Environmental, Health & Safety

Methodology for Selecting and Implementing an EHS Management Information System (EMIS)

Presented at:

NAEM MIS Workshop

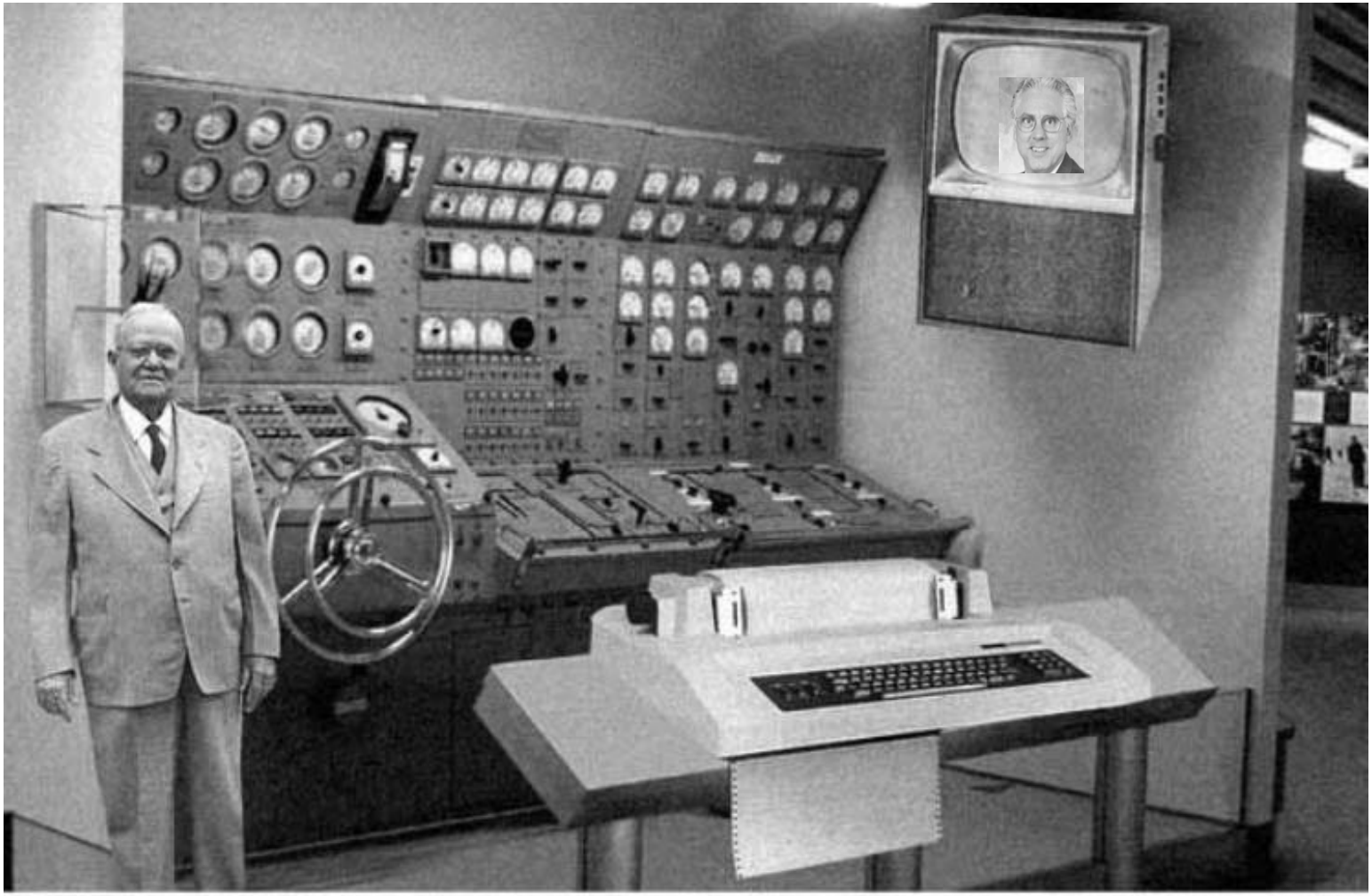
Demonstrating EHS Performance with Management Information Systems - June 7 & 8, 2005 - Denver, CO

Presented by:

Terry Bergen, ERM (Information Solutions Practice)
610-857-3003
terry.bergen@erm.com

June 7, 2005

ERM



Scientists from the RAND Corporation have created this model to illustrate how a "home computer" could look like in the year 2004. However the needed technology will not be economically feasible for the average home. Also the scientists readily admit that the computer will require not yet invented technology to actually work, but 50 years from now scientific progress is expected to solve these problems. With teletype interface and the Fortran language, the computer will be easy to use.

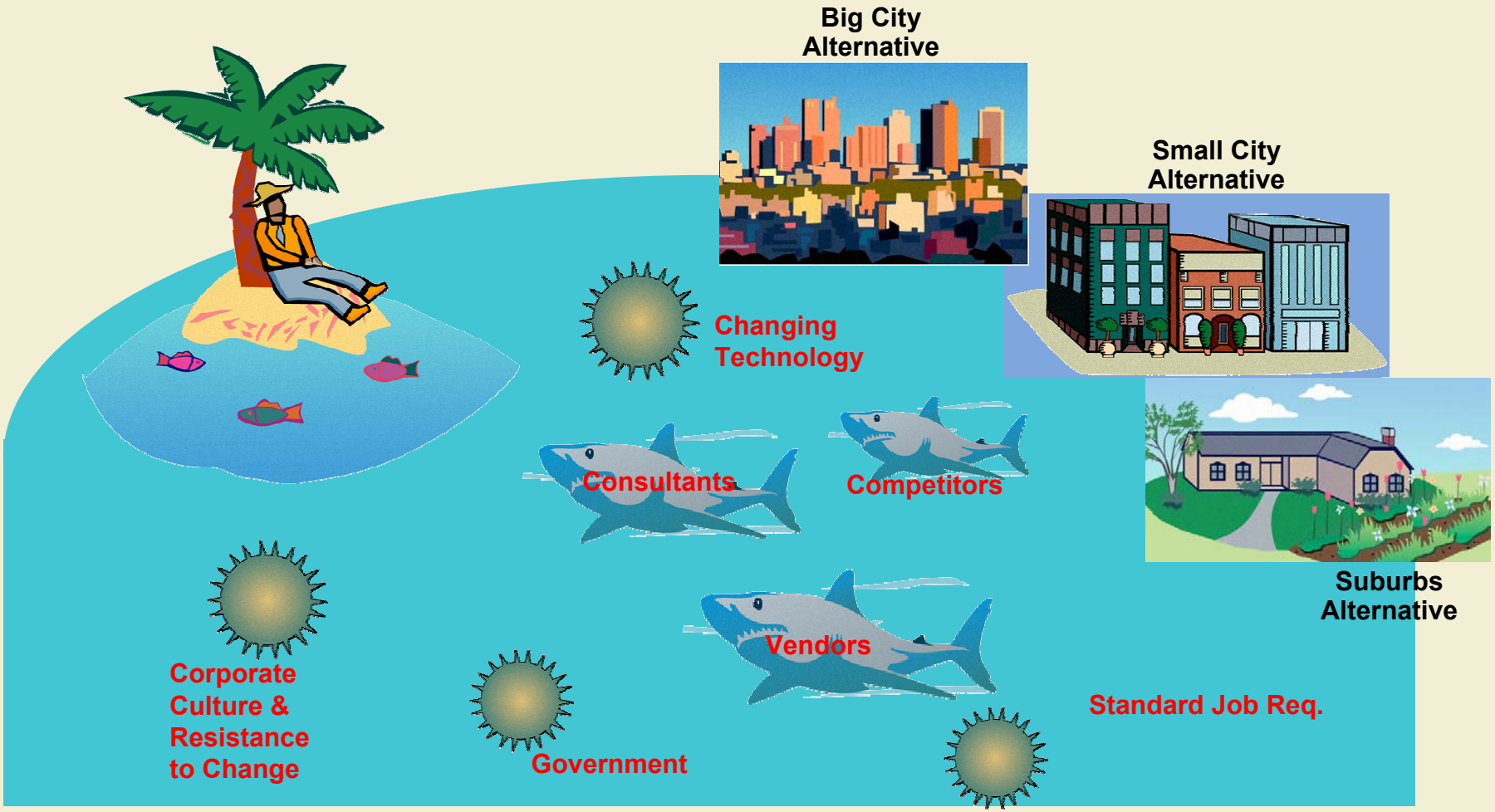
NAVIGABLE TABLE OF CONTENTS

Contents

Introductions

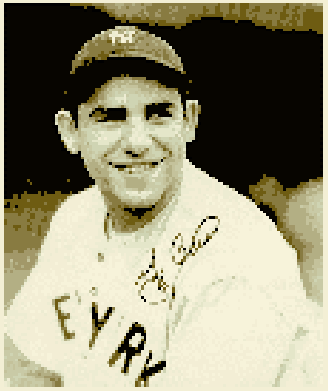
1. Name?
2. Company / Organization?
3. Primary job function?
4. What, if any, EMIS systems are in place?
5. What do you expect to learn?

Where are you and where are you going?



Thoughts to Ponder

"If you don't know where you are going, how do you know when you get there?"



Baseball Legend – Yogi Berra

When asked why his team lost the 1960 series to Pittsburgh…
"We made too many wrong mistakes."

Source: *The Official Yogi Berra website at www.yogiberra.com*

How do you avoid “too many wrong mistakes”?

