The Knowledge Leader for Project Success

Owners • Contractors • Academics

Communicating the Value

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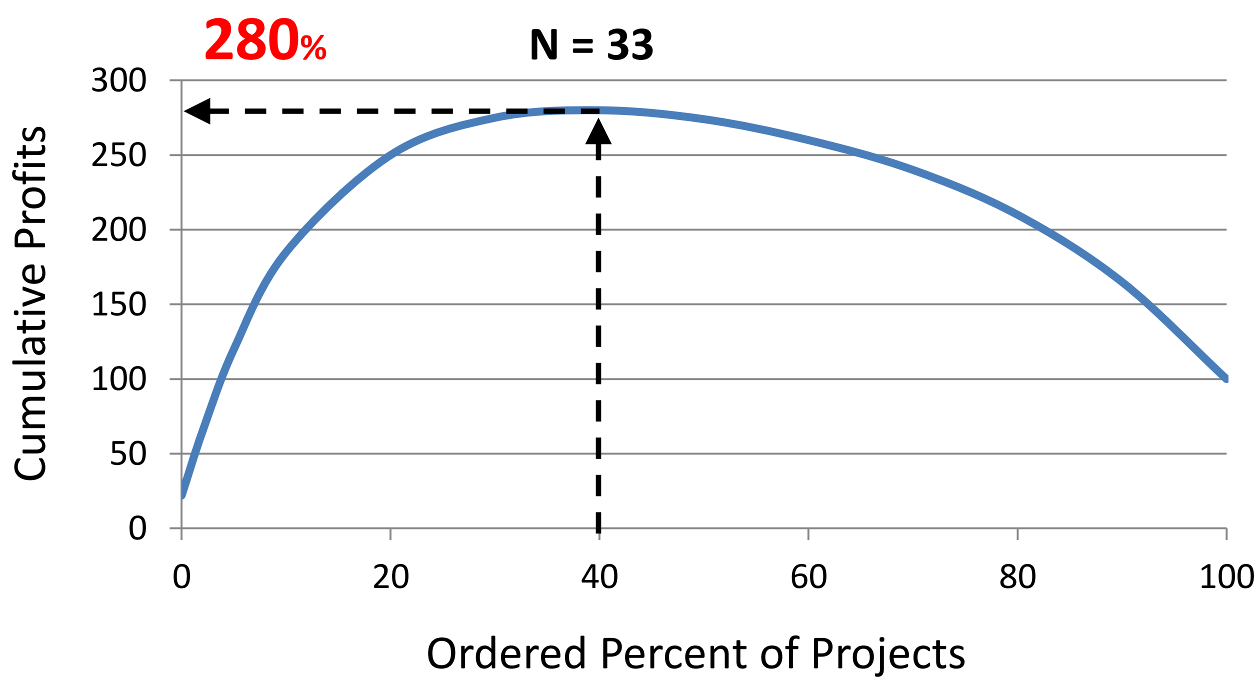
INTRODUCTION QUESTION 1:

The 40% most profitable projects make ______% of an EPC contractor's total profits.

- **A. 60%**
- **B. 85%**
- **C. 140%**
- **D. 280%**



INTRODUCTION QUESTION 2:

Which role has the biggest impact on project schedule performance?

A.	CEO	22.9%*
B.	Project Sponsor	21.7%*
C.	Finance Manager	35.4%
D.	Contract/Legal Mgr.	11.8%*
E.	Project Controls Mgr.	33.5%
F.	Engineering Team Leads	33.1%
G.	QA/QC Manager	29.5%

Percent Variation Explained

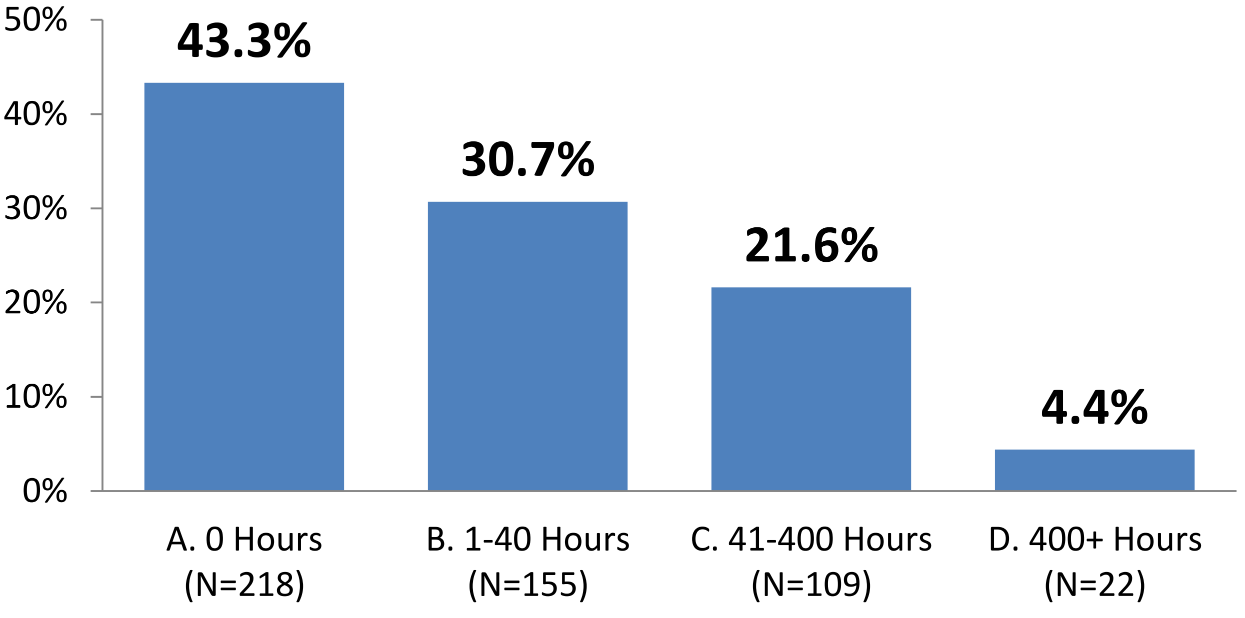
N = 39

* Not Significant at $\rho > 0.1$

INTRODUCTION QUESTION 3:

What percentage of key business personnel are NOT involved in a project?

A. 4%
B. 22%
C. 31%
D. 43%



Experience is what you get when you didn't get what you wanted.

– Randy Pausch

Agenda

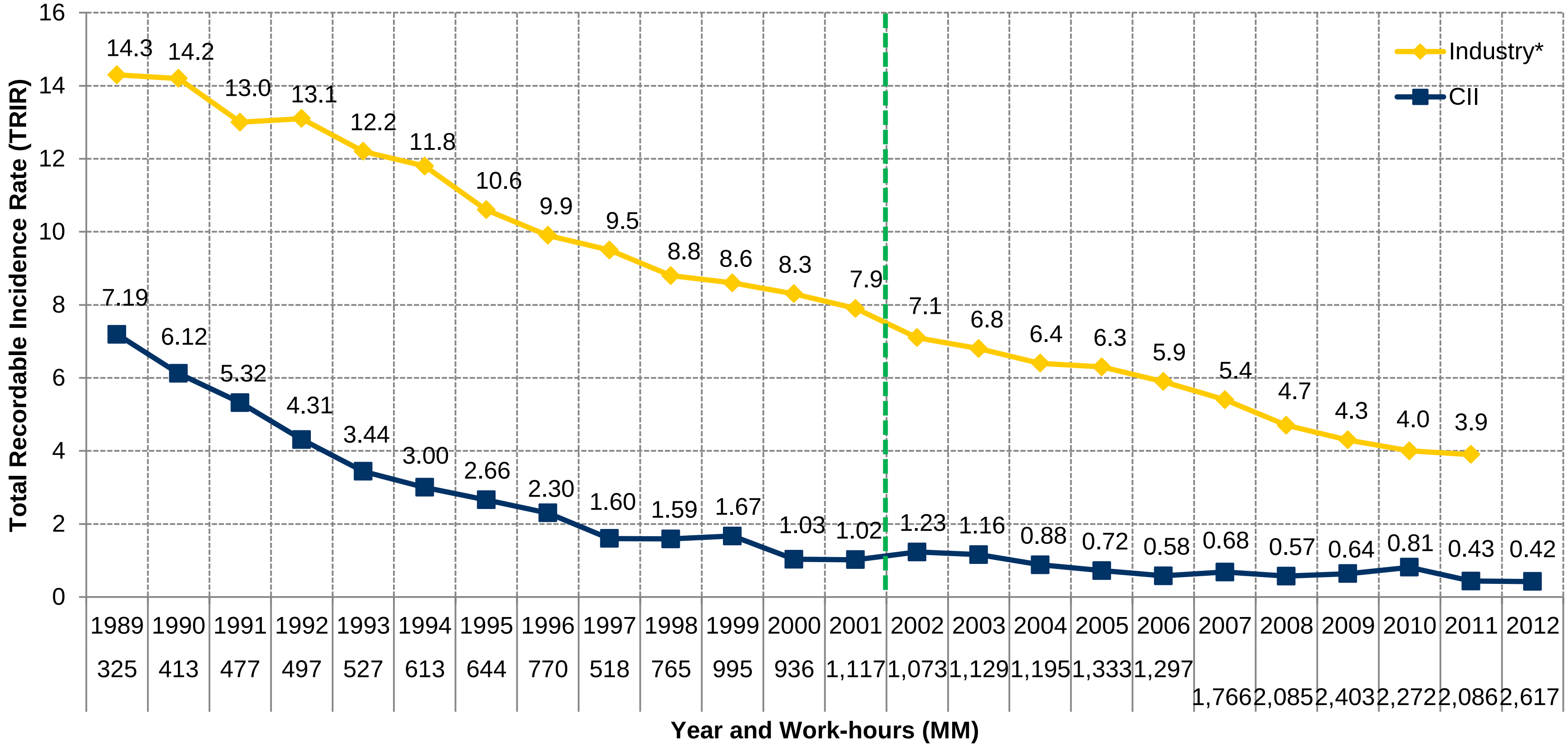
- Capital Projects should be a **strategic weapon** in the creation of benefits driving shareholder value.
- Today's business leaders perceive capital projects as a **"necessary evil"** – as risky and plagued by cost and schedule overruns that erode benefits.
- Construction Industry Institute (CII) identified the root causes of benefits subtraction as **poor working relationships, dysfunctional team dynamics, and ineffective contract management**.
- How CII is changing the notion of benchmarking in capital projects by **measuring the "softer side" of project management** and how this form of communication radically improves project outcomes.

BACKGROUND

CII Purpose

CII's purpose is to <u>measurably</u> improve the capital delivery process.

CII's Legacy of Improvement
(TRIR Rate)



*OSHA Construction Division, NAICS 236-238 (SIC 15-17) Reflects OSHA reporting

Trim Capital Spending by 25%

- McKinsey & Company

  "The management of capital investment has an enormous effect on profitability and competitiveness, yet few companies do it effectively. We believe that the use of **evaluation tools**, **disciplined processes**, and **best practices** can help companies trim capital spending by **up to a quarter** without reducing capacity or functionality - and improve their operating costs and revenues through **better investment decisions**."

National Research Council (2009)

- Advancing the Competitiveness and Efficiency of the U.S. Construction Industry
  - Opportunities for Breakthrough Improvements:
    - Widespread Use of Interoperable Technology Applications (BIM)
    - Improved Jobsite Efficiency (Effective Interfacing of People, Processes, Materials, Equipment and Information)
    - Greater Use of Prefabrication, Preassembly, Modularization, and Offsite Fabrication (PPMOF) Techniques and Processes
    - Innovative, Widespread Use of Demonstration Installations
    - Effective Performance Measurement to Drive Efficiency and Support Innovation

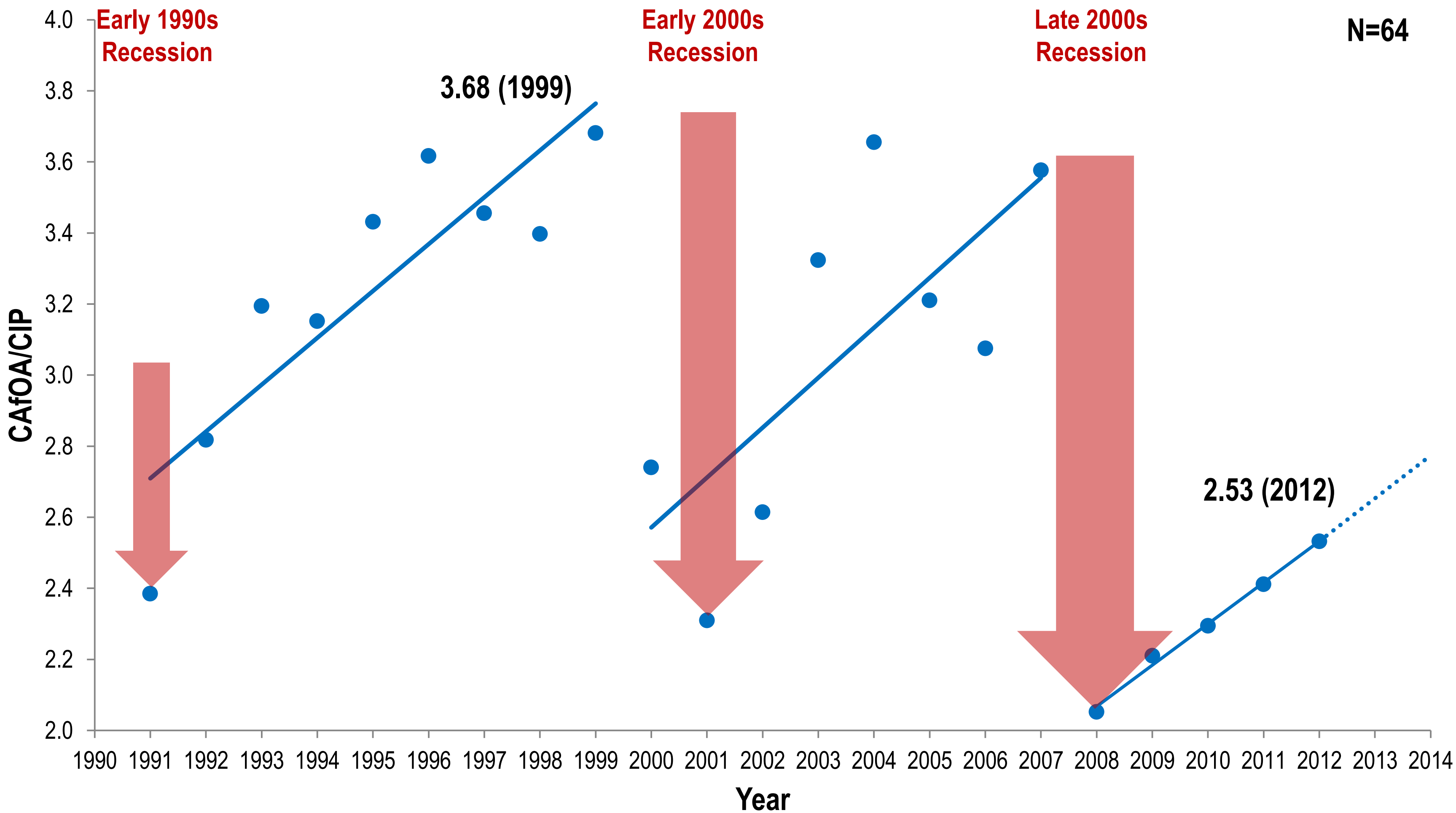
Whenever an individual or a business decides that success has been attained, progress stops.

– Thomas J. Watson

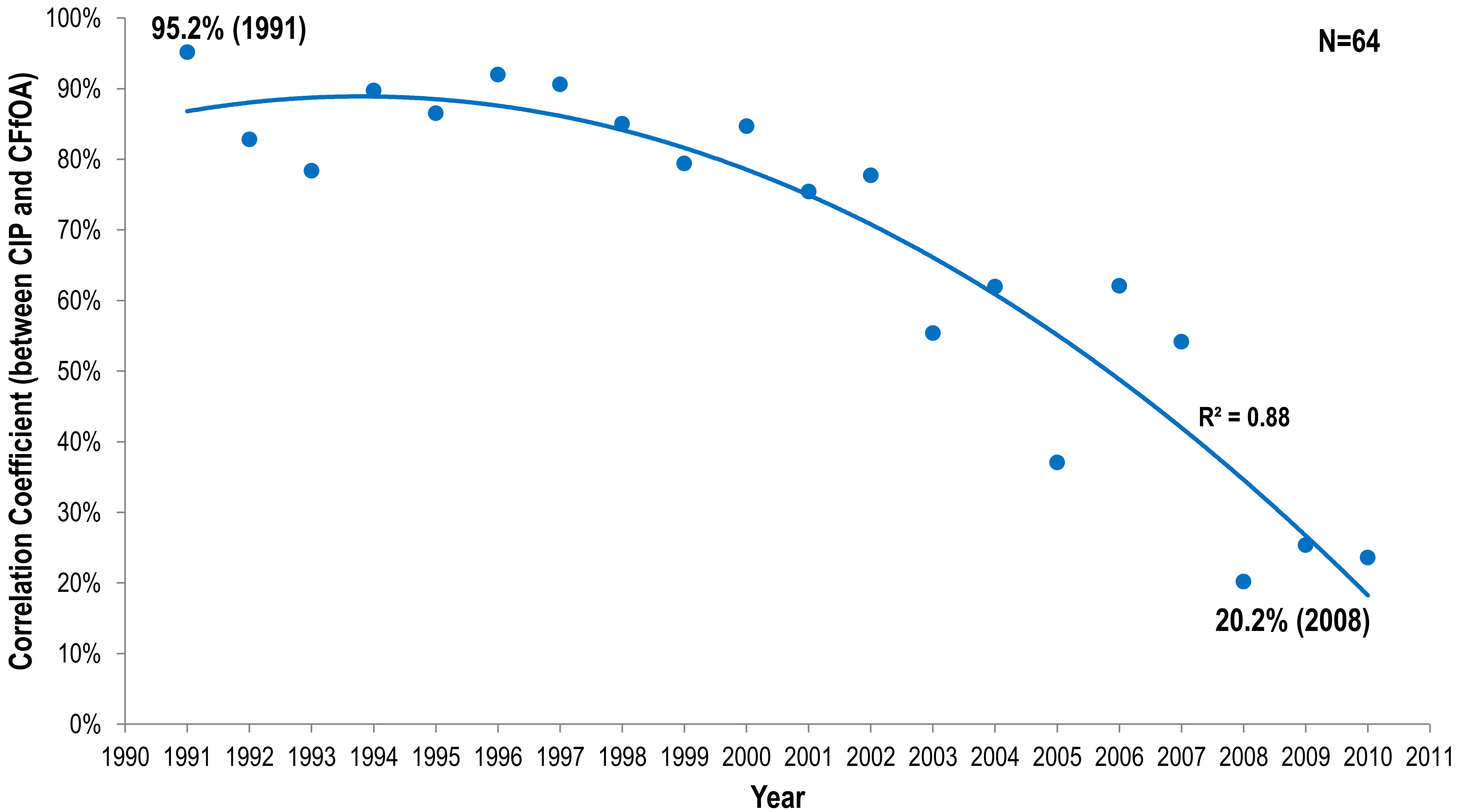
PROJECT PERFORMANCE PREDICTABILITY RESEARCH
(IMPACT ON FINANCIAL RETURNS)

CII Owners' Capital Efficiency

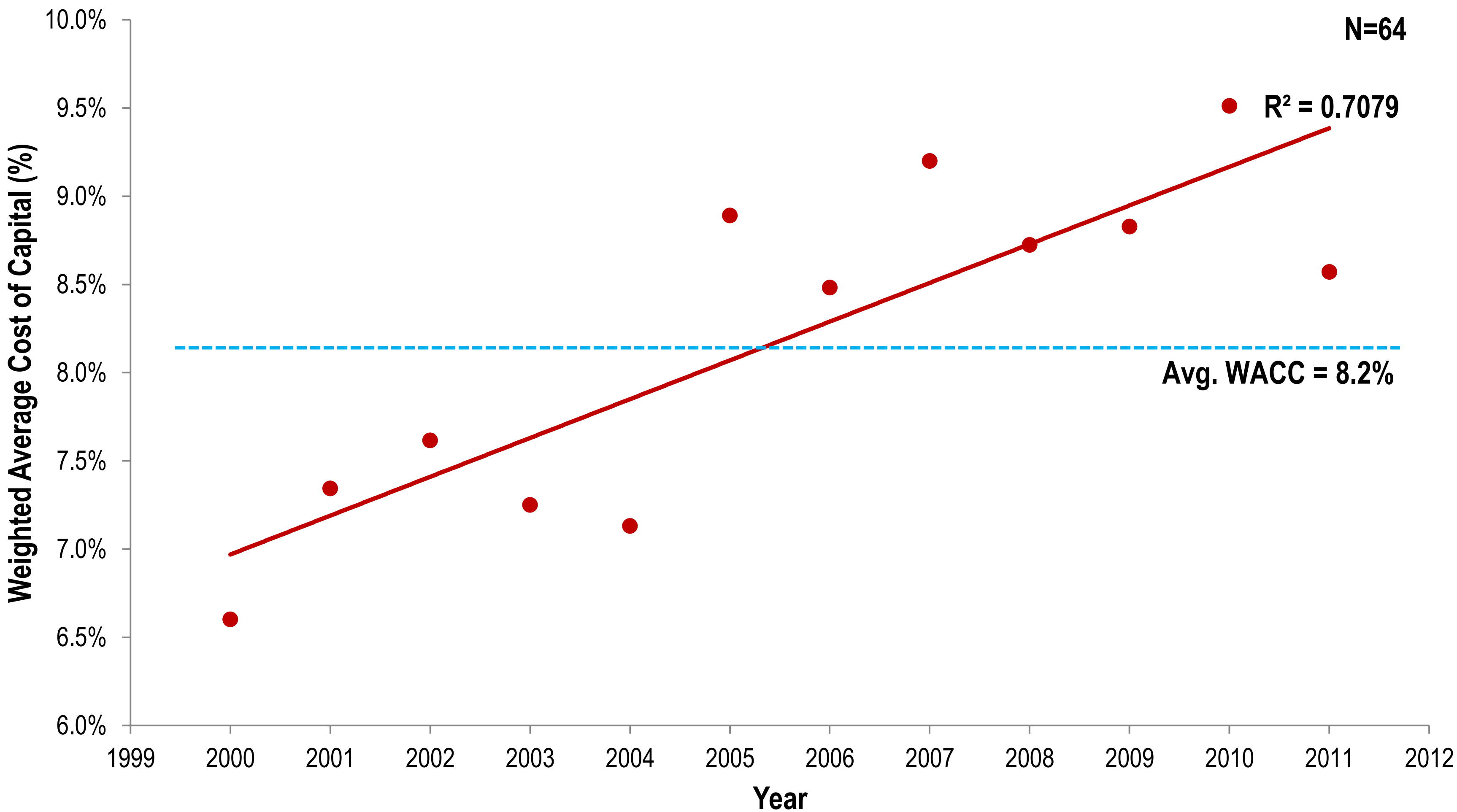
(Ratio of Cash Flow (CFfOA) to Construction In Progress (CIP))



Correlation between Construction In Progress (CIP) and Cash Flow (CFfOA) for CII Owners

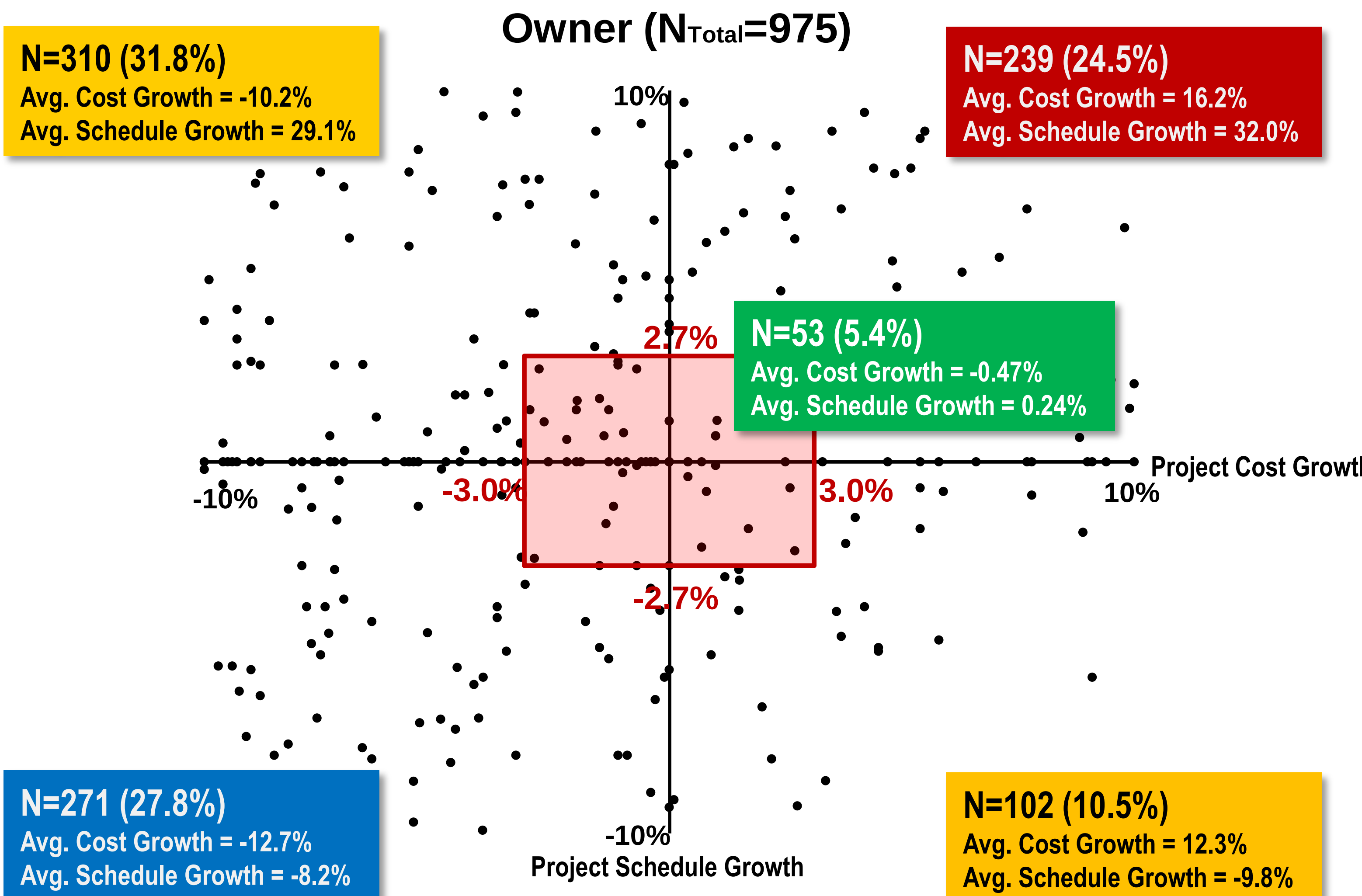


CII Owners' Weighted Average Cost of Capital (WACC)



The WACC is the minimum return that a company must earn on an existing asset base to satisfy its creditors, owners, and other providers of capital, or they will invest elsewhere.

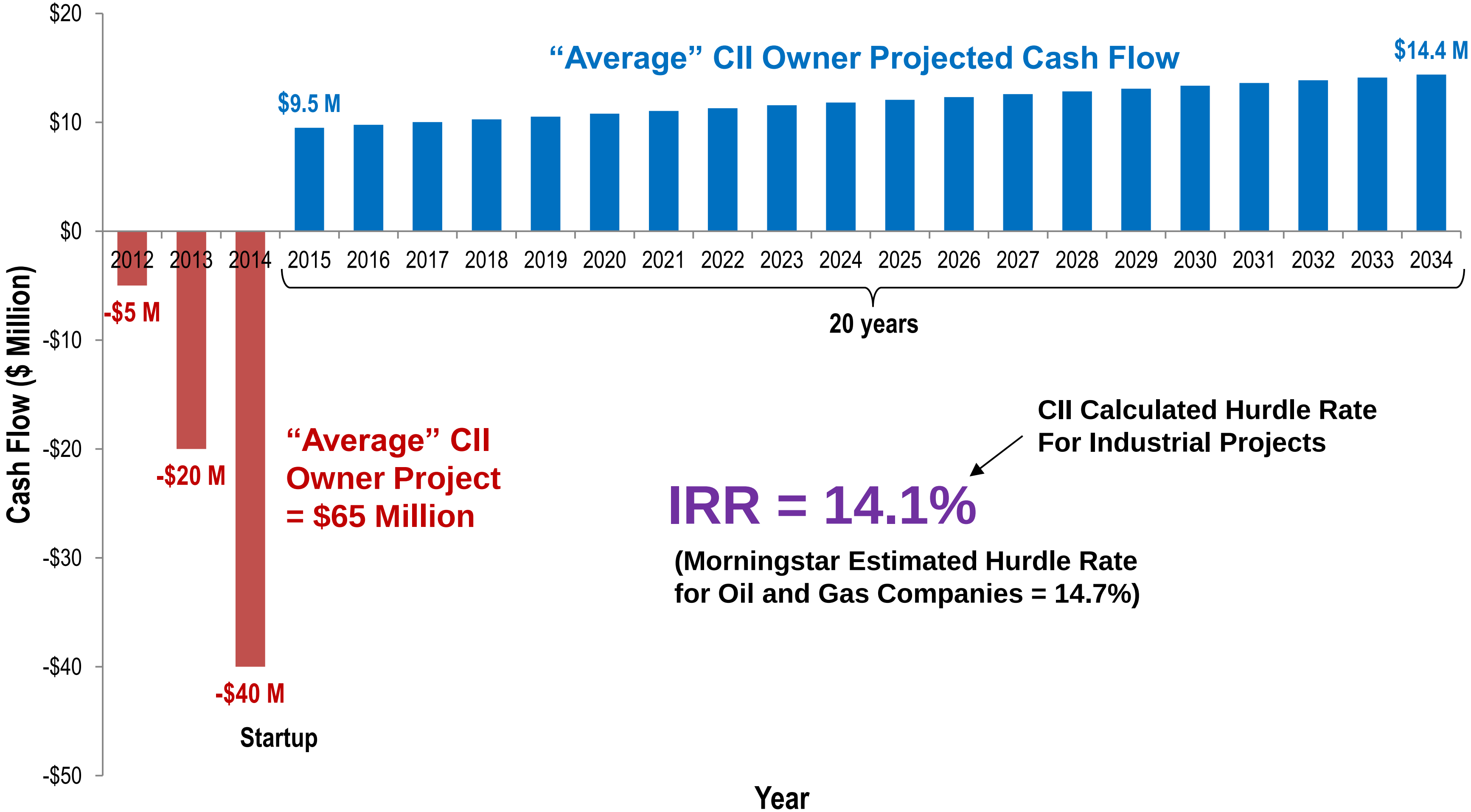
Capital Project Performance - CII Owners



69.7% Projects Not Shown

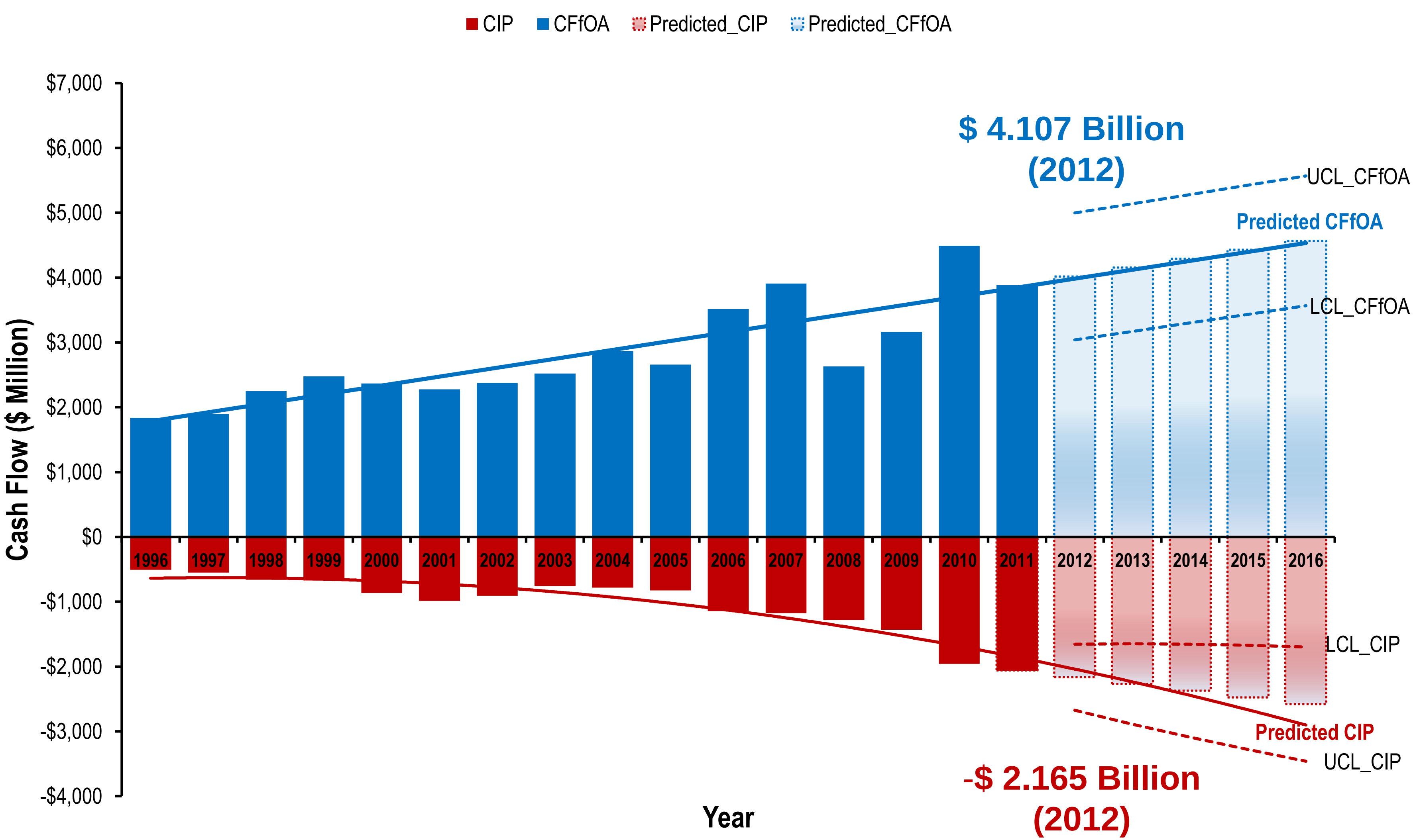
Cash Flow for an “Average” CII Owner Project

Slope of Revenue = 2.7% per year
(Incremental Rate of Corporate CFfOA)



Cash Flow Diagram for an "Average" CII Owner

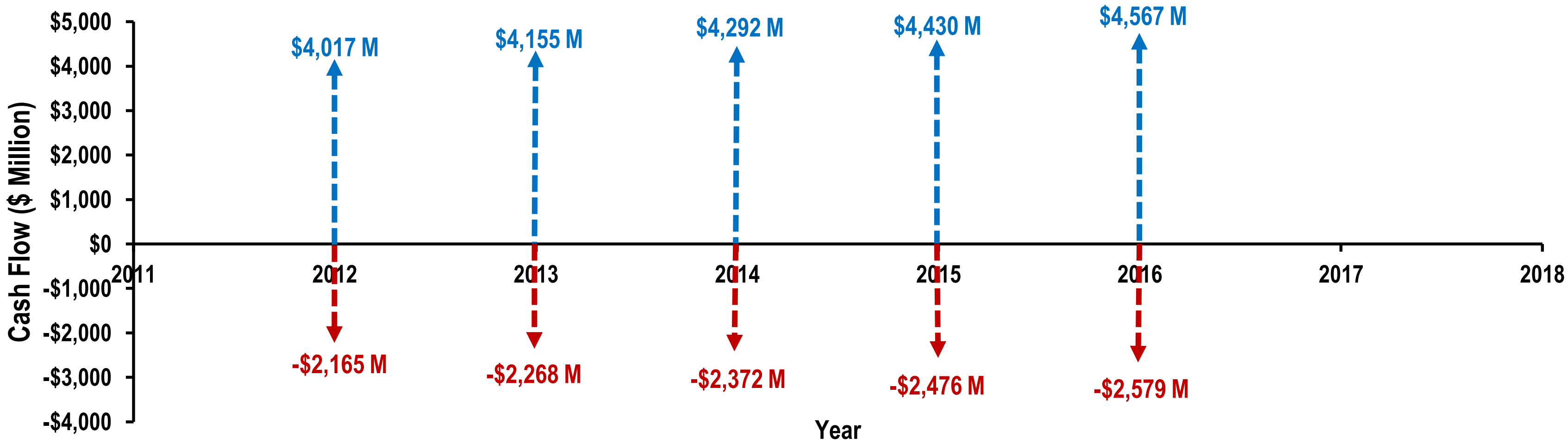
(Includes Forecast 2012 - 2016)



Source: Capital IQ Courtesy of McCombs School of Business, UT Austin

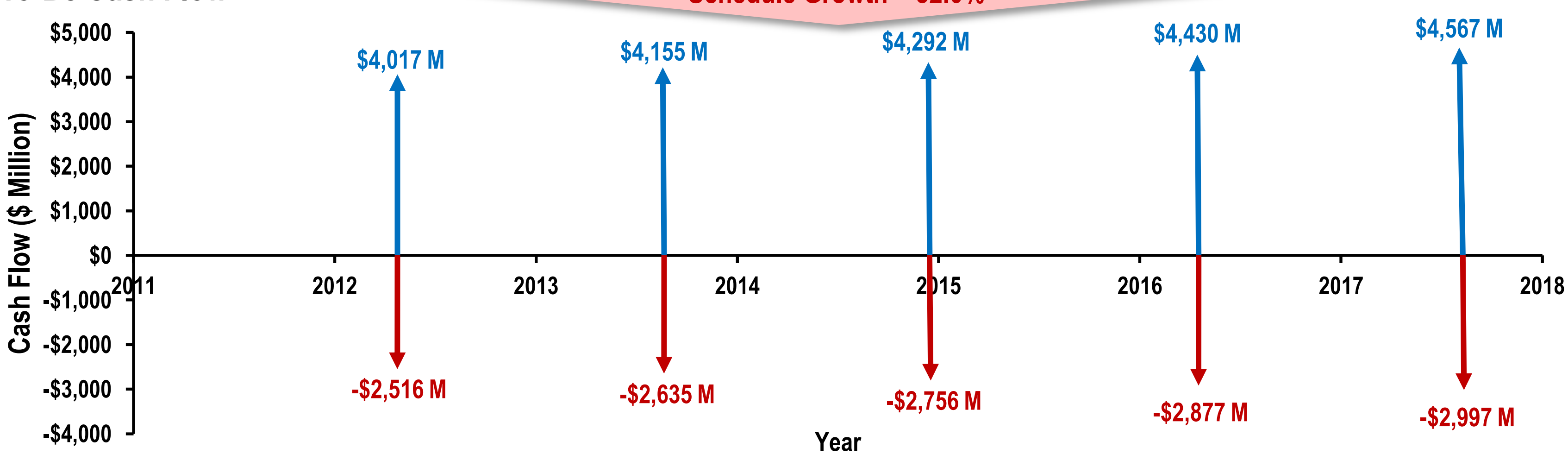
Scenario 1: High Cost and Schedule Growth

As-Is Cash Flow



Cost Growth = 16.2%
Schedule Growth = 32.0%

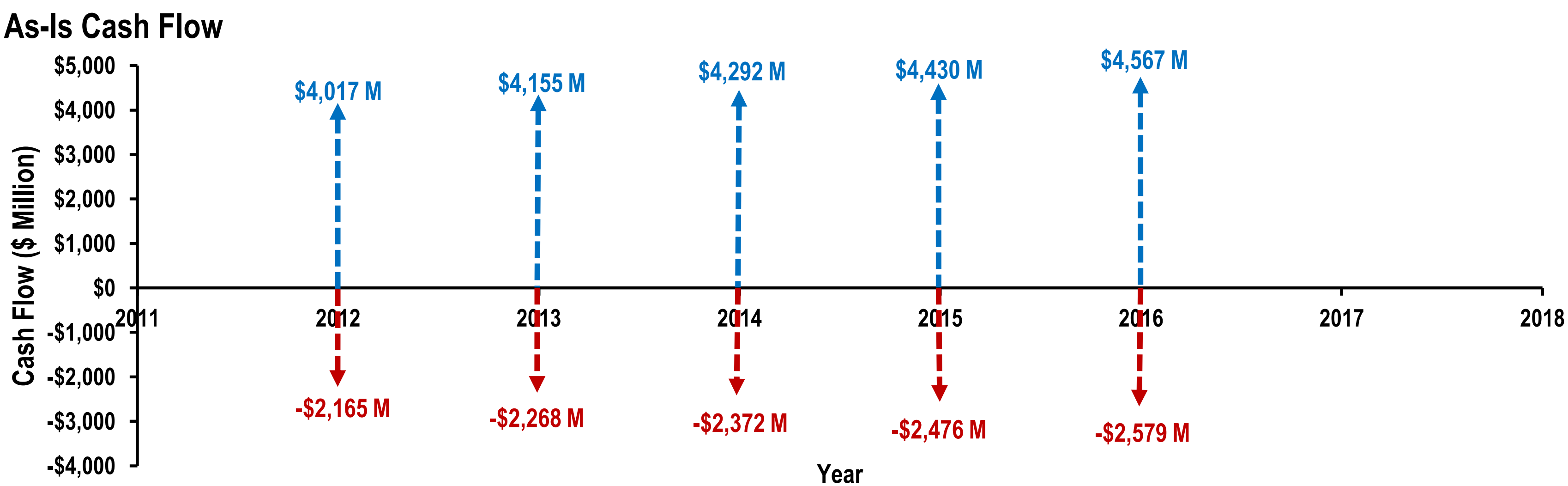
To-Be Cash Flow



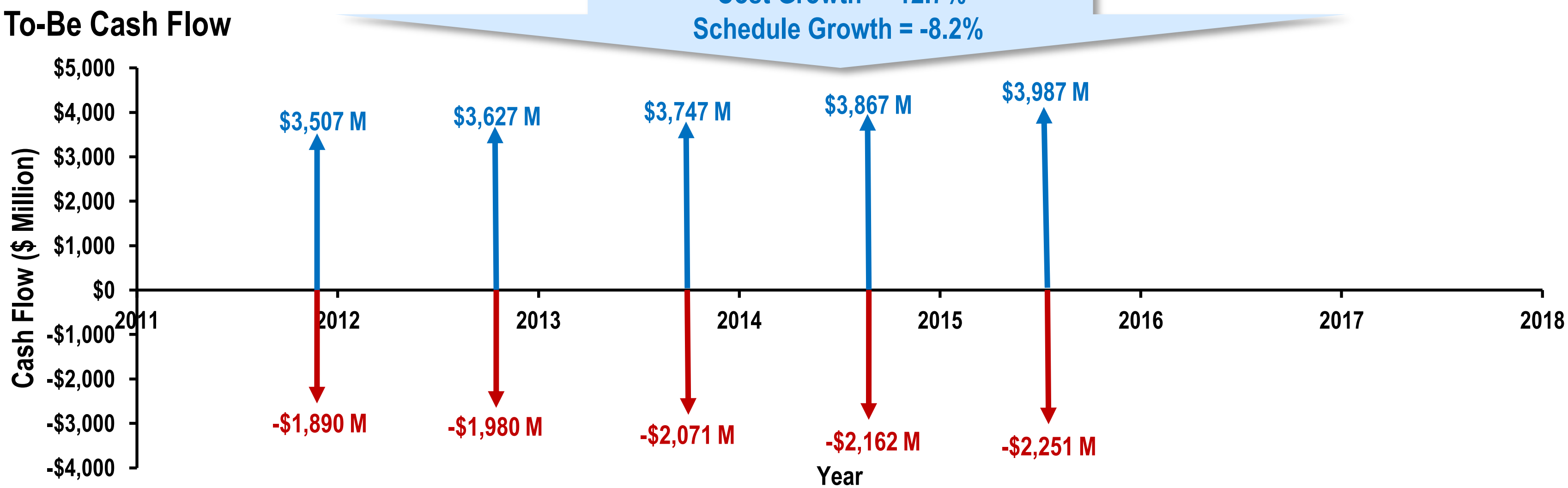
NPV_{Target} = $7.6 Billion → $NPV_{Scenario\ 1}$ = $5.7 Billion

25.3% Loss of NPV

Scenario 2: Low Cost and Schedule Growth



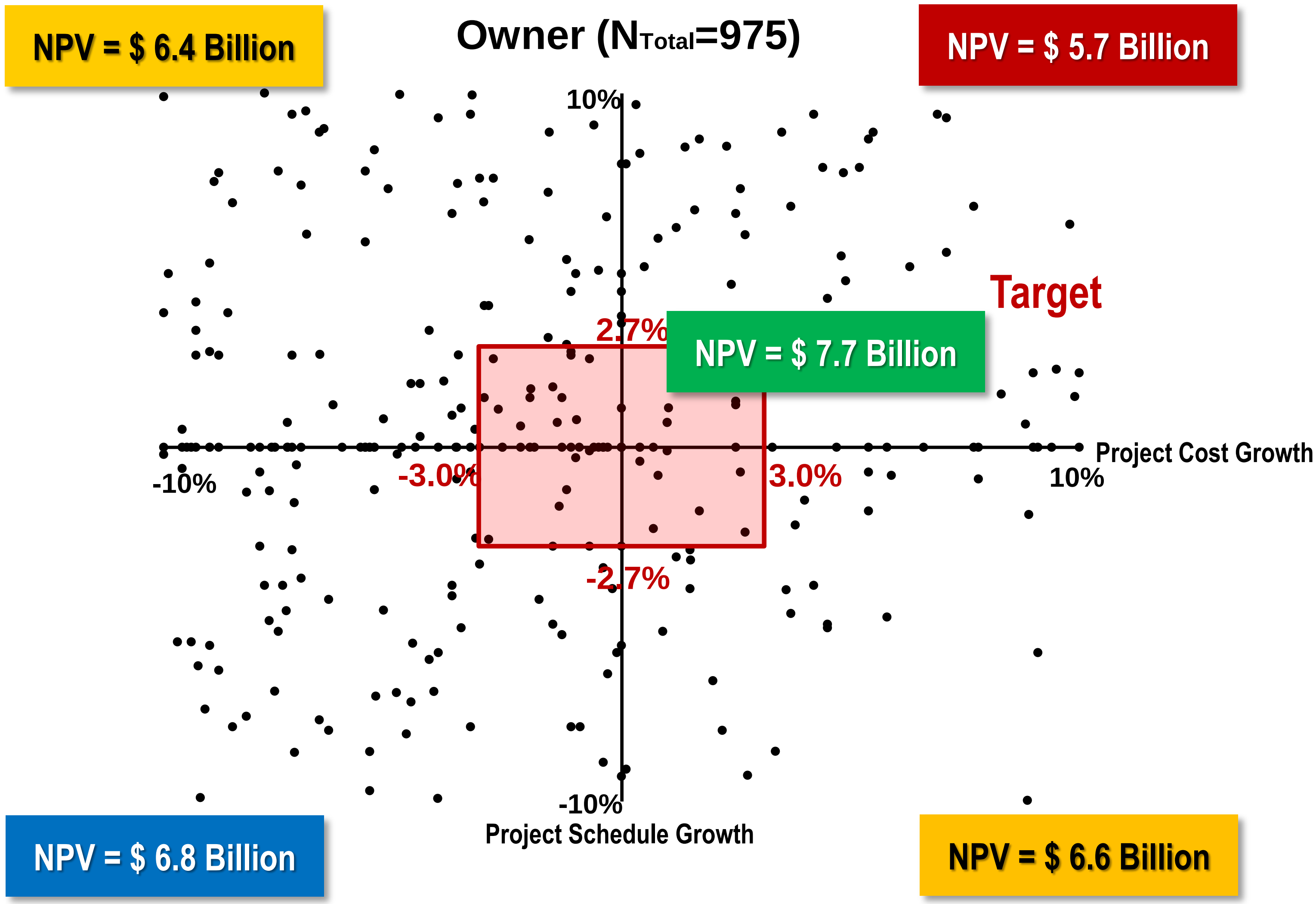
Cost Growth = -12.7%
Schedule Growth = -8.2%



NPV_{Target}= $7.6 Billion → $NPV_{Scenario\ 2}$= $6.8 Billion

11.1% Loss of NPV

Net Present Value (Forecast for 2012-2016)



Expected NPV = $ 6.5 Billion

NPV Impact of Suggested P.M. Practices

	Practices	Expected NPV	Gain/Loss	Improvement
CII Owners' Average		$ 6.45 Billion	N/A	N/A
Contract Method	Lump Sum	$ 6.81 Billion	$ 360 Million	5.5%
	Cost Reimbursable	$ 5.50 Billion	- $ 950 Million	-14.8%
Working Relationship	Work w/ Partner Contractor	$ 6.80 Billion	$ 350 Million	5.3%
	Work w/ Non-Partner Contractor	$ 4.61 Billion	- $ 1,840 Million	-28.5%
PDRI	<=200	$ 6.48 Billion	$30 Million	0.5%
	>200	$ 6.10 Billion	- $360 Million	-5.6%
Planning for Startup	High Use	$ 6.45 Billion	$ 0 Million	0.0%
	Low Use	$ 6.23 Billion	- $220 Million	-3.4%

- Best Strategy to Maximize Expected NPV
  - Lump Sum Contract, Working with CII Contractor, PDRI<=200, and High Use of Planning for Startup

$$\sqrt{(\$360)^2 + (\$350)^2 + (\$30)^2 + (\$0)^2} = \$496 \text{ Million}$$

  - Expected NPV can increase $496 Million
  - Expected NPV can decrease $2,113 Million

QUESTION:

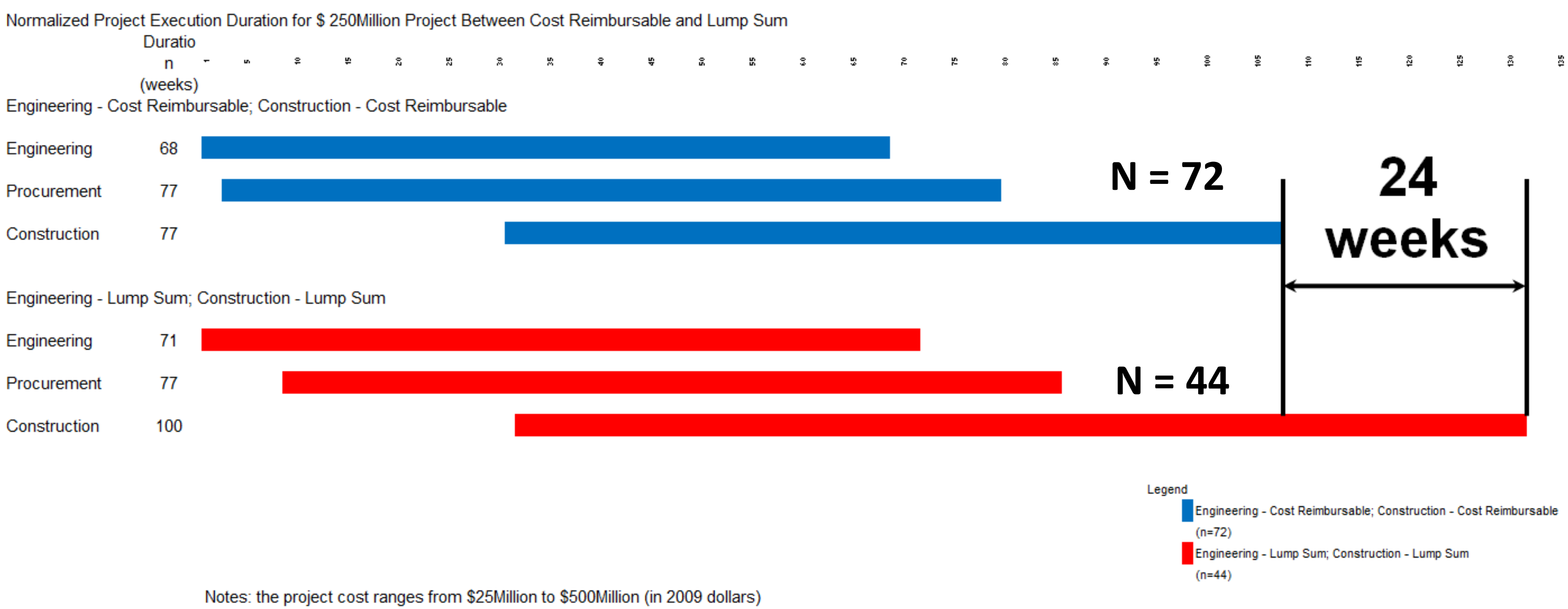
Cost Reimbursable is faster than Lump Sum EPC by how much? (assume $250 MM project)

A. 4 weeks

B. 10 weeks

C. 24 weeks

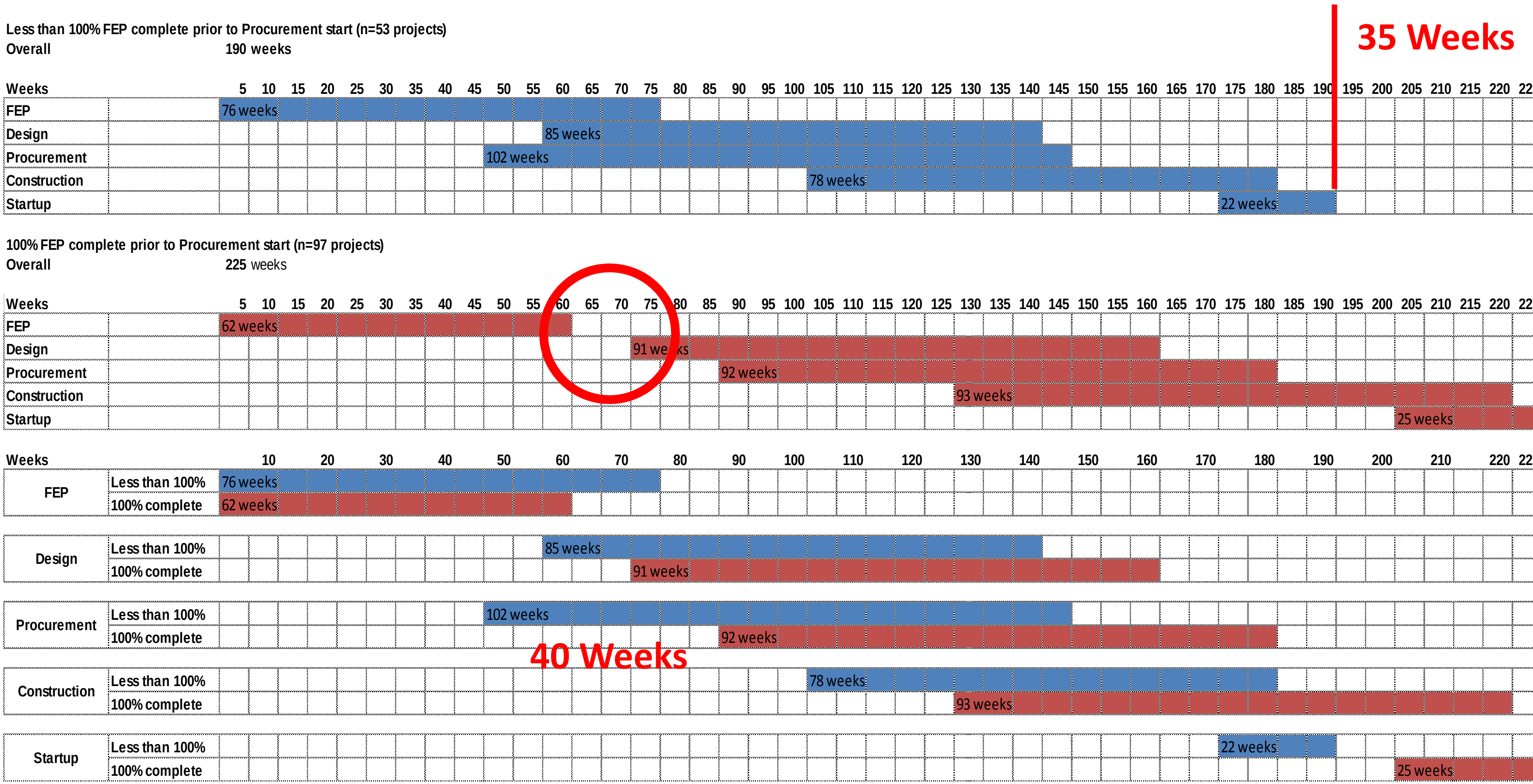
D. 40 weeks



Procurement Involvement in FEP

Construction Industry Institute®

Analyzed by: BMM Team
*Each project's cost was normalized to $ 250 MM



Conclusion: Opportunity Exists To Improve

Target NPV	$7.65 B
Expected NPV	$6.45 B
B.P. Enhanced NPV	$6.95 B
Optimal NPV	$8.00 B

KNOWN

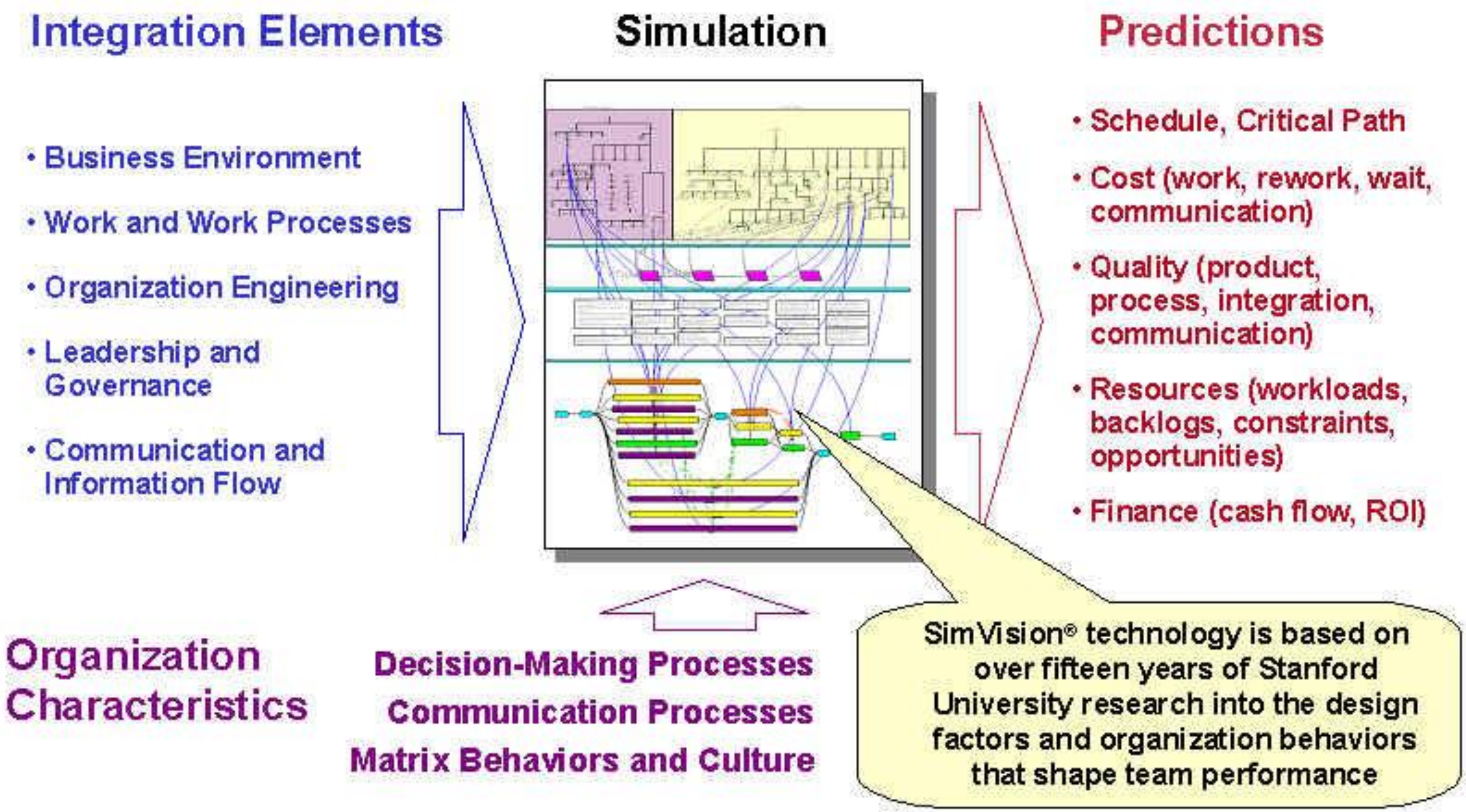
(RESEARCH)

High expectations are the key to everything

– Sam Walton

ORGANIZATIONAL MODELING & SIMULATION

SimVision® Modeling and Simulation

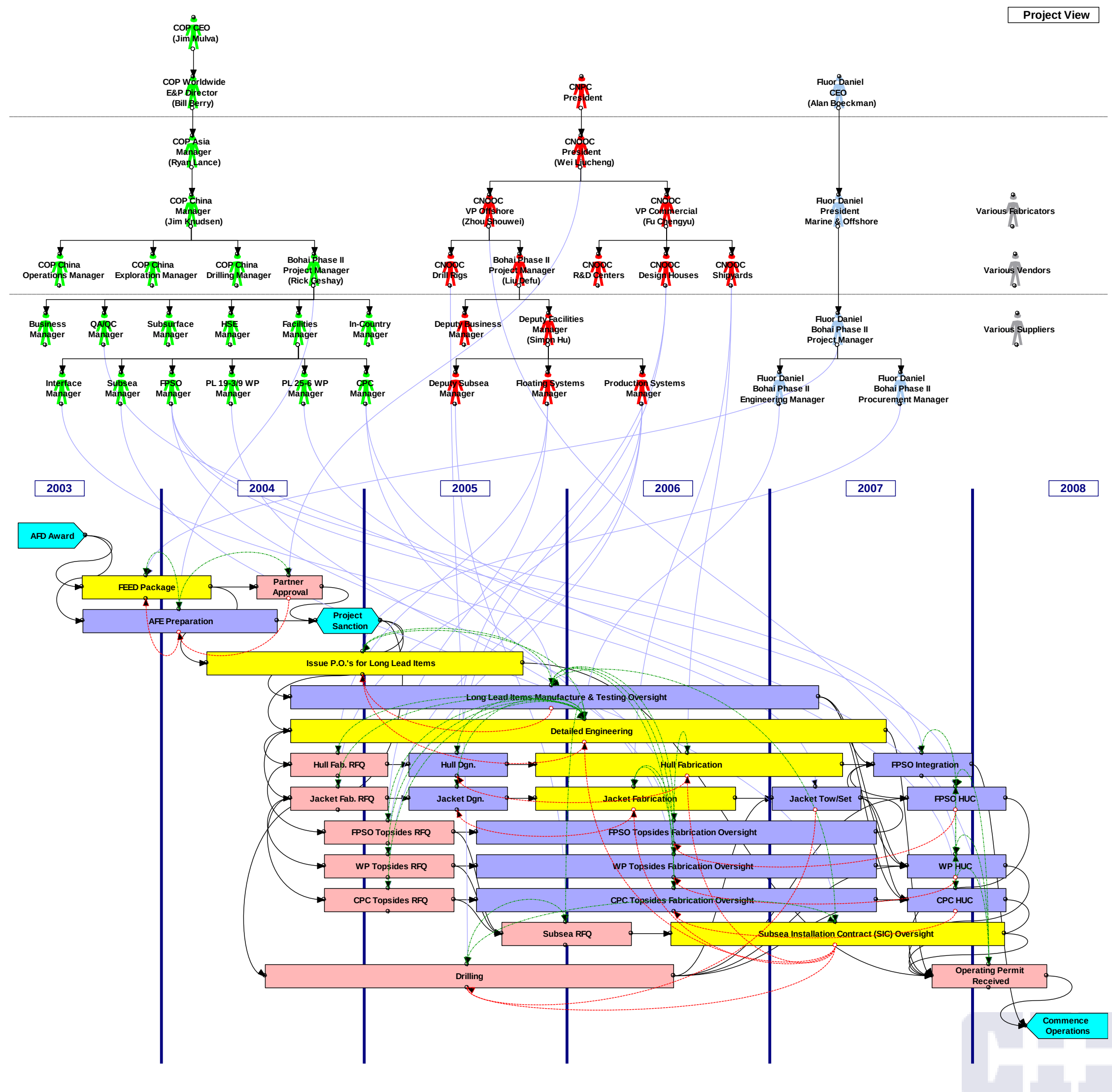


Exceptions (Galbraith 1974)

Source: ePM, LLC (2006)

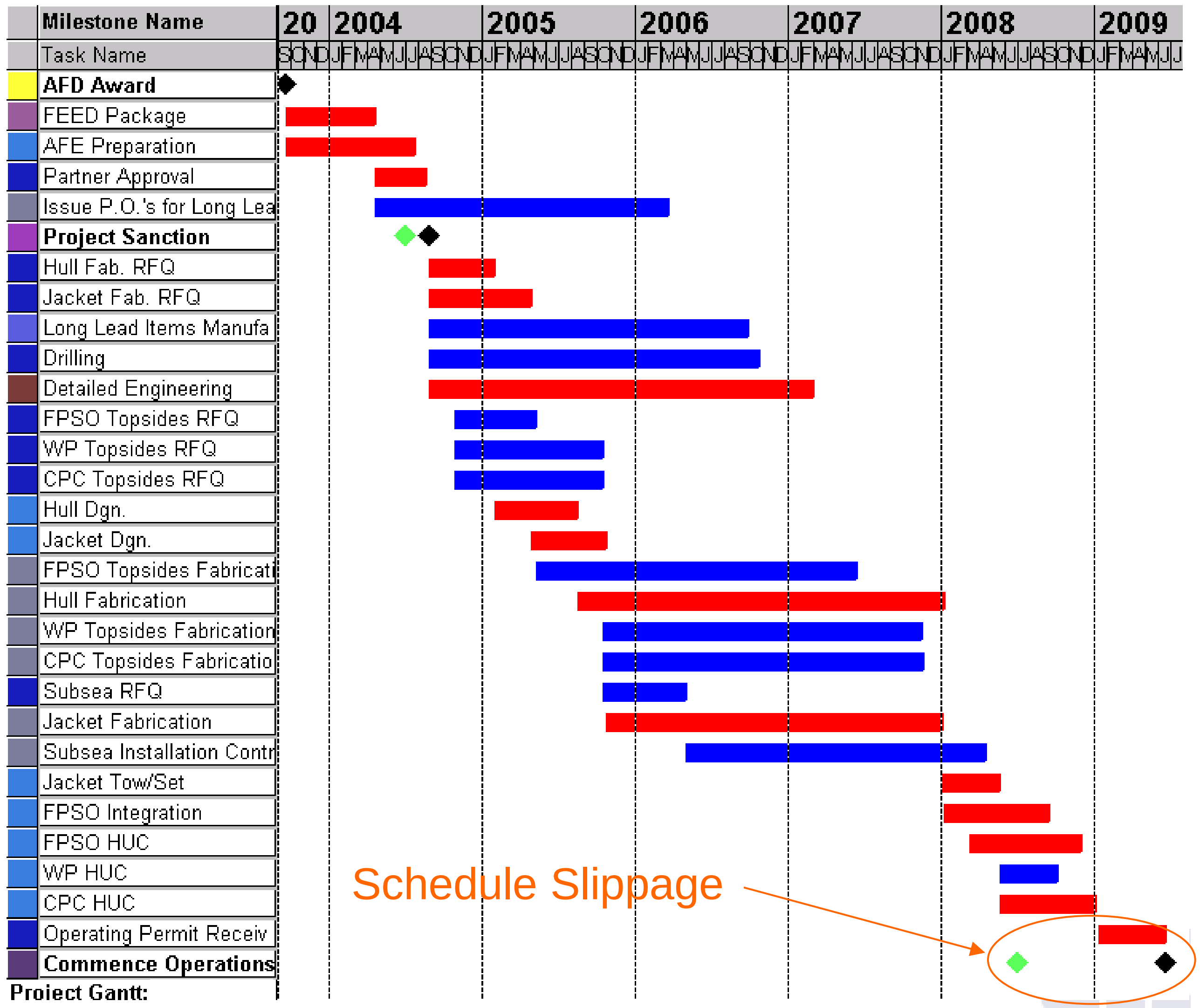
Offshore China Project Model

- Organizations
  - Owner (Green)
  - Contractor (Red)
  - Sub (Blue)
  - Other (Grey)
- Main Activities
  - Facilities
  - Responsibility
  - Coordination
  - Rework



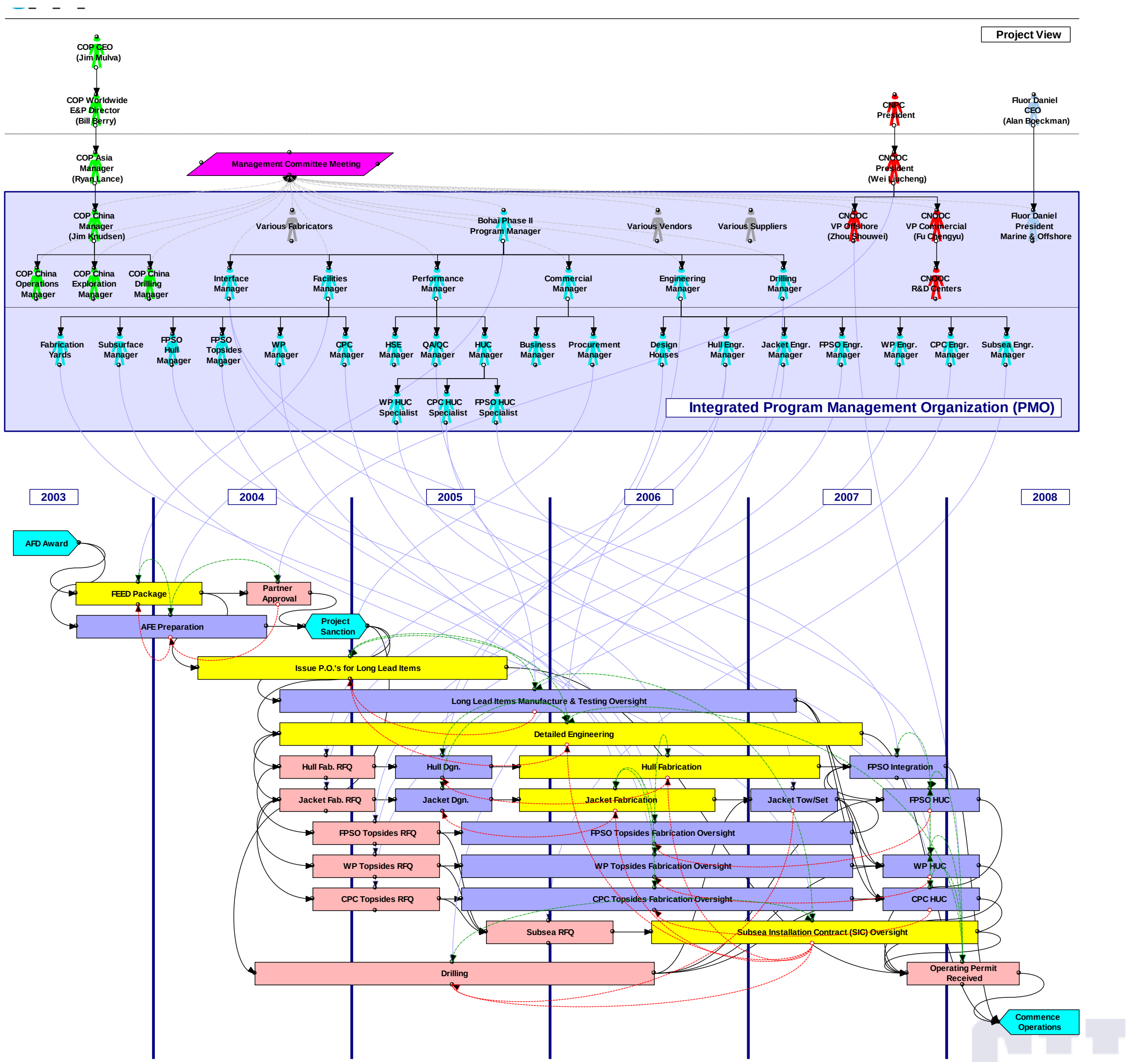
Offshore China Project Simulation

- 55% Critical Activities
- Need to Focus on:
  - *Controlling* Engineering
  - *Planning* for Fabrication
  - *Planning* for HUC
- Duration
  - 11 Months Longer than Anticipated



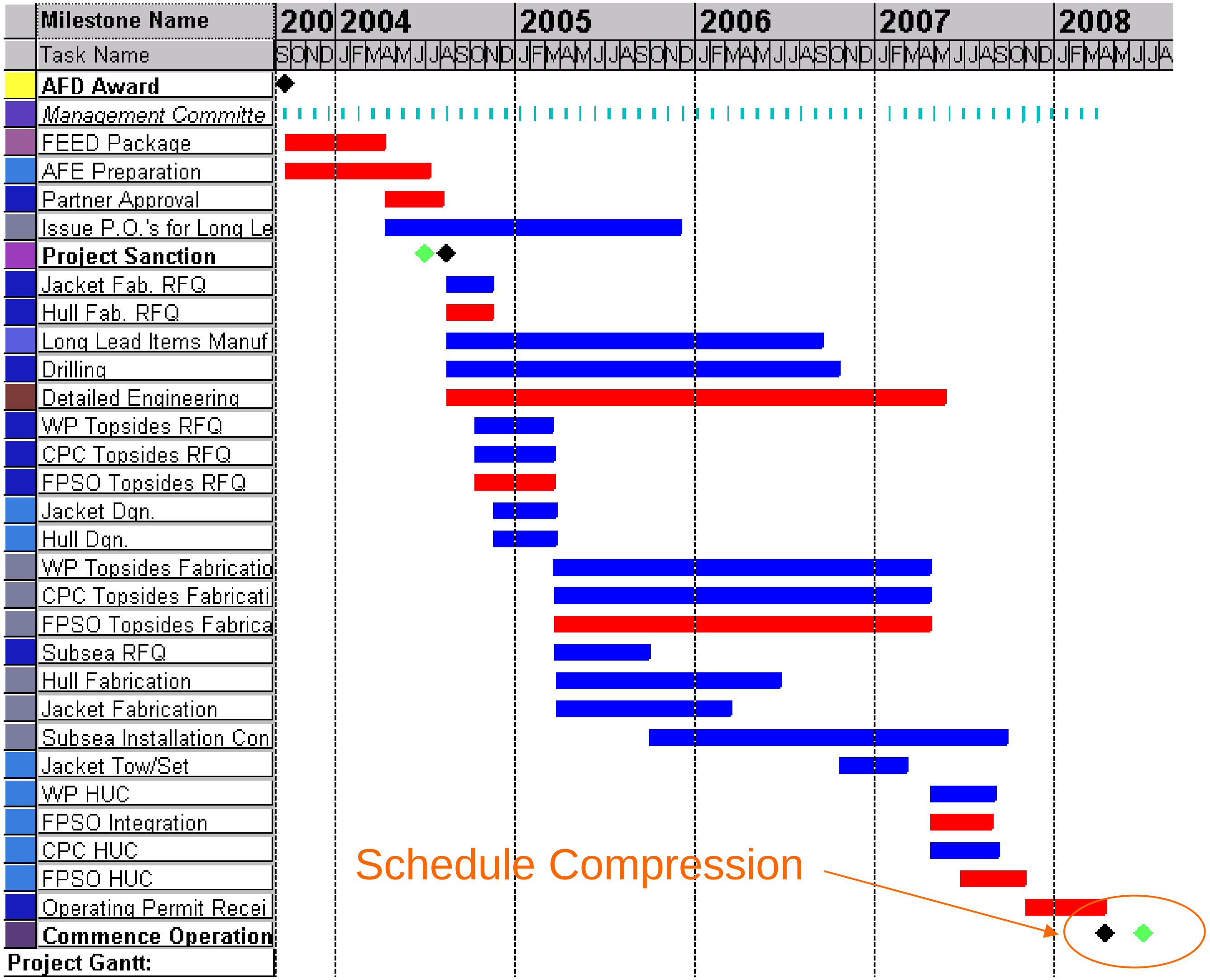
Offshore China PMO Model

- **Program Organization**
  - Integrated Program Management Organization (PMO)
  - Personnel from ALL Companies
- **Focus On:**
  - Reducing Project Overhead
  - Decision-Making
  - Improving Performance



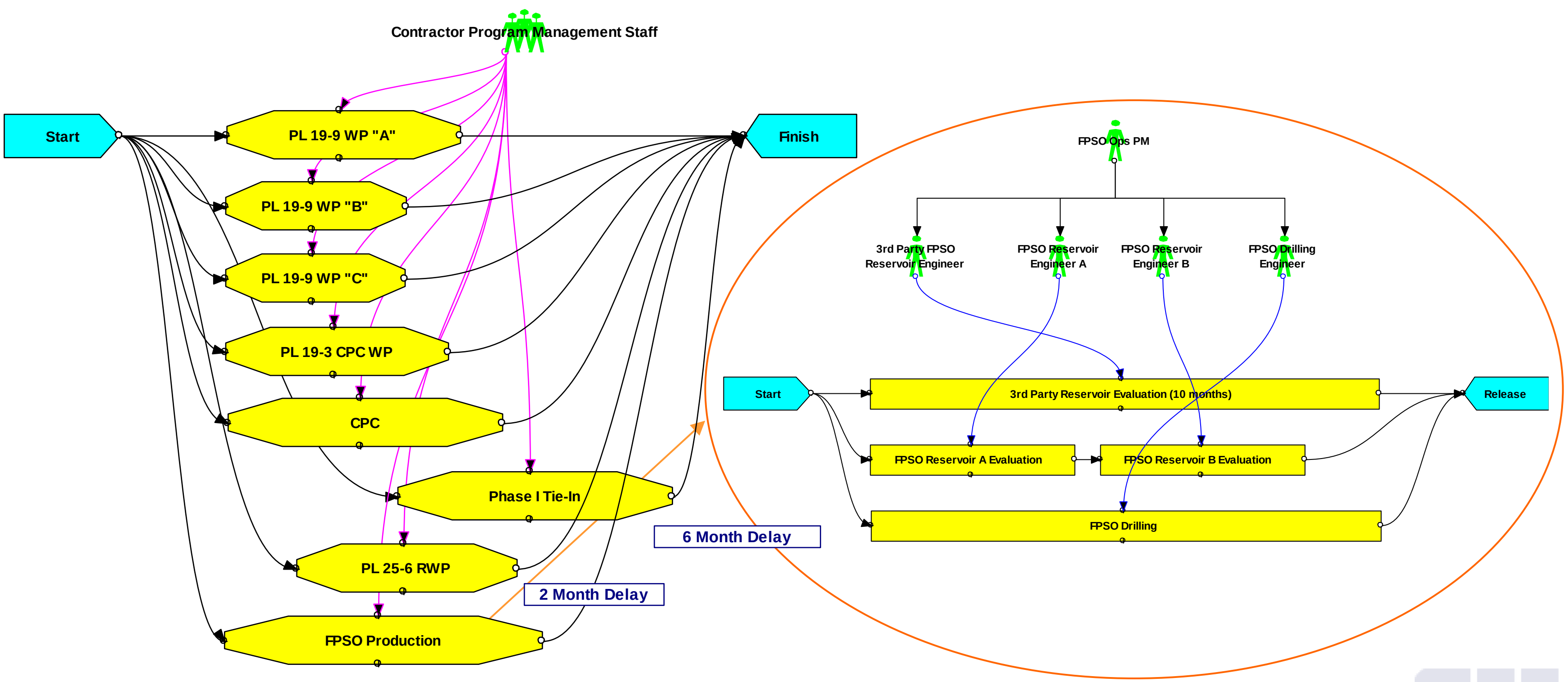
Offshore China PMO Simulation

- **37% Critical Activities** (Changed Critical Path)
- **Shifted Focus Toward:**
  - Project *Sanction*
  - FPSO EPC, *Integration*, HUC
  - *Completion*
- **Duration**
  - 2 Months Shorter than Anticipated



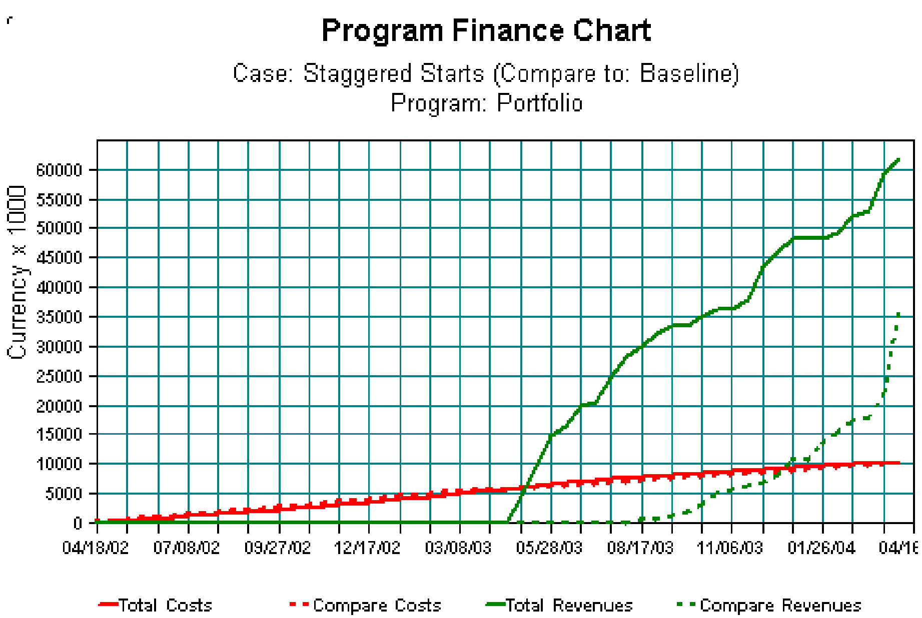
Offshore China Program Model

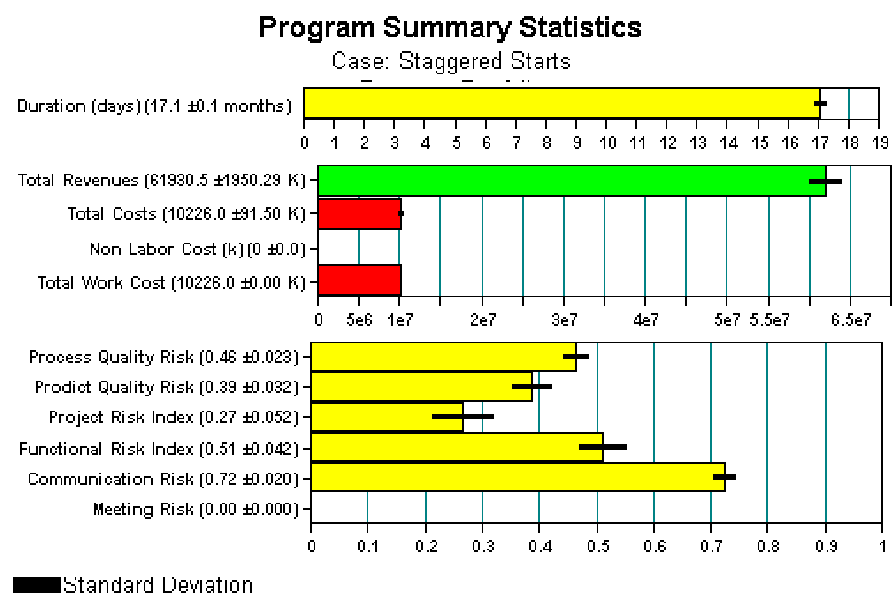
- Projects Delayed
  - Phase 1 Tie-In (6 Months)
  - Remote Wellhead Platform (2 Months)



Offshore China Program Simulation

- Improvement
  - 57% Increase in ROCE
  - 20% Schedule Reduction
- Tolerable Risk Levels





It isn’t what we know that gives us trouble, it’s what we know that ain’t so

– Will Rogers

5 Principles of Project Integration (first 3)

- Organizational Engineering
  - The organization is tailored to the work at hand
  - Team members' skills and experiences are matched to task demands
- Governance and Leadership
  - Business and project objectives are aligned
  - Roles and responsibilities are clearly understood
  - Decision making processes are timely and certain
- Key Work Processes
  - The project work processes complement each other
  - Critical handoffs are identified and actively managed

5 Principles of Project Integration (cont'd)

- Communication and Information Flows
  - Communication culture is proactive
  - Communication is planned and not ad hoc
  - Information content and delivery is tailored to specific audiences
- Business and Execution Environment
  - Contracting strategy fits the business objectives
  - Sources of organizational noise are understood and mitigation strategies employed where appropriate

CII 10-10 PROGRAM AND PERFORMANCE ASSESSMENT CAMPAIGN

Motivation

- Senior Management Disconnect
- Need for Actionable Information
- Measures Roll Up, Down

10 Input Measures

- Planning
- Controlling
- Design Efficiency
- Human Resources

10 Outcomes

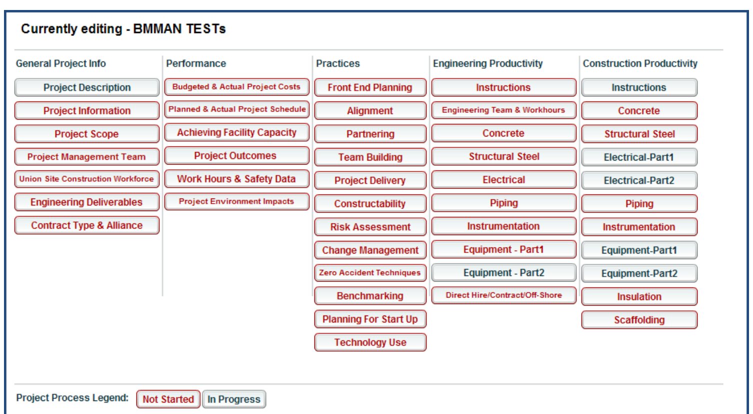
- Proj. Sch. Efficiency
- Capacity Efficiency
- Proj. Cost Efficiency
- Burn Rate

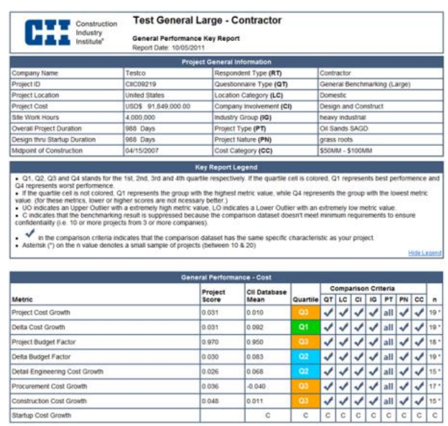
CII 10-10 Program

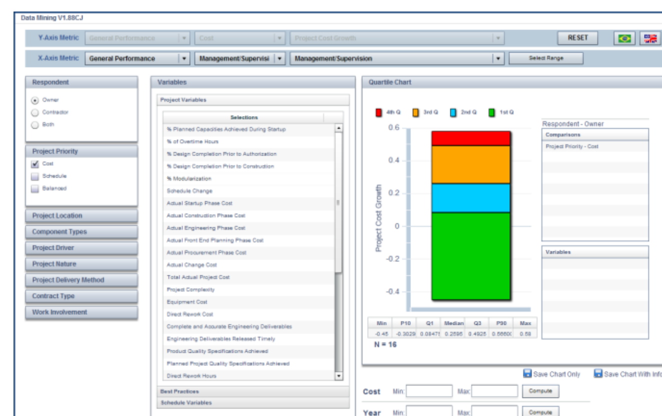
$/BOED, $/GSF, Capacity Efficiency
Quality, Design Efficiency, Leading, HR

CII General Program

Budget Factor, Change Cost Growth, WH/LF Piping, Project TRIR, etc.



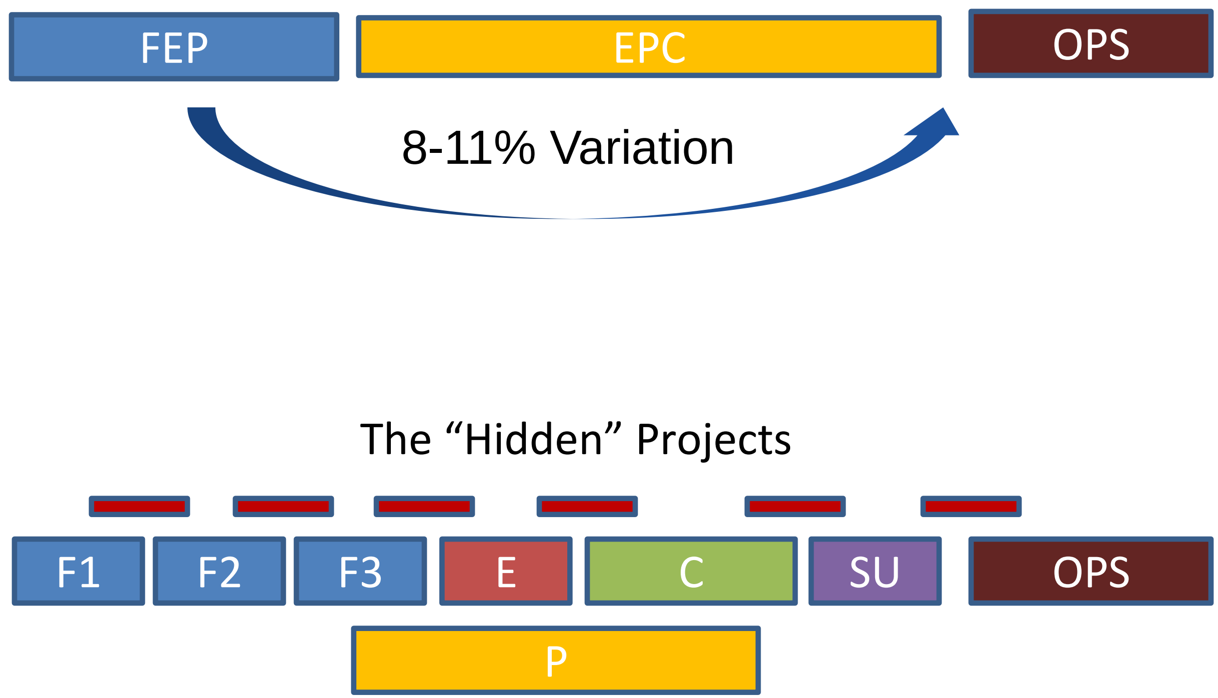




21st Century Project Context

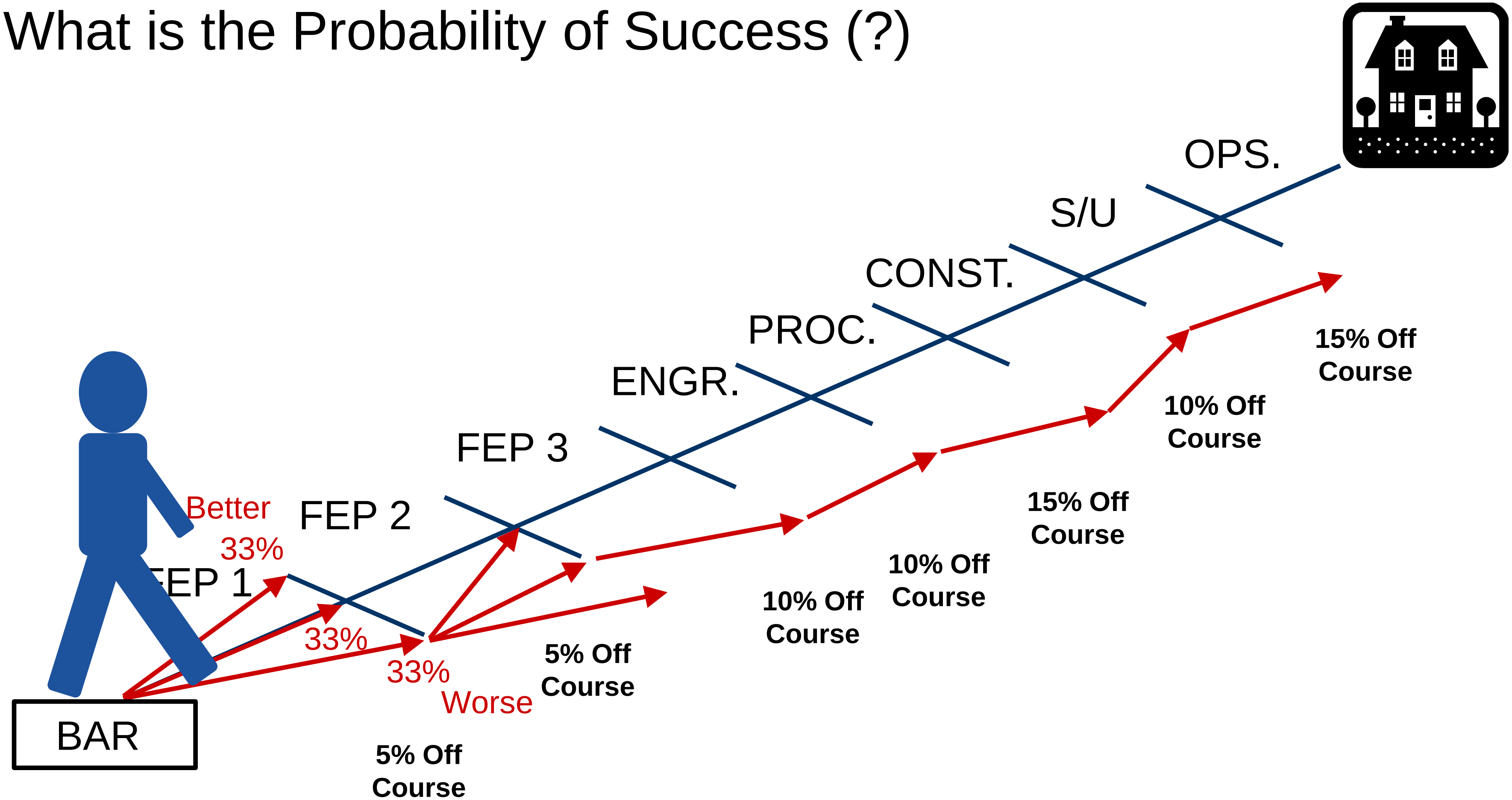
"Old School"
Project Management

Phase-Gate Based
Project Management



"Drunkard's Walk" (Markov Chain)

What is the Probability of Success (?)



“Famous” Construction Quotes

“Construction would be easy, if it weren’t for all the people involved”

– Ted VanWyck

“When we pay for benchmarking, we typically tend to find the data being asked”

– Sanat Doshi

10-10 Questionnaires

- Practice-Based
  - Yes/No
  - 5-point scales (strongly agree ⟷ strongly disagree)
- Phase-Based
  - Help for current projects
  - Answered as project nears phase completion
- Quantitative, yet simple to answer
- Research-based, empirically tested
- Paper- and Internet-Based (2013-2014)
- Examples…

FEP Questionnaire

The interfaces between project stakeholders were well-managed.

A. Strongly Agree
B. Agree
C. Neutral
D. Disagree
E. Strongly Disagree

Input Metrics: Organizing, Leading

Engineering Questionnaire

The equipment procurement and vendor schedules were a significant challenge or problem for this project

A. Strongly Agree
B. Agree
C. Neutral
D. Disagree
E. Strongly Disagree

Input Metrics: Planning, Controlling, Partnering & Supply Chain Management

Procurement Questionnaire

Preferred suppliers were used effectively to streamline the procurement process

A. Strongly Agree
B. Agree
C. Neutral
D. Disagree
E. Strongly Disagree

Input Metrics: Planning, Controlling, Quality, and Partnering & Supply Chain Management (SCM)

Construction Questionnaire

The availability and competency of craft labor was adequate

A. Strongly Agree
B. Agree
C. Neutral
D. Disagree
E. Strongly Disagree

Input Metrics: Planning, Controlling, Quality, HR and Safety

Start-Up Questionnaire

The project experienced an excessive number of project management team personnel changes

A. Strongly Agree
B. Agree
C. Neutral
D. Disagree
E. Strongly Disagree

Input Metrics: Organizing, Leading, and Human Resources (HR)

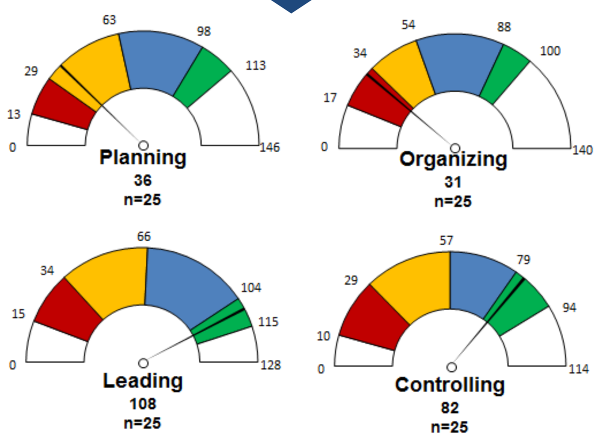
Start-Up Questionnaire

- Which of the following statements characterize the decisions made by the manager(s) of this project? (please check all that apply)
  - Considered final and not revisited
  - Collaborative and inclusive
  - Made at the lowest appropriate level in the organization
  - Communicated promptly to the team
  - Made in a timely and effective manner
  - Consistent with the delegation of authority
- Input Measure: Leading

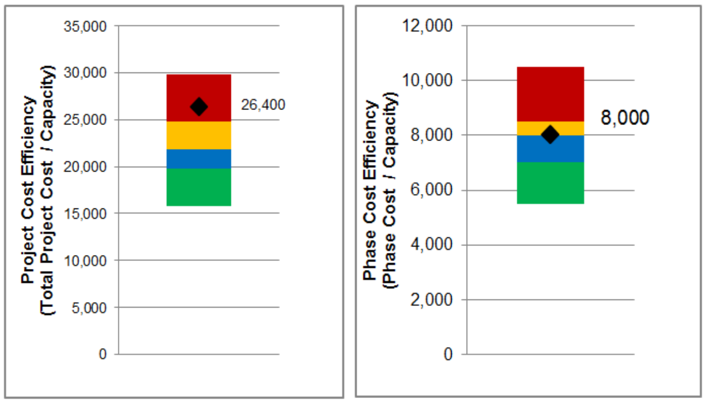
How CII’s 10-10 Program Works

Sample Statement-Based Question

	Strongly Disagree		Neutral		Strongly Agree
26. The interfaces between project stakeholders were well managed.	◘	◘	◘	◘	◘



Sample Input Metrics

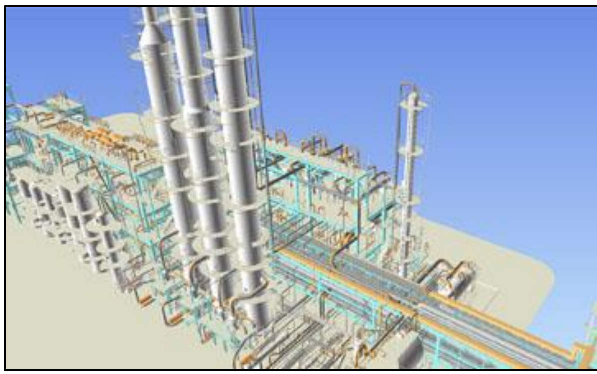


Sample Output Metrics

- **Develop Corrective Action Plans**
- **Implement CII Research and Tools**

Design Efficiency (DE)

- CII Model Plant / CII Reference Project

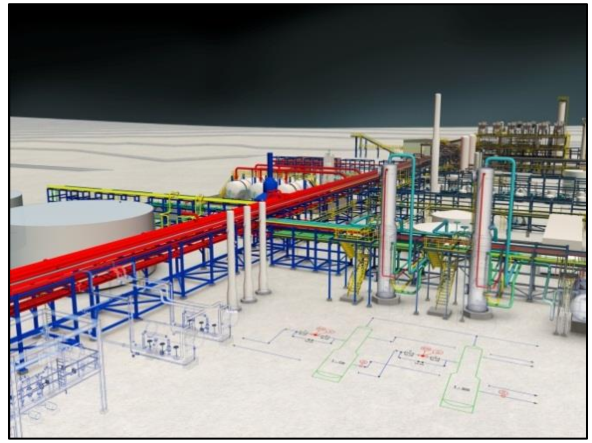


Bill of Material (BOM)

Work Hours

Baseline Reference Factor (RF)

- Project A
- Capacity: 2,600 tons/yr
- BOM: 1.78 RF

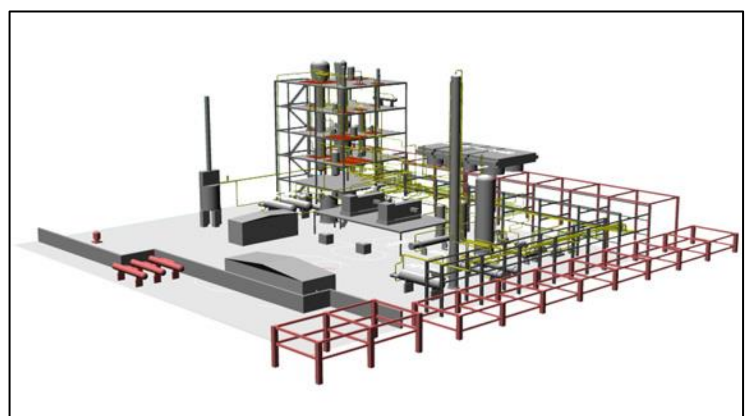


$$\frac{CAP_A}{RF_A} = 1{,}461\ (DE)$$

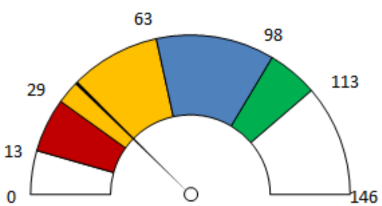
CII 10-10 Database

$$\frac{CAP_B}{RF_B} = 1{,}386\ (DE)$$

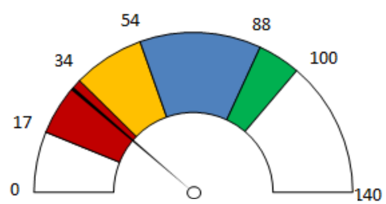
- Project B
- Capacity: 1,150 tons/yr
- BOM: 0.83 RF



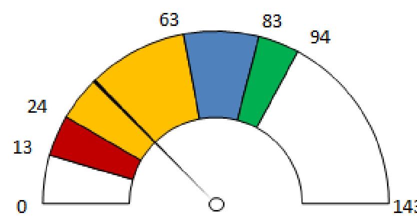
10-10 Input Metrics



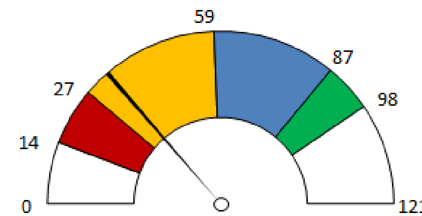
Planning
n=25



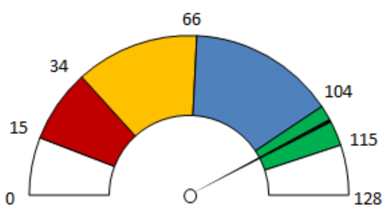
Organizing
n=25



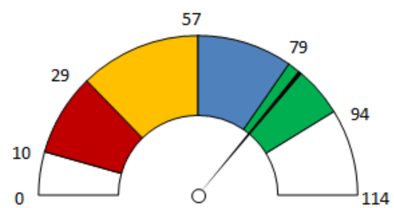
Quality
n=25



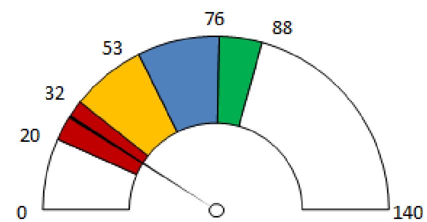
Sustainability
n=25



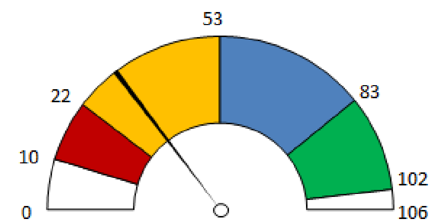
Leading
n=25



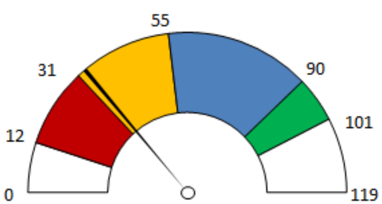
Controlling
n=25



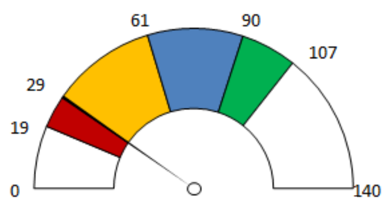
Partnering and SCM
n=25



Safety
n=25



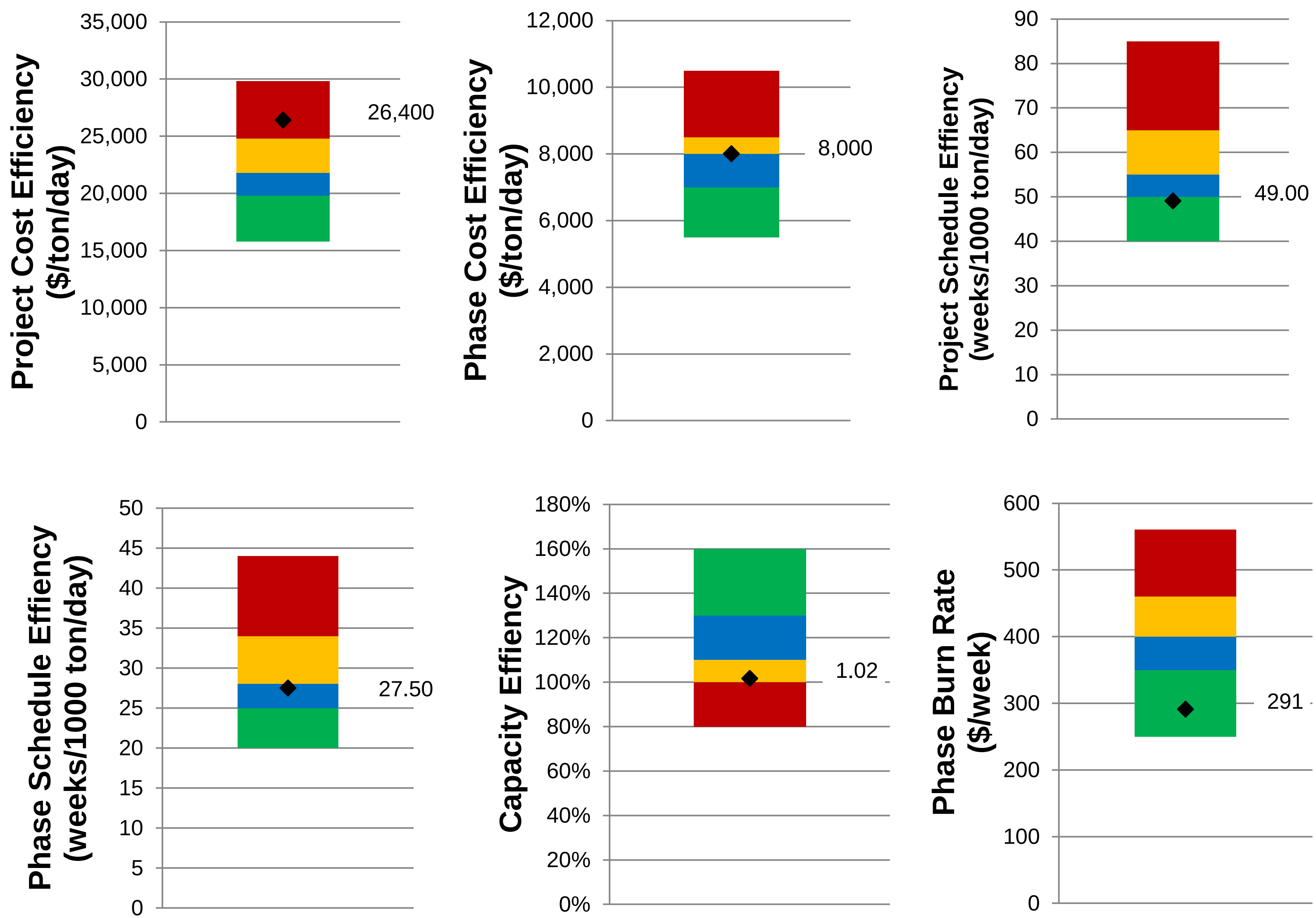
Design Efficiency
n=25



Human Resources
n=25

- Simple
- Motivating
- Insightful

10-10 Outcome Metrics (6 of 10 Shown)



10-10 Integration, Diagnostics

- Phase-Based, Sector-Based, Attribute-Based

	List of CII Tools
1	Design Effectiveness Toolkit (64 Strategies)
2	17 Constructability Principles
3	eGuide for Materials Management
4	PEpC
5	Common Commodity Codes (?)
6	Product Integrity Concerns (video – no tool?)
7	Interim Product Database (IPD)
8	Industrial Engineering Techniques
9	Lean Principles in Construction (35 Principles & Sub-principles)
10	Planning for Startup SuPERTool
11	Activity Analysis
12	Rework Reduction
13	Crew Scheduling ‘Look Up’ Table
14	Best Practices Productivity Improvement Index (BPPII)
15	Voice of the Craft Worker (VOW) Tool
16	Attracting and Maintaining a Skilled Construction Workforce (75 Activities)?
17	Multiskilling Cost Model
18	Compass (Communications Project Assessment)Tool
19	Global Virtual Engineering Team (GVET) Planner
20	Project Priority Calculator – worthy of more investigation…
21	Core Competency Toolkit (Owner/Contractor Work Structure Process Handbook)
22	Management of Virtual Team Checklist
23	Partnering Toolkit
24	Leader Selection Guide
25	Team Leadership Planner
26	Team Health Check
27	Trust Evaluation System (RT24)
28	ValueShare Tool
29	QMS Correlation Matrix
30	Zero Field Rework Opportunity Checklist
31	Value Management Process (VMP) Selection Tool
32	Small Projects Toolkit
33	Quality Performance Management System (QPMS) superceded by QMS Correlation Matrix
34	Work Packaging Execution Model
35	Cost/Schedule Tradeoff Tool (CSTT) – 23 techniques
36	Project Health Indicator (PHI) Tool
37	Indirect Construction Cost (IDCC) Checklist
38	Project Controls and Management Systems (PCMS) Participants Involved Tool (interfaces)
39	Project Controls and Management Systems (PCMS) Information Flow Tool (interfaces)
40	Predictive Tools Road Map (?)
41	Interactive Risk Register Tool (incl. Probabilistic Risk Analysis)
42	Contract Strategy Selection Tool (from C/R RT 260)
43	Equitable Risk Allocation (ERA) Tool
44	Project Delivery and Contract Strategy (PDCS) Selection Tool
45	International Project Risk Assessment (IPRA) Tool
46	Dispute Review Board (DRB) Implementation Guidelines
47	Disputes Potential Index (DPI)
48	(Commodity vs. Value-Added) Contractor Services Communication and Evaluation Tool
49	Single-Party Risk Assessment Worksheet
50	Two-Party Risk Assessment Worksheet
51	Contractor Compensation Strategies (31 flavors) Checklist
52	Construction Contract Change Clause Checklist (vol. I and II)
53	“Hot Button” Risks Checklist (incl. Contract Language Table)
54	Risk Management Model and Checklist
55	Active and Passive Safety Leading Indicators Checklist
56	Checklist for Sustainable Construction Job Sites
57	Design for Construction Safety Toolbox, Version 2.0
58	Workers’ Compensation Contractor Checklist
59	Environmental Information