Contract

Include in Bidding Document



Include in Bidding Document



Design-Build-Operate Contract

Include in Bidding Document

Project Management

Asset Management

Current
State

Change
Enablers

Future
State

Sustain
Enablers

Sustained
State

1. State

4. Specify 1

2. State

5. Specify 2

3. State

Design-Build-Operate Contract

Include in Bidding Document



Defining the State	
Quantity	Current
Quality	Future
Reliability	
Efficiency	Sustained
Compliance	

Need to define states
Use performance measures

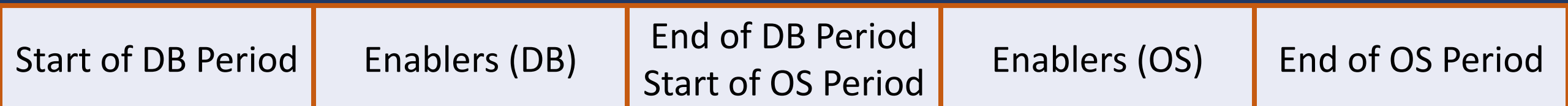
Include in Bidding Document

Section 3 Evaluation and Qualification Criteria	Section 6 Employers Requirements	Section 8 Particular Conditions of Contract
Evaluation	Introduction	Production Guarantees
Qualification	Current State (Start of DB)	Process Guarantees
Financial Requirements	Future State (End of DB)	
	Enablers (DB)	
Bidder's Experience	Sustained State (Each Year of OS)	
Subcontractors	Enablers (OS)	
Bidder's Proposal	Programs	
	Project Management	
	Asset Management	
	Control Points	
	Information Management Systems	

Include in Bidding Document

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	Asset Management		
	Control Points		
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Bidder' Proposal
Sustained State
Project Management
Asset Management
Information Management Systems



Include in Bidding Document

DB Period			OS Period	
Start of DB Period	Enablers (DB)	End of DB Period Start of OS Period	Enablers (OS)	End of OS Period

What are the things we can do to sustain the performance measures achieved at the end of the DB Period over the OS Period and beyond?

Include in Bidding Document

Annual Delivery Performance Measures and Targets

Annual Process Performance Measure and Targets

Data Collection and Reporting System

Include in Bidding Document

Annual Delivery Performance Measures and Targets

Annual Process Performance Measure and Targets

Data Collection and Reporting System

Maintenance Job Codes and Maintenance Schedule

Maintenance Bills of Quantities and Unit Rates

Maintenance Management System

Preventative Maintenance Program Delivery Incentives

Include in Bidding Document

Annual Delivery Performance Measures and Targets

Annual Process Performance Measure and Targets

Data Collection and Reporting System

Maintenance Job Codes and Maintenance Schedule

Maintenance Bills of Quantities and Unit Rates

Maintenance Management System

Preventative Maintenance Program Delivery Incentives

Mandatory Attendance at Maintenance Training Programs

Session 3: Summary

Maintenance must be included in the bidding document and contractors must be required to, and encouraged to, undertake the maintenance

The right amount of maintenance must be specified, priced and locked in as part of the procurement process

When procuring, recruit contractors who know what to do; or contractor's willing and able to learn what to do; and recruit a trainer who has done it before, even if it costs money

The procurement strategy must be tailored to the relevant contracting industry

The FIDIC DBO is a very good base but must be adapted suit to local jurisdictions and procurement practices

End of Session 3