1 – Build a Strategy

2 – Identify your Needs

3 – Document your Requirements

4 – Wisely Choose your solution

5 – Plan your Implementation

6 – Properly Execute that plan

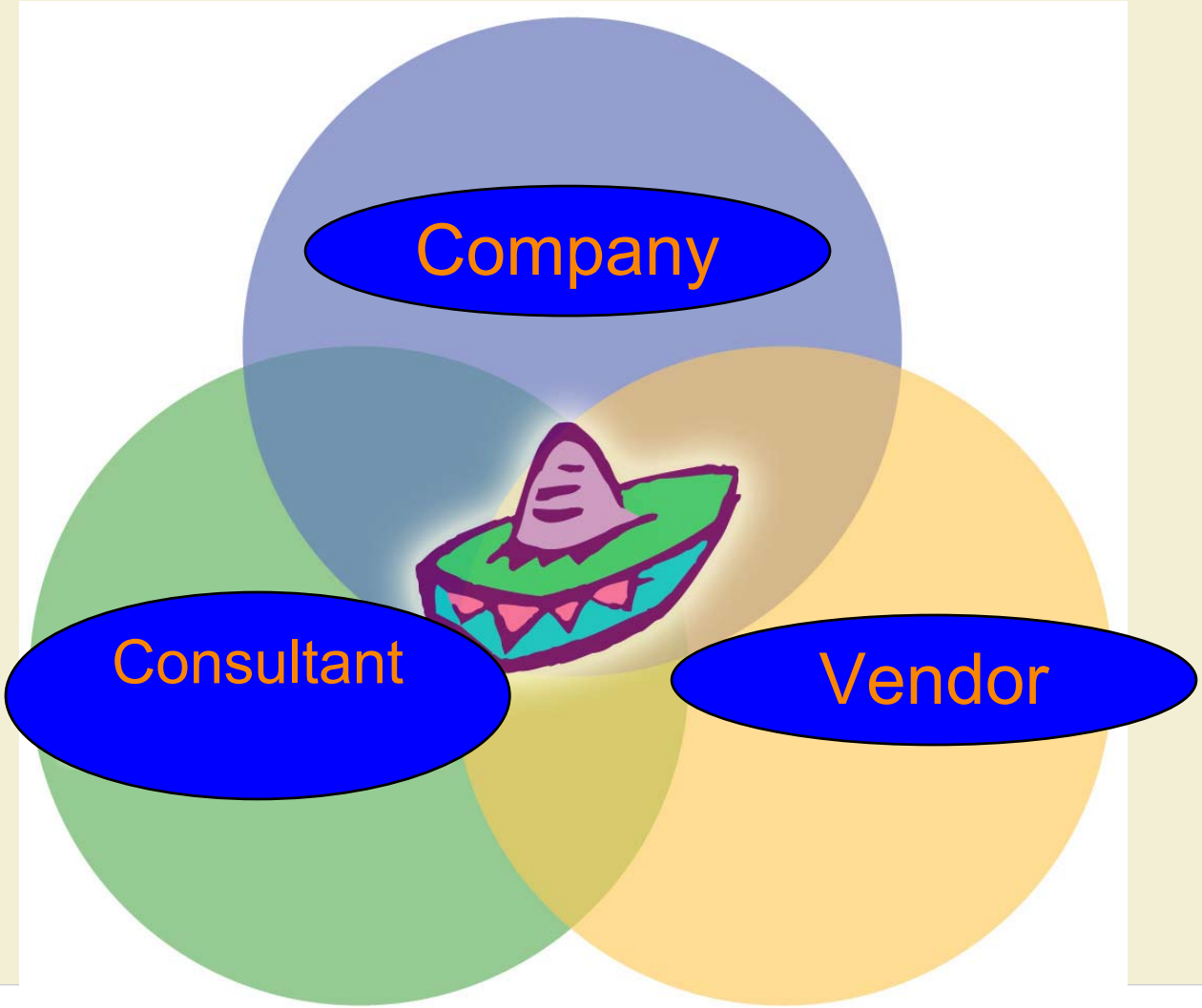
Thoughts to Ponder

Winston Churchill once said…..

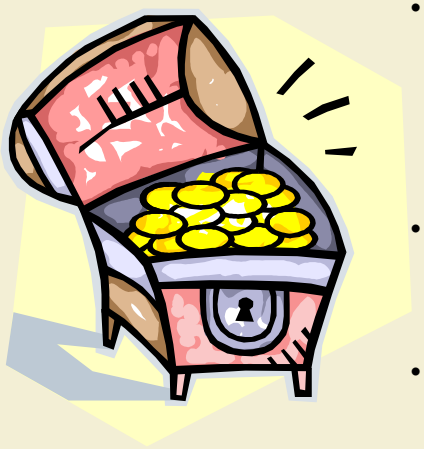
"Americans can always be counted on to do the right thing…

but only after exhausting all other possibilities!"

Three Amigos are better than one!

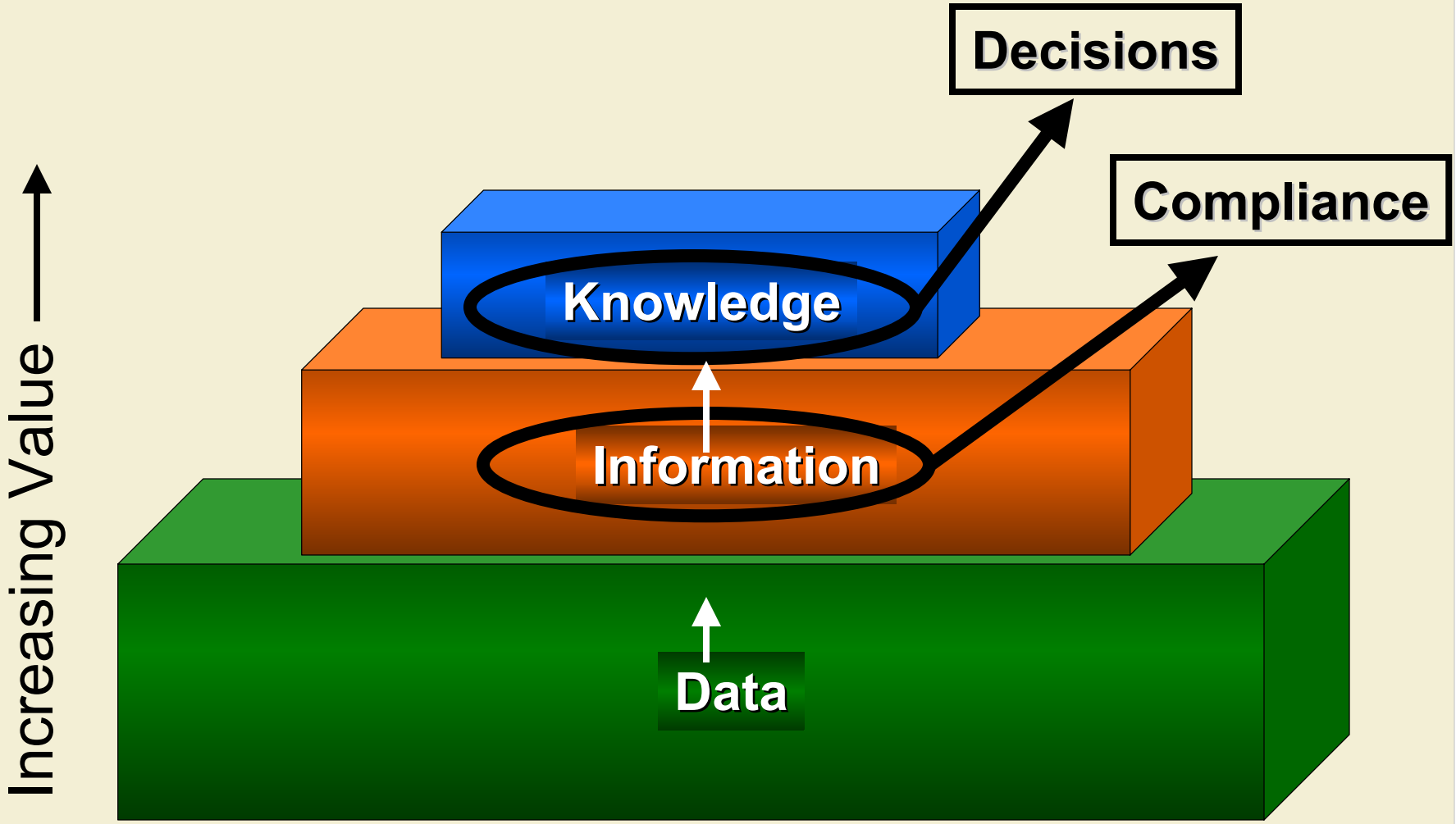


The methodology offers significant benefits that collectively lead to a successful implementation.



- ***Stakeholder buy-in***
  - Through close involvement of critical stakeholders throughout the process, the risk of significant roadblocks down the road are mitigated. Ensures everyone is part of the ongoing solution and all points of view are considered.
- ***Lower total cost of ownership***
  - By properly completing the upfront identification of needs and functional requirements, the probability of implementation success is significantly increased. Approximately 75% of software projects fail at some major level and costly rework is required. Often, the fundamental cause is improper identification of needs and requirements combined with poor planning. This proven methodology significantly reduces this risk and reduces the total cost of the project.
- ***The selected solution will work***
  - The proper assessment of needs and requirements ensures that when a vendor(s) are evaluated, the solution selected will be embraced by the user community.
- ***Simplifies the vendor selection process***
  - Through a consensus driven list of functional requirements and an objective evaluation methodology, it is possible to consider a single vendor or a small list of vendors that truly will meet your requirements. Without such a rigorous process, all products tend to look the same and appropriate differentiation is difficult and the risk of an improper selection is unacceptably high. This process keeps all the qualified vendors on a level playing field by evaluating each vendor against the same set of detailed requirements.
- ***Supports decision-making***
  - Data in an organization has expanded exponentially in organizations over the past 30 years but the ability to make decisions based upon derivations of those data has proven to be a major challenge.
- ***Integrates EHS strategy into company strategy***

Compliance & Decision Support



Project Centric Approach

The Project Management Institute defines Project Management as the application of knowledge, skills, tools, and techniques to a broad range of activities in order to meet the requirements of a particular project. Project management is comprised of five **Project Management Process Groups** –

1. Initiating Processes
2. Planning Processes
3. Executing Processes
4. Monitoring and Controlling Processes, and
5. Closing Processes

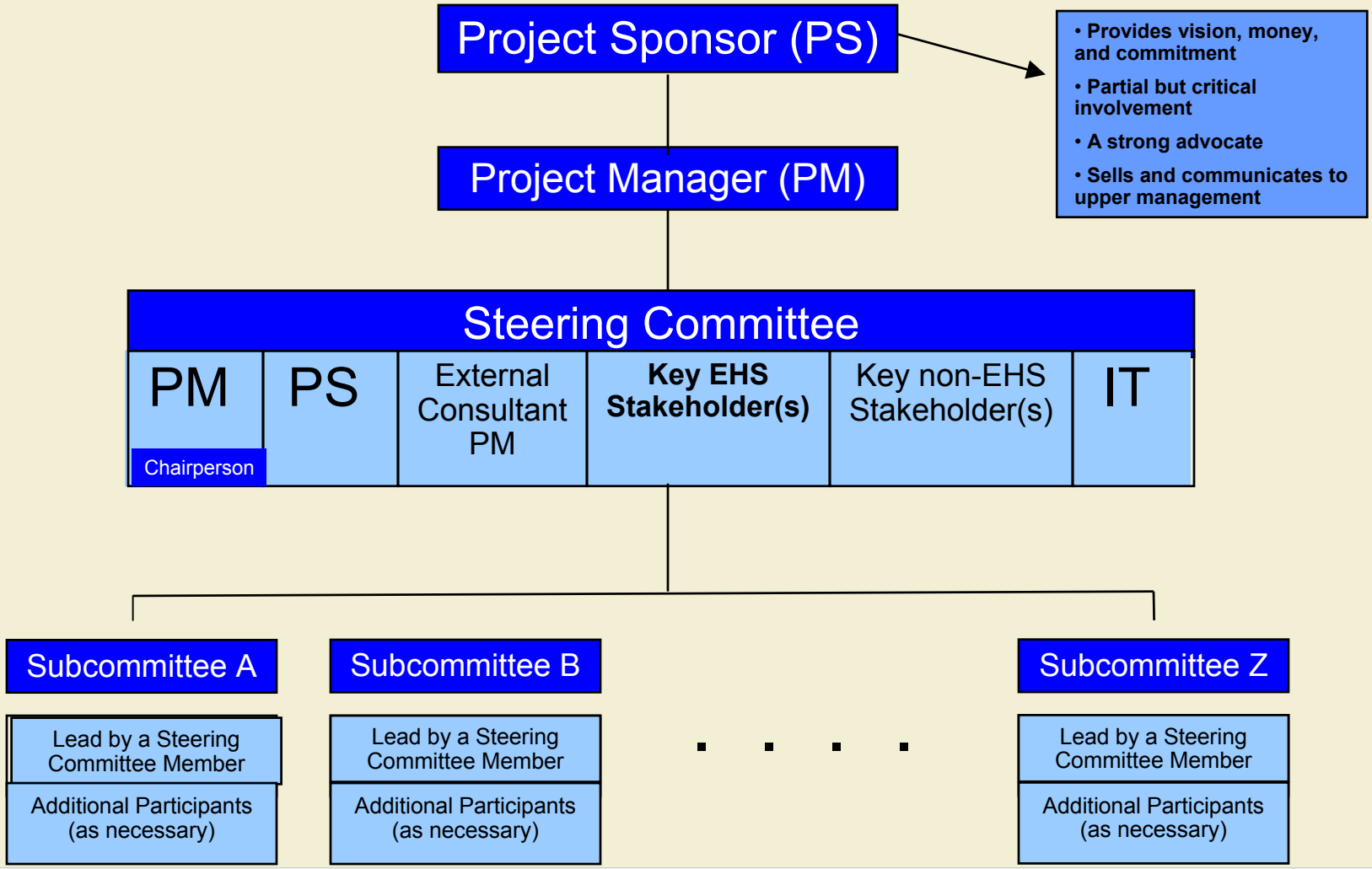
as well as nine **Knowledge Areas**. These nine Knowledge Areas center on management expertise in

1. Project Integration Management,
2. Project Scope Management,
3. Project Time Management,
4. Project Cost Management,
5. Project Quality Management,
6. Project Human Resources Management,
7. Project Communications Management,
8. Project Risk Management and
9. Project Procurement Management.

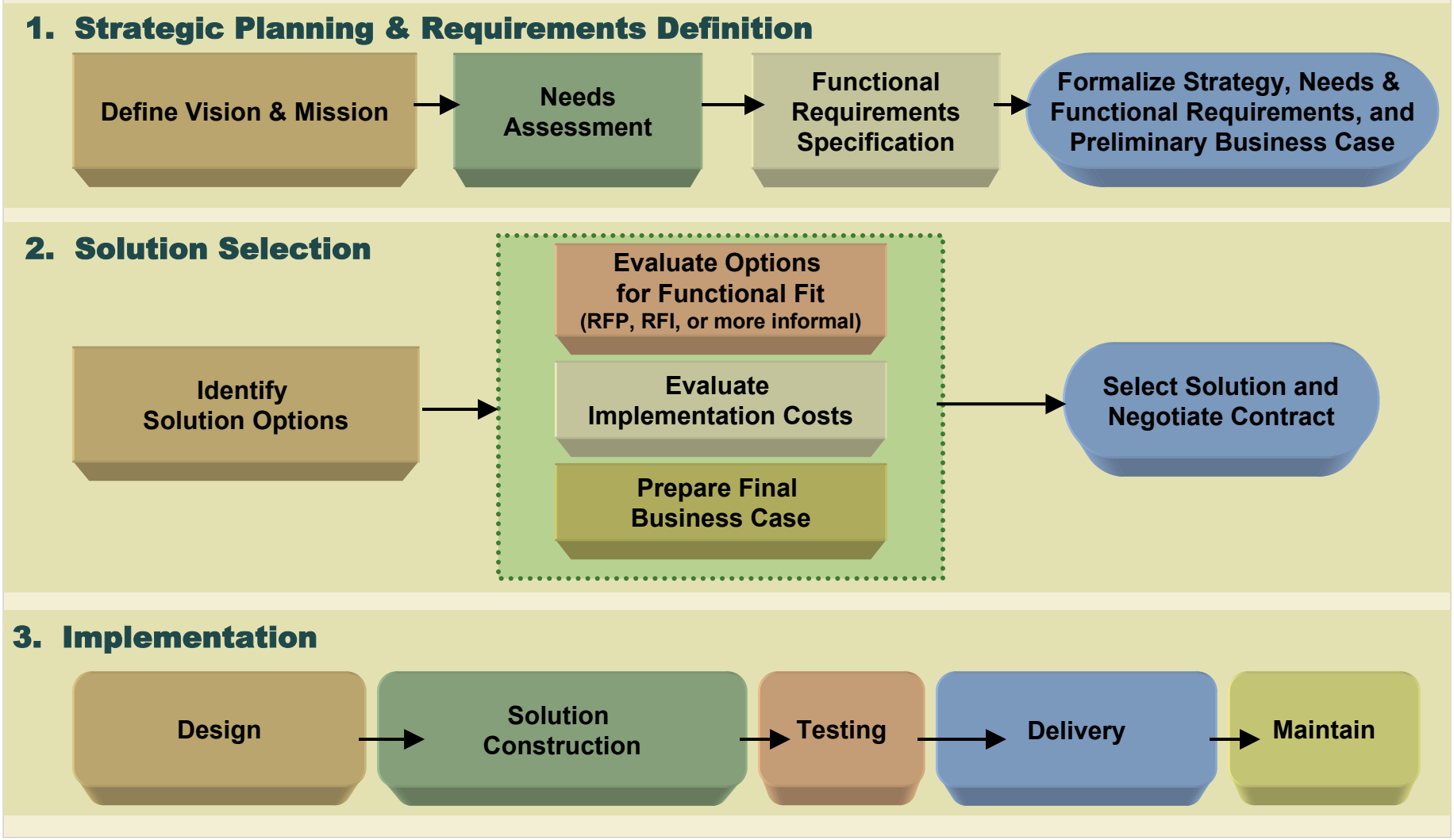
Source: *A Guide to the Project Management Body of Knowledge* (*PMBOK® Guide*), - Third Edition

More information about the Project Management Institute (PMI) can be found at http://www.pmi.org

Project Team Organization



Conceptual Methodology



Contents

The Facts of Information Management Life!

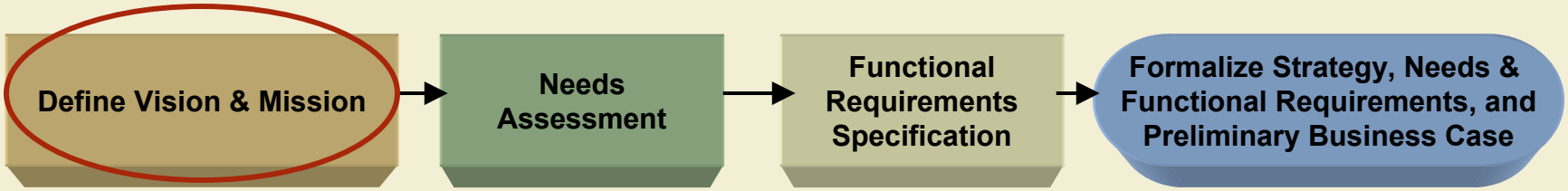
- The most difficult part of selecting a software system is deciding exactly what requirements are needed. Along with a list of the functionality required, these requirements include interfaces with existing systems and various hardware devices. If done wrong, no other part of the work destroys the resultant solution's acceptance and the credibility of the individuals involved in the project. Rework later is much more costly than getting it right the first time.

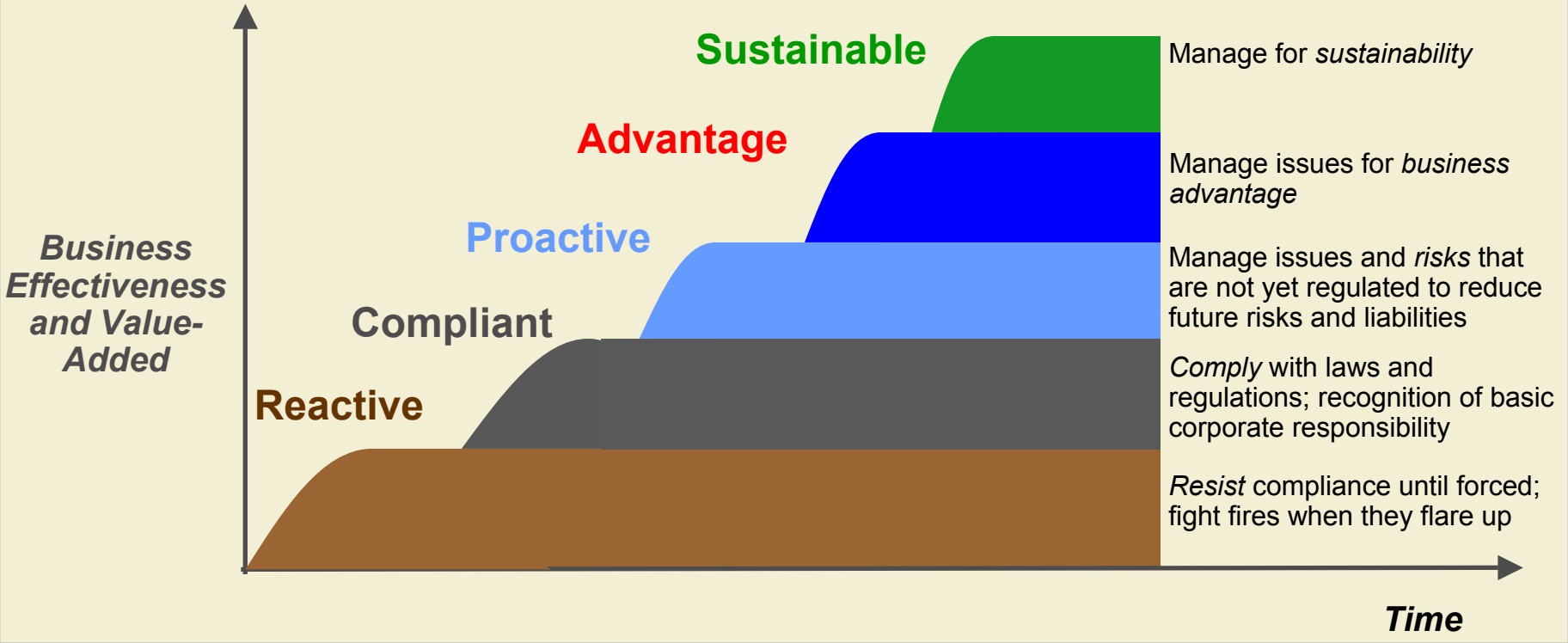
Plan, Plan, and Plan some mor

Rock

Hard Place

1. Strategic Planning & Requirements Definition

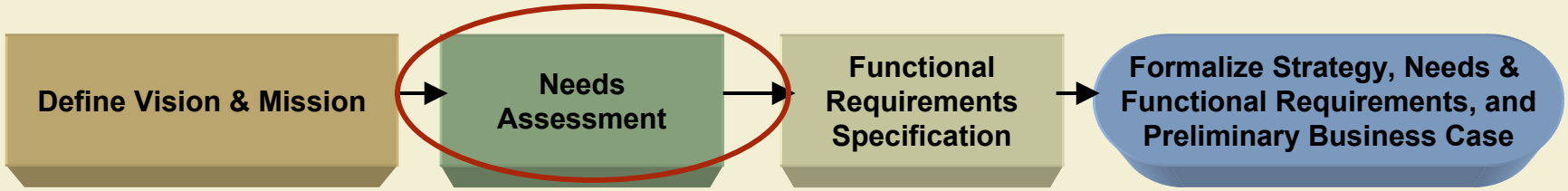




Where are you on this diagram?

Where do you want to be?

1. Strategic Planning & Requirements Definition



- **Identify Key Stakeholders**
  - Corporate EHS, Plant EHS, HR, facility maintenance, legal, materials management, shipping & receiving, other…
  - Don't arbitrarily exclude anyone
- **Send introductory e-mail to interviewees**
  - Describe Project
  - Ask for pre-interview tasks
- **Plan the Interviews**
  - Create Interview Schedule (Typically one on one, in person or telephone)
  - Prepare your note taking structure
- **Conduct Interviews**
  - Typically 1 to 2 hours. Ask open ended questions, take good notes (paper or computer), confirm what you think you heard, ask about priorities, characterize where they are today, where do they want to be
  - Be a good listener (probe, use what if)
  - Determine high level cost "now" and identify potential savings
  - Identify core processes and owners
  - Identify current tools used – collect samples
- **Deliverables**:
  - Characterization of Current Situation
  - Prioritized Needs
  - Foundation for Preliminary Business Case

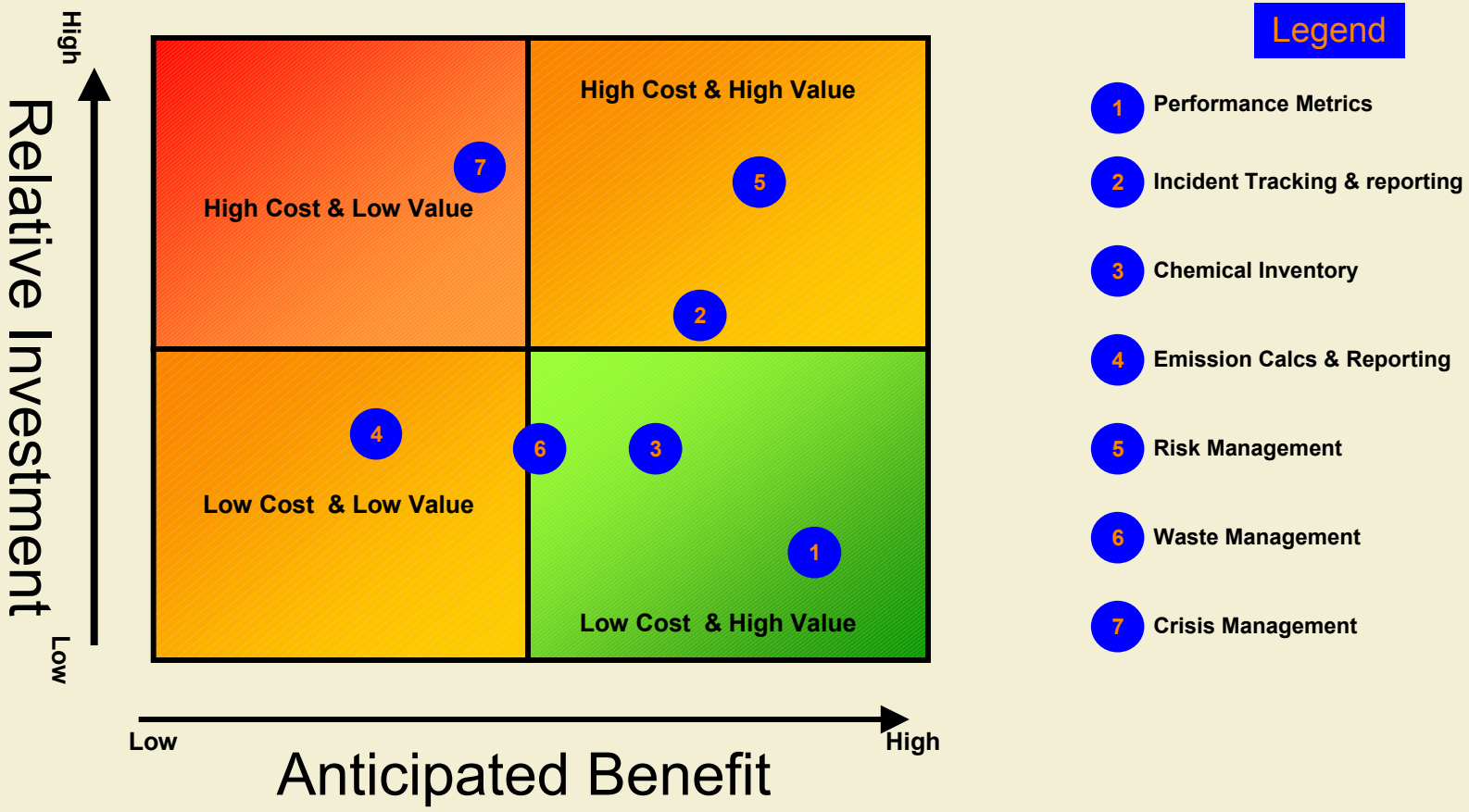
Examples of EHS Needs

- EH&S Needs
  - Incident Management (across EH&S)
  - Action Item Tracking
  - Air emission calculations
  - Audits, inspections, and assessments
  - Maintain MSDS
  - Prepare electronic forms
  - Track GHG emissions
  - Chemical Inventory Management
  - EH&S performance metrics
  - Document Management
  - Key Performance Indicator (metric) Reporting & Corporate Reporting
  - M&A/Transitional Information Impact Analysis
  - Regulatory Compliance Tracking (Title V, RCRA, Clean Air Act, Clean Water Act, MACT, PSD, etc.) e
  - Knowledge Management & Decision Support Systems
  - Hazardous Waste Tracking
  - Fugitive Emission Systems
  - Database Management

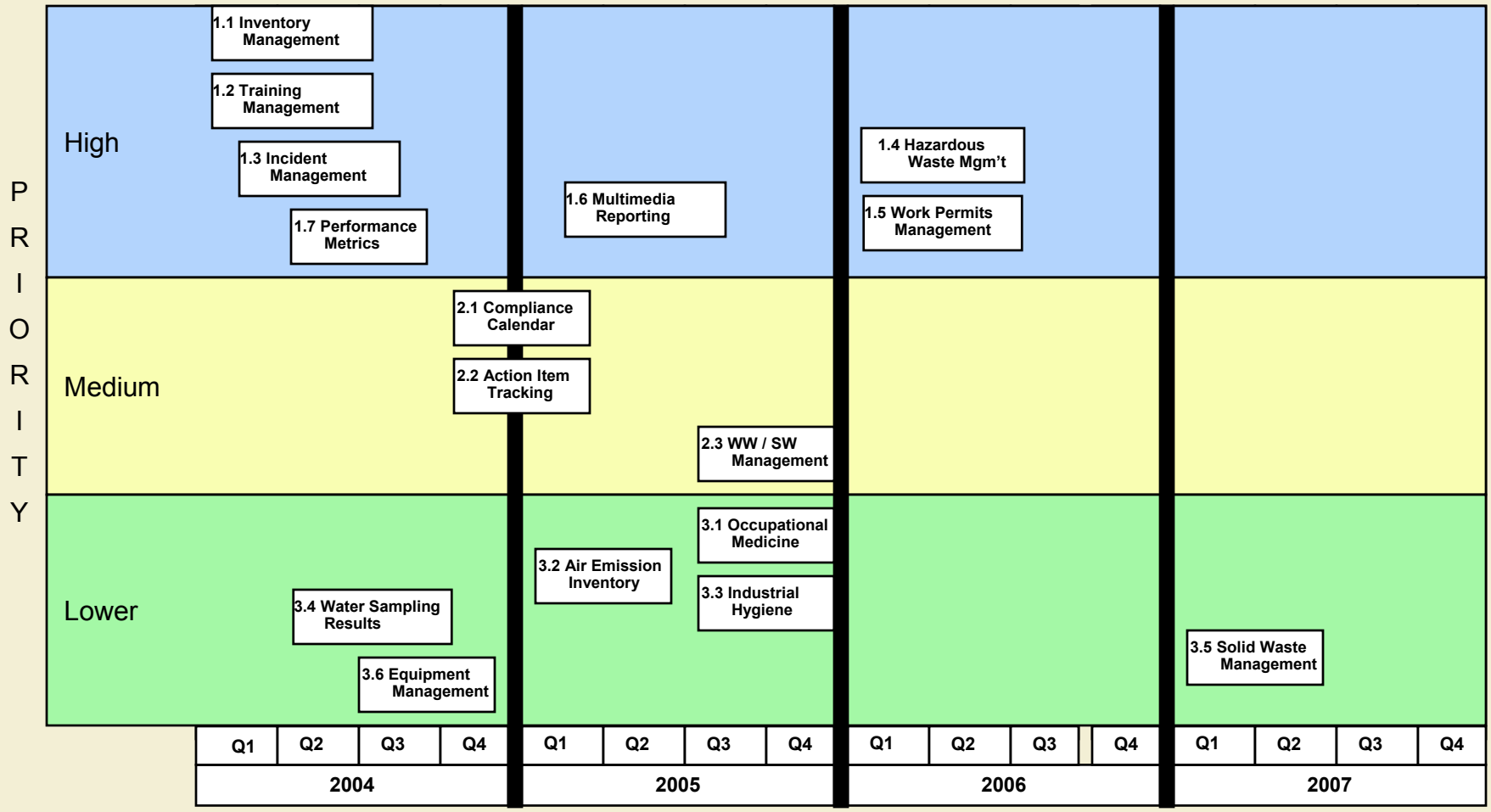
- IT Needs
  - Database platform
  - Operating system
  - Web-enabled
  - Groupware integration

- Operational Needs
  - Simple user interface
  - Electronic data entry
  - Support for Bar Coding
  - Multiple security levels
  - E-mail integration with reminders & escalation

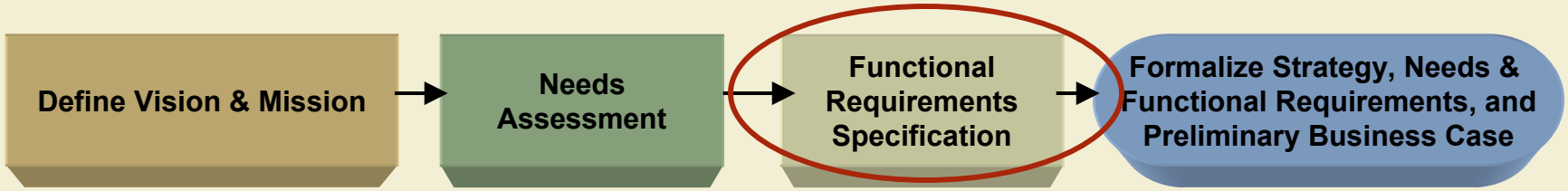
Prioritizing Needs Technique (Factious Sample)



Prioritizing Needs Technique (Sample)



1. Strategic Planning & Requirements Definition



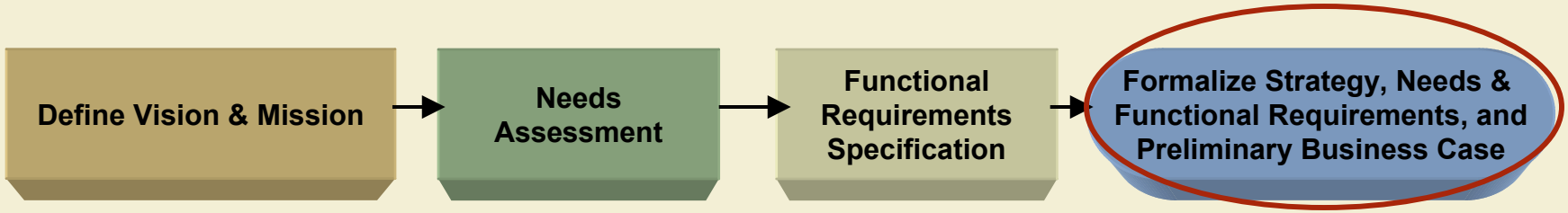
- **Identify Key Stakeholders**
  - Corporate EHS, Plant EHS, HR, facility maintenance, legal, materials management, shipping & receiving, other…
  - Don't arbitrarily exclude
- **Send introductory e-mail to interviewees**
  - Describe Project
  - Ask for pre-interview tasks
- **Plan the Interviews**
  - Create Interview Schedule (Typically one on one, in person or telephone)
  - Prepare your note taking structure
- **Conduct Interviews**
  - Typically 1 to 2 hours. Ask open ended questions, take good notes (paper or computer), confirm what you think you heard, ask about priorities, characterize where they are today, where do they want to be
  - Be a good listener (probe, use what if)
  - Determine high level cost "now" and identify potential savings
  - Identify core processes and owners
  - Identify current tools used – collect samples
- **Deliverables**:
  - **Functional Requirements Specification (FRS)**
  - **Preliminary Communication Plan**

Sample / Partial Functional Requirement Specification (FRS)

- Develop requirements only for the high priority Needs
- Matrix used to solicit vendor responses as part of a Request for Proposal (RFP)
- Requirements are subsequently used in acceptance testing

Requirement Type	Requirement Number	Requirement Description	Priority	Response	Response Comments
Incident Tracking	INC-09	The system should allow for the automated opening of an investigation case for each incident	1		
Incident Tracking	INC-10	The system should track status of investigations and root cause data findings	1		
Incident Tracking	INC-11	The system should store guidance documents regarding incident investigation and company procedures	1		
Incident Tracking	INC-12	The system should maintain the necessary workflows for incident tracking, incident investigation and corrective actions	1		
Incident Tracking	INC-13	The system should route incident forms/reports to designated supervisors	1		
Incident Tracking	INC-14	The system should send out alerts for upcoming tasks to responsible individuals	1		
Incident Tracking	INC-15	The system should send out notifications about overdue items related to incidents to responsible individuals and designated supervisors	1		

1. Strategic Planning & Requirements Definition



- Prepare report[1] which contains (at a minimum)
  - Characterization of Current Situation
  - List of Stakeholders interviewed
  - Prioritized Needs
  - Reference to Functional Requirements Specification (FRS)
  - Business value to your organization
  - Recommendations
- Incorporate a review cycle with increasing larger audiences to finalize the report and obtain approval for next phase.

[1]Recommended tool is Microsoft PowerPoint

Sample list of Stakeholders Interviewed

- Interviews were conducted in November and December 2004 via telephone and included a cross-section of several key functions/roles. The following table lists the various individuals (in alphabetical order by last name), their Sector, specific business name, and their title.

Name	Sector	Business Name	Job Title

Sample Interview Findings

Key Interview Findings

- Everyone interviewed wants a single information management tool for data entry, analysis, and reporting used throughout organization's global businesses.
- Several Sectors use a custom configured application developed internally using a product called CorVu[1] to collect the data. Once all data are collected, they are exported to a spreadsheet for reporting and graphing before being e-mailed to executive management.
- The CorVu product is only used by ESH. The company's IT department has standardized on Cognos[2] as it's performance metrics and scorecard tool for all company Sectors.
-

[1]Additional information can be found at www.corvu.com

[2]Additional information can be found at www.cognos.com

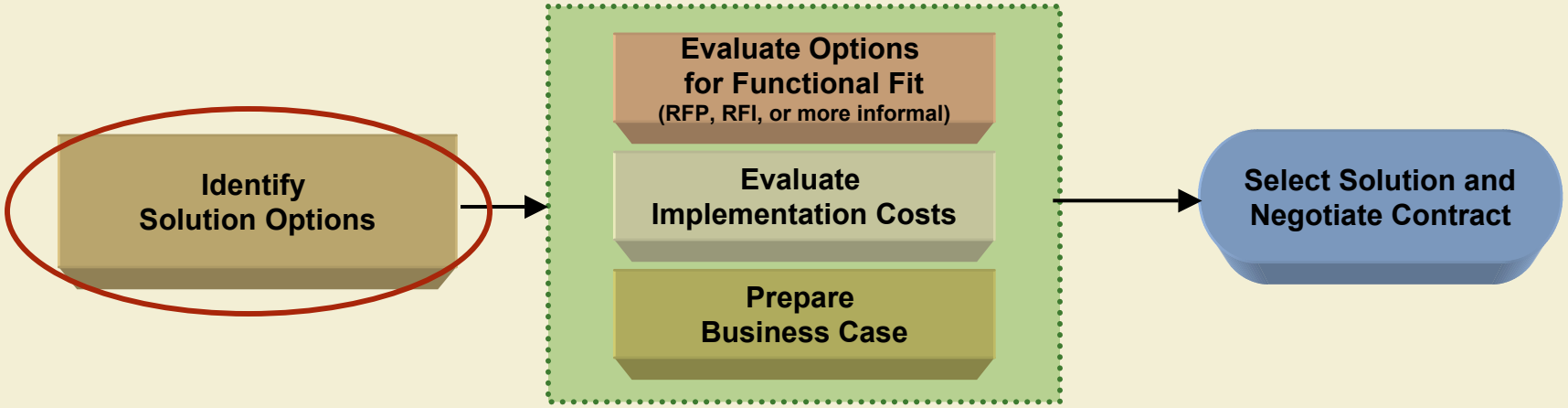
Sample Summary Results

The following table lists the overall anticipated key benefits regardless of the solution alternative selected.

Key Benefits	
• Streamlines business process. • As the company continues to grow additional sites can easily be added into the process without significant cost. • Provides secure and confidential access to all ESH information. • Supports decision making and risk reduction • Maintains centralized control and protection of critical ESH information – single point of access • Supports ISO audits, Sarbanes-Oxley, and other Government regulations and guidelines • Facilitates collaboration and associated recordkeeping • Scalable for "tomorrow's" needs • Increases productivity by reducing the labor effort to compile information into the proposed system. This labor savings yields a cost savings as estimated on another slide.	• Standardizes and reduces cost of training new employees through development of standard materials and readily available in-house expertise. • Reduces training costs as ESH employees move across the various Business Sectors since they will already know how the proposed standard enterprise solution operates. • Leverages the company's current investment in Cognos software solutions • Solutions utilize the familiar Web interface which results in less training and immediate familiarity.

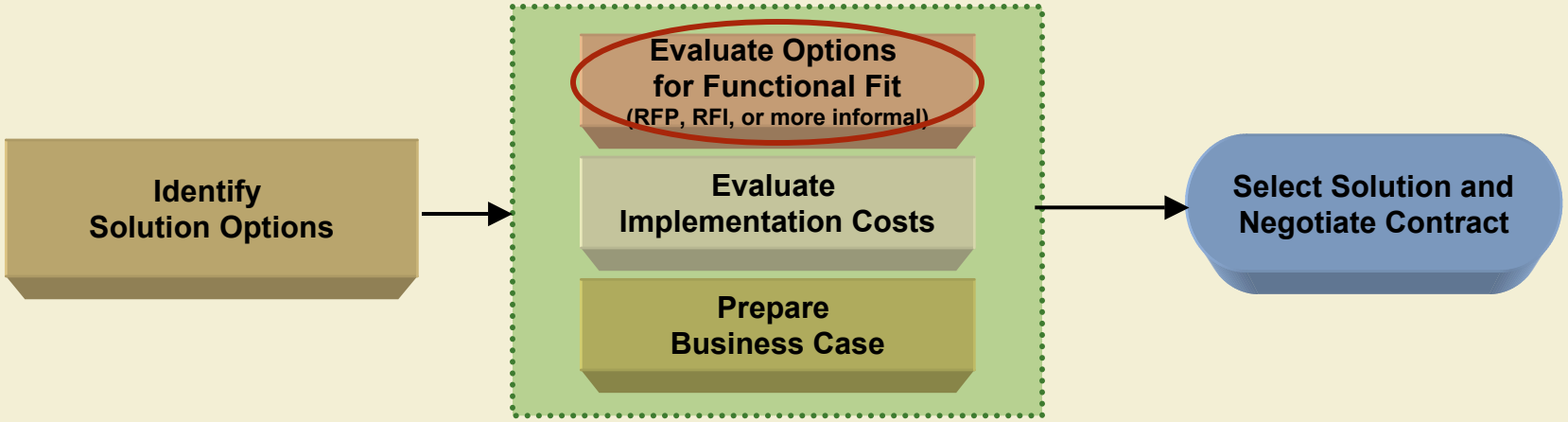
Contents

2. Solution Selection



- Based upon the Needs and Requirements, identify several candidate solutions.
  - Association Meetings
  - Web research
  - Consultants
  - Colleagues and competitors
- Identify appropriate point of contact to send information to for each vendor
- Identify procurement process (formal vs informal) and evaluation criteria
- Establish internal single point of contact (purchasing, project manager, consultant, other) and rules to follow
- Treat all vendors equally

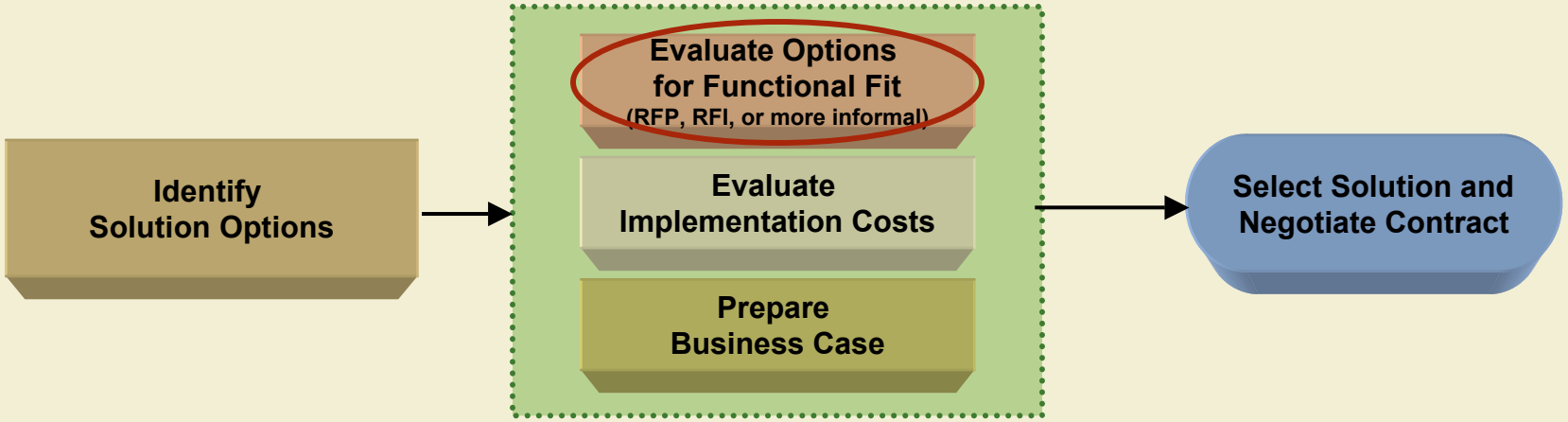
2. Solution Selection



- Prepare RFP or other document (including FRS) and send to vendors (electronically)
  - Define proposal instructions, selection process and critical dates
  - Be very specific as to the format for cost to facilitate comparison of vendors.
  - Define process for questions (typically an e-mail to one point of contact by a certain date)
- Pre-proposal Process
  - Limit access by vendors to one point of contact
  - Provide all questions and all answers to each vendor by the date specified (electronically)
  - Don't tell who the other vendors are
  - Limit communication to e-mailed questions
  - Consider a pre-proposal meeting (If the RFP is done well there is no need for this)

Continued…..

2. Solution Selection



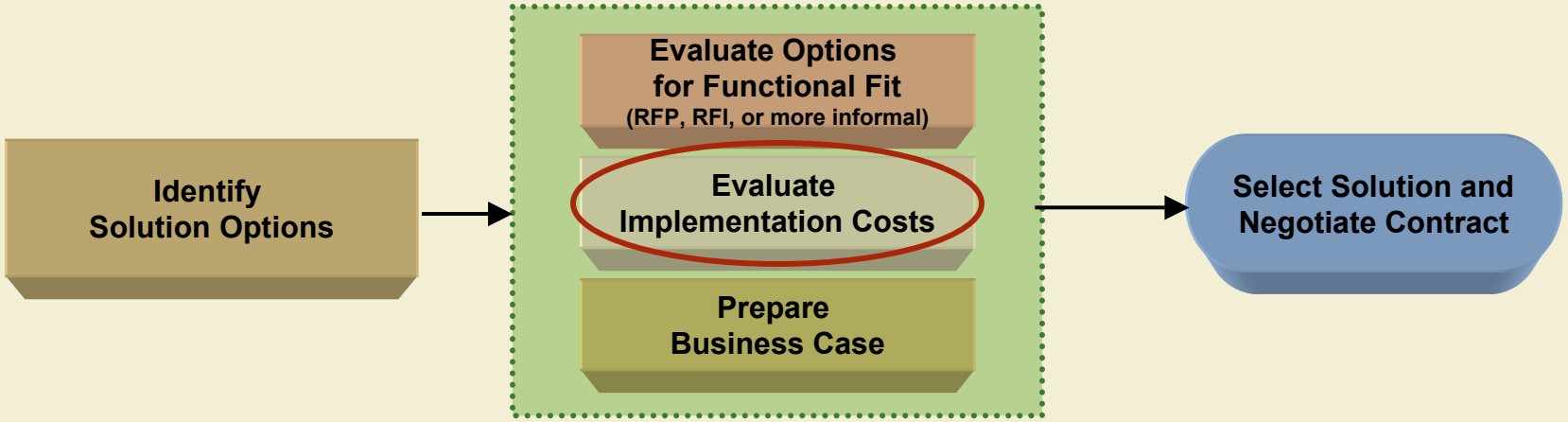
- Receive proposals, check for adherance to instructions, and distribute to the Steering Committee
- Use predefined process to evaluate and reduce the viable number of finalists to 2 to 4 solutions.
- Prepare scripted demonstration scenarios and presentation agenda
- Invite the finalists to present at your office (at their expense). All members of the Steering Committee "MUST" attend all demonstrations.

Sample Vendor Comparison

EMIS Vendor
Software comparison

	ABC	XYZ
Basic Data		
Overview	ABC has been around for many years and has the largest customer base of any enterprise EH&S software product. Their approach was to develop the best EH&S software solution that had configurable components to accommodate the EH&S uniqueness of each client. ABC has been converting its software to the Microsoft .net platform and will be completed eat the end of 2004 or early 2005. They release schedule blends well with Koppers' implementation priorities. Koppers will benefit from the enhancement requests of the users since everyone will use the same system. Although the input fields are predefined by ABC, Koppers' (via configuration) can add fields to theexiostimng forms. However, fields may not be deleted otr hidden on those forms. Koppers will get additional functionality (some in Phase II and some simply additional) that are included in the overall price of the software modules.	Enviance is totally developed using Microsoft's .net developemt technology. Since it is a relatively newly developed application, there is no old programming using outdated and innefficinet techniques. Enviance's approach is to provide a robust and highly configurable software platform for EH&S professional to configure their unique EH&S requirements. It provides flexibility to build custom templates but with significant design commitment from Koppers EH&S and facility staff. Templetes, although flexible and easy to configure (once the design is completed), have a vertical column approach - one "row" for each field. You are not able to configure more consise templates. Although Koppers would benefit from the Enviance user group, EH&S implementations are not part of the updated product since everyone developes their own templates. Since each client of Enviance implements their EH&S initiatives following their own unique process, it minimizes the opportunity for Koppers to leverage what other EH&S organization have done. Enviance listens well to its clients to add configfuration and workflow capabilities.
Quoted cost (negotiable)	$175K (1st yr) $57.2K/yr purchase software / ESS hosting	$44.7K / yr no software purchase / vendor hosting
Modules to be purchased in phase 1	Compliance Manager Task Manager Incident Manager Performance Manager Advanced Reporting Solution (ARS).	no modules - user defines what they want to track and how

2. Solution Selection



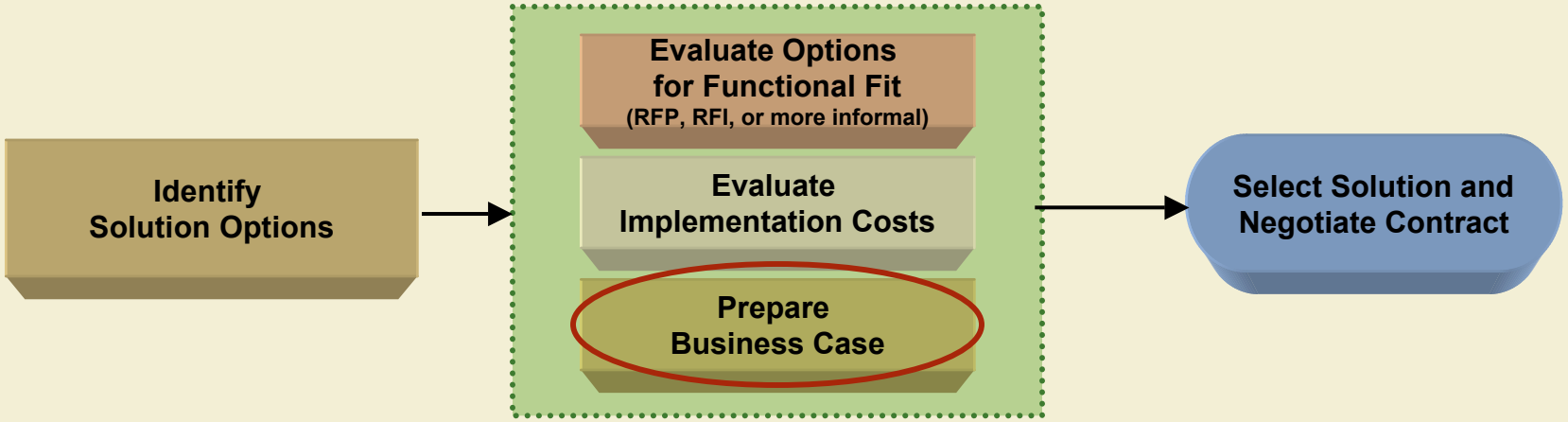
- Plan your Implementation into Phases
- Understand any Vendor or Consultant fees
- Determine your internal staff resource requirements
- Have an overall Implementation Schedule

Sample Partial Client Implementation Plan

COST ESTIMATE - IMPLEMENTATION

Stage	Task Description	Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Project Total													
Phase I			**34,750**	**45,560**	**34,810**	**41,940**	**40,430**	**41,210**	**38,310**	**38,310**	**45,510**	**39,510**	**42,860**
Incidents		**By Module**	21,890	27,400	-	-	-	-	-	-	-	-	-
	Design	**$**	15,510	-	-	-	-	-	-	-	-	-	-
		ERM	15,510	-	-	-	-	-	-	-	-	-	-
		Client	-	-	-	-	-	-	-	-	-	-	-
	Configuration	**$**	3,480	2,900	-	-	-	-	-	-	-	-	-
		ERM	3,480	2,900	-	-	-	-	-	-	-	-	-
		Client	-	-	-	-	-	-	-	-	-	-	-
	Data Discovery	**$**	2,900	2,900	-	-	-	-	-	-	-	-	-
		ERM	2,900	2,900	-	-	-	-	-	-	-	-	-
		Client	-	-	-	-	-	-	-	-	-	-	-
	Testing	**$**	-	4,640	-	-	-	-	-	-	-	-	-
		ERM	-	4,640	-	-	-	-	-	-	-	-	-
		Client	-	-	-	-	-	-	-	-	-	-	-
	Training	**$**	-	9,280	-	-	-	-	-	-	-	-	-
		ERM	-	9,280	-	-	-	-	-	-	-	-	-
		Client	-	-	-	-	-	-	-	-	-	-	-
	Delivery	**$**	-	7,680	-	-	-	-	-	-	-	-	-
		ERM	-	7,680	-	-	-	-	-	-	-	-	-
		Client	-		-	-	-	-	-	-	-	-	-
Water		**By Module**	8,580	11,600	24,650	22,480	-	-	-	-	-	-	-
	Design	**$**	8,580	-	-	-	-	-	-	-	-	-	-
		ERM	8,580	-	-	-	-	-	-	-	-	-	-
		Client	-	-	-	-	-	-	-	-	-	-	-
	Configuration	**$**	-	7,250	14,500	-	-	-	-	-	-	-	-
		ERM	-	7,250	14,500	-	-	-	-	-	-	-	-
		Client	-	-	-	-	-	-	-	-	-	-	-
	Data Discovery	**$**	-	4,350	4,350	-	-	-	-	-	-	-	-
		ERM	-	4,350	4,350	-	-	-	-	-	-	-	-
		Client	-	-	-	-	-	-	-	-	-	-	-
	Testing	**$**	-	-	5,800	3,480	-	-	-	-	-	-	-
		ERM	-	-	5,800	3,480	-	-	-	-	-	-	-
		Client	-	-	-	-	-	-	-	-	-	-	-
	Training	**$**	-	-	-	5,800	-	-	-	-	-	-	-
		ERM	-	-	-	5,800	-	-	-	-	-	-	-
		Client	-	-	-	-	-	-	-	-	-	-	-
	Delivery	**$**	-	-	-	13,200	-	-	-	-	-	-	-
		ERM	-	-	-	13,200	-	-	-	-	-	-	-
		Client	-	-	-		-	-	-	-	-	-	-

2. Solution Selection



- Tangible Costs
  - Identify real labor savings (if any)
  - Identify other potential savings (be conservative)
  - Understand your "total" investment over time
- Intangible Costs
  - Identify other potential benefits to a new system

Sample Cost Summary & Preliminary Business case

The following tables contain the conceptual cost summary for the current system and estimated savings and a summary of the investment costs for each Alternative.

Cost Estimate Category	Annual Cost Estimate
Current Process	$ 347,308/ year
Savings via implementation of one of the alternatives	$134,712 / year
% Savings	39%

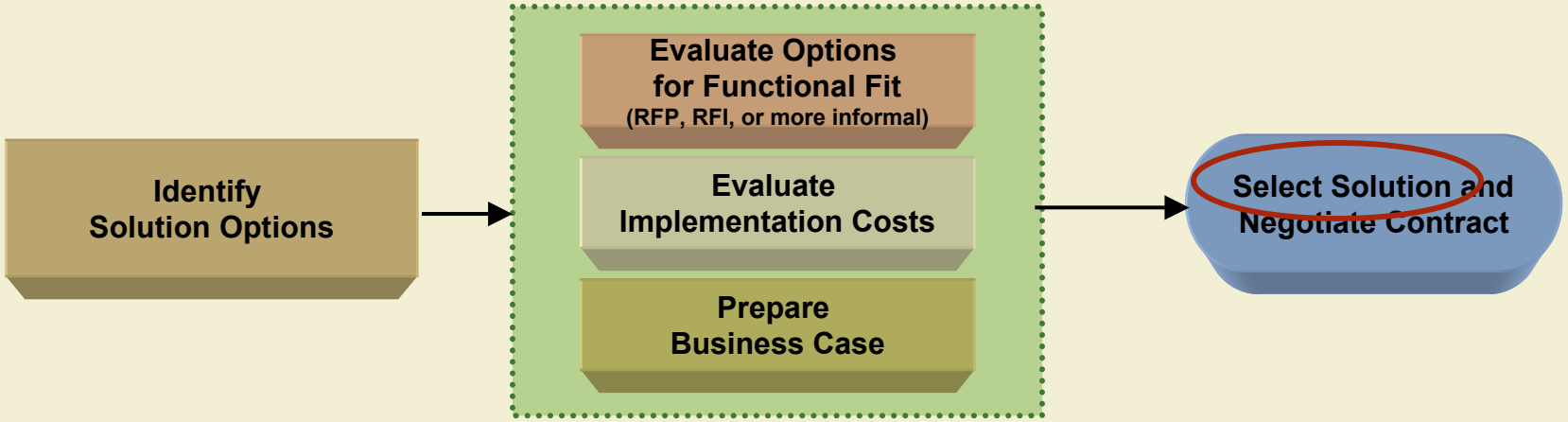
Investment Cost Summary		
Alternative	Description	Annual Cost Estimate[2]
A		$36,000 / year
B		$49,000 / year
C		$127,000 / year

[2]Represents an average annual cost based on a five (5) year projection.

Business value resulting from improved EHS management

- **Reduce costs**
  - Reduce raw materials and waste per unit of production (non-product output)
  - Reduce energy use
  - Reduce cost of compliance and insurance
  - Prevent accidents (reduce WC costs, downtime, operational loses)
- **Reduce Risks**
  - Reduce EHS risk profile
  - Improve compliance performance
  - Prevent disruptions in supply chain
  - Avoid customer and regulator retaliation in the event of an incident
- **Differentiate yourself in the marketplace**
  - Develop new products, pursue new markets, differentiate existing products on EHS attributes
  - Enhance brand loyalty
  - Improve employee retention, attract new talent
  - Attract capital from socially responsible investment market

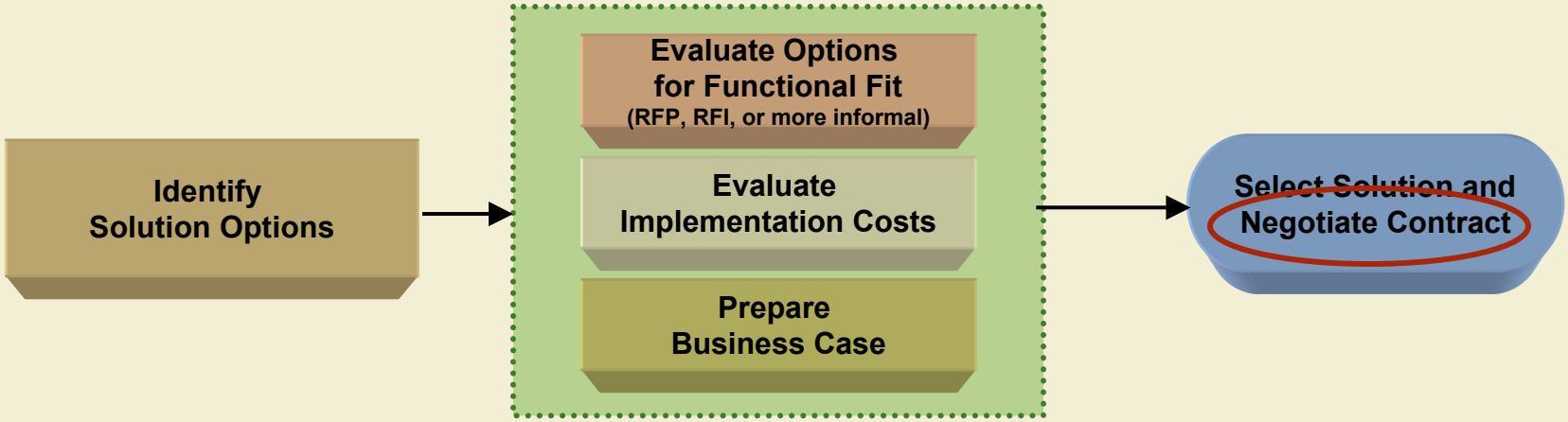
2. Solution Selection



- Use predefined process to evaluate and reduce the viable number of finalists to a "selected" vendor. Additional questions may need to be answered by the vendor.

- Notify non-selected vendors and provide some tangible positive feedback. Do not entertain alternative submissions. You might keep your 2nd choice in place should you not reach a negotiated contract with your 1st choice.

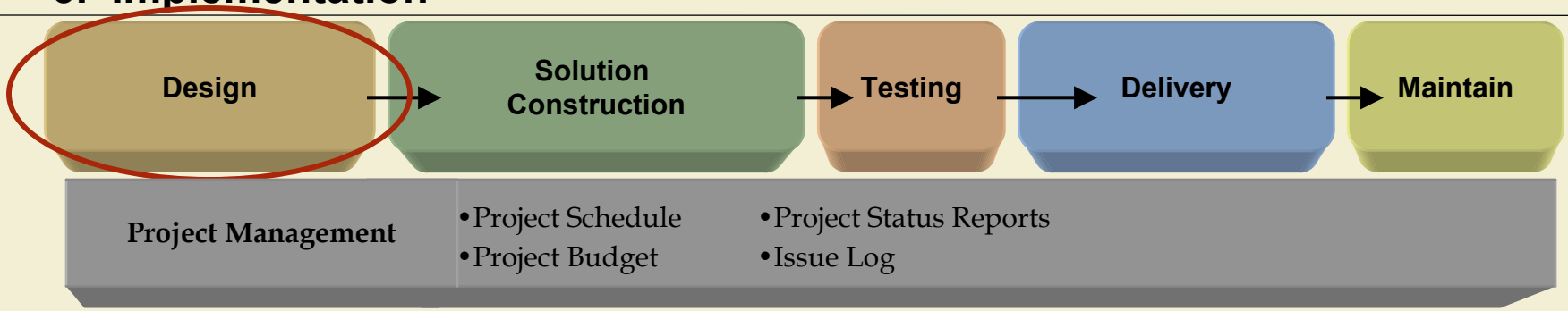
2. Solution Selection



- Get legal help and understand you are NOT purchasing supplies or raw materials
- Software services are very different contracts
- Although vendors will want most of their money up front, negotiate a payment schedule based upon their delivery of what they presented.
- Expect to pay implementation services (via vendor and or consultant as incurred)

Contents

3. Implementation



Gap Analysis and Resolution

Implementation Planning

Integration Planning

Skills Required

Subject Matter Expert(s)

Integration Systems

Network/ Systems

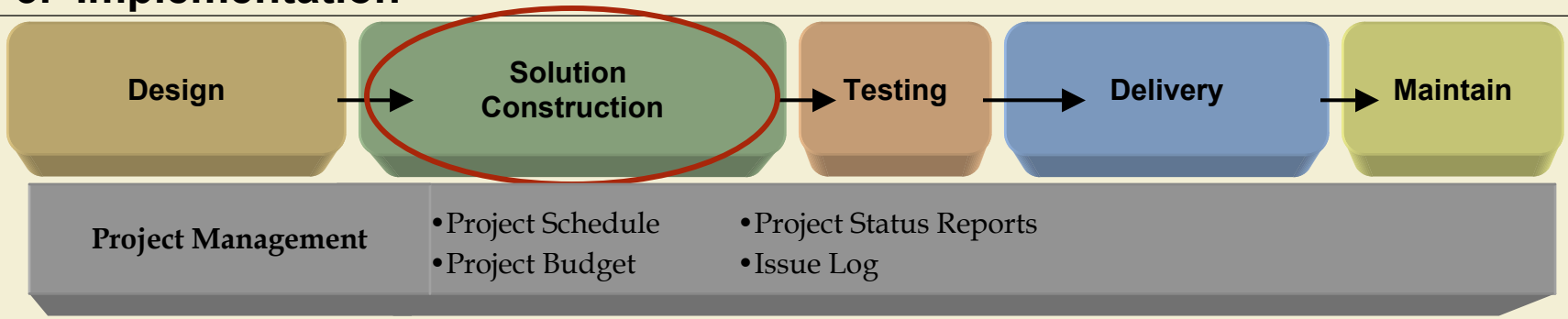
Application Knowledge

Process Knowledge

Deliverables

- Gap analysis and resolution strategy
- Integration and infrastructure strategy
- Configuration and implementation plan

3. Implementation



Configuration

- Staffing and Structure
- Training Development
- Data Discovery / Conversion
- Integration Development

Skills Required

Subject Matter Expert

Process Knowledge

Application Knowledge

Solution Design

Integration Development

Process Knowledge

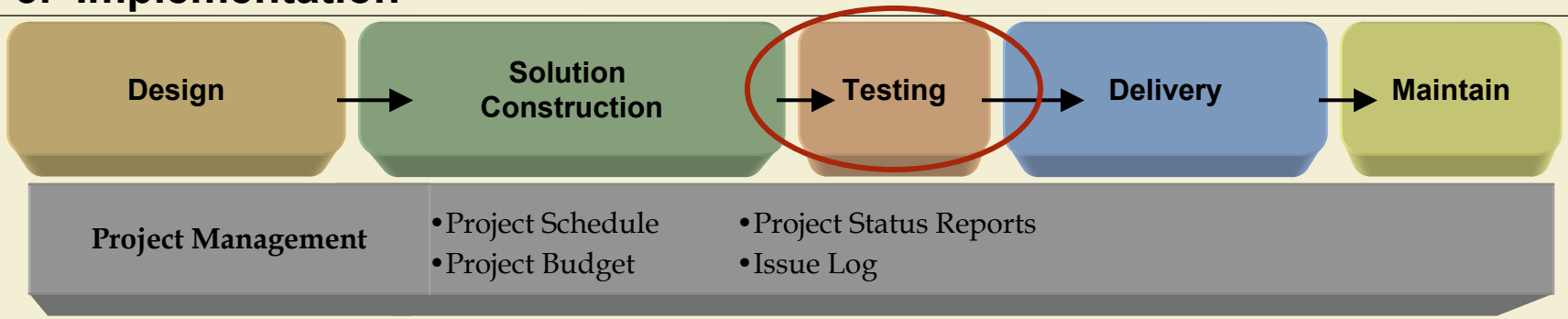
Integration Systems

Solution Design

Deliverables

- Custom reports
- Integration with selected site data systems
- Training schedule and materials
- Staffing details
- Communications

3. Implementation



Solution and Integration Testing

Acceptance Testing

Skills Required

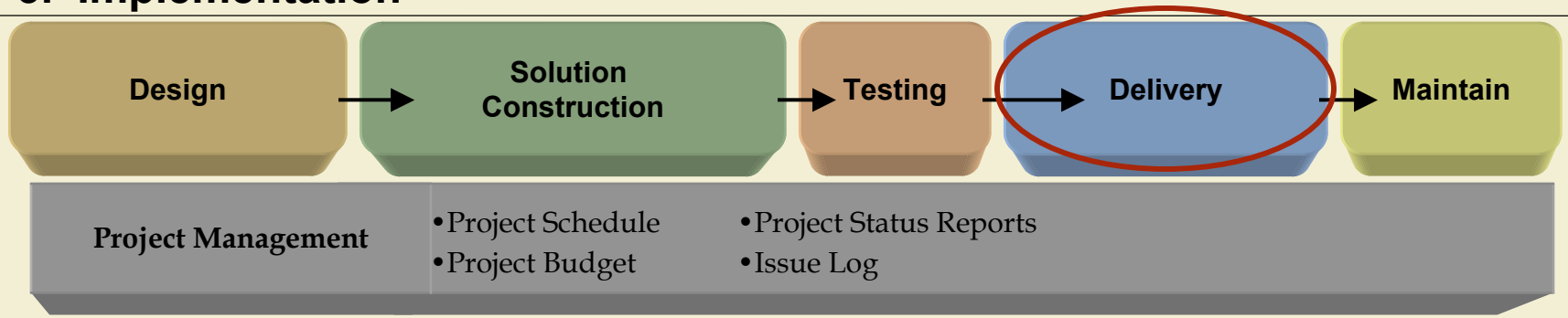
- Process Knowledge
- Application Knowledge
- Integration Systems
- Solution Design

Deliverables

- Completed solution test logs
- All solution test issues resolved
- Completed pilot test logs
- All pilot test issues resolved
- Configured & tested solution

Note: FRS ties directly to Acceptance Testing

3. Implementation



Deliverables

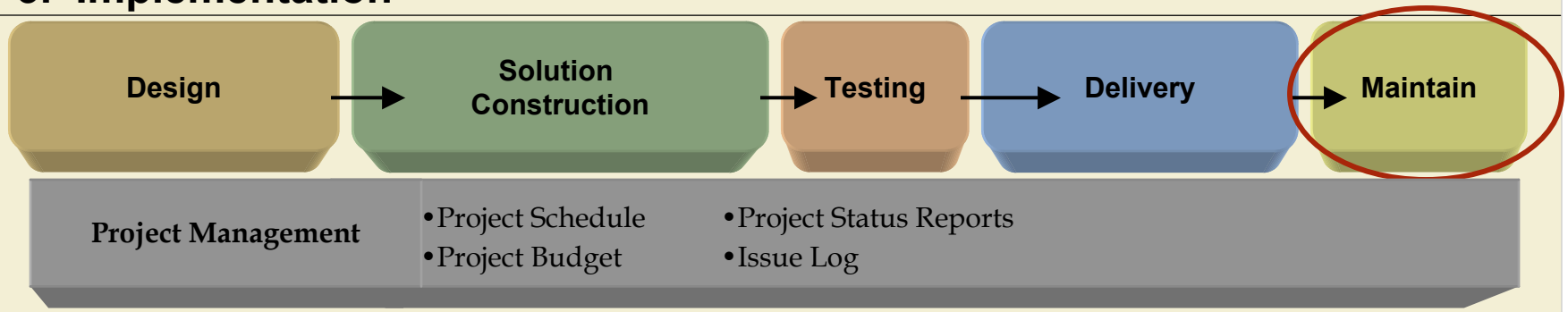
- End-users trained
- Database in production environment
- Security access in place

Skills Required

- Application Knowledge
- Process Knowledge
- Solution Design
- Training

- Training Delivery
- Site Preparation
- Cutover
- Implementation Support

3. Implementation



Deliverables

- Data quality review
- Application kept up-to-date

Skills Required

Process Knowledge

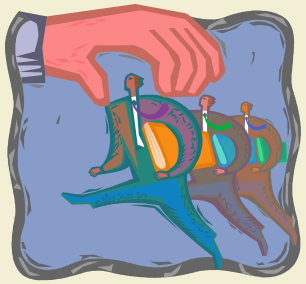
Application Knowledge

Maintain Production Environment

Maintain Master Data

Contents

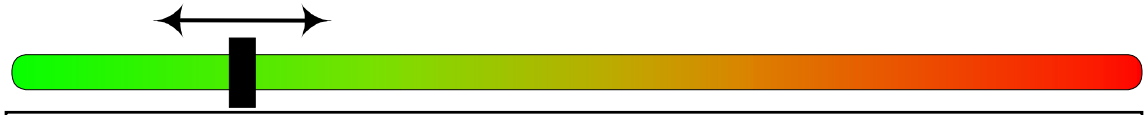
Major Project Deliverables



- **Phase 1 – Strategic Planning & Requirements Definition**
  - Documented Vision and Objectives
  - Needs Assessment
  - Functional Requirements Specification
  - Business Case
- **Phase 2 - Solution Selection**
  - List of Candidate Vendors
  - Request for Proposal (RFP) or Request for Information (RFI)
  - Vendor Evaluation Criteria
  - Scripted Demonstration Request & Demonstration Agenda
  - Final Business Case
  - Negotiated Contract
- **Phase 3 - Implementation**
  - Design Document (Blueprint)
  - Implementation Plan
    - Data Initiation & Migration Plan
    - Training Plan
    - Interface Plan
    - Test Plan
    - Q/C Plan
    - Acceptance Plan
  - Project Execution

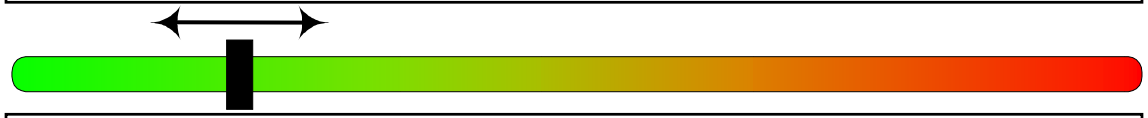
Project Self Analysis Diagnostic

1. General Support of Stakeholders & Team. Participants are engaged and are part of the consensus building process



Be certain expectations are properly established and communicated, critical users are engaged in the entire process, decisions are make via consensus, critical details are passed through all levels for review and comment. Provide frequent project status and details and involve the proper balance of strategic and tactical thinkers throughout the project

2. Potentially affected users and upper management have bought into the methodology and are patient and supportive.

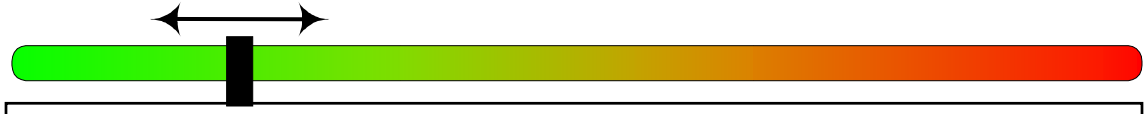


Properly sell the methodology and give people the opportunity to propose solutions at the appropriate time. Firmly manage the entire process and reinforce the importance of understanding what you want BEFORE you start to look at solutions.

3. Active and passionate support by upper management is achieved.

Be certain the correct Project Sponsor has been selected and is engaged. Be certain the Sponsor understands and buys into his/her role and is a passionate advocate and is an engaged participant in the project. Solicit ideas and proactive support of the Sponsor to communicate and engage other critical managers throughout the process. An effective and well executed communication plan is critical.

4. Other parts of the organization are fully engaged and participative at a level suggestive of their potential interface with a new system.



Stakeholders come from any part of the organization that does or should interface with the EH&S system(s) under consideration. When in doubt, suggest that they be involved or kept informed. Engaging the Information technology (IT) group is critical to success.

5. Users embrace and rave about the selected solution.

Be certain all critical requirements have been satisfactorily met and communicated to the user community. Check for the suitability of the training

Thank You

Don’t let your first Information Management Project be your Last!

Final Questions and Discussion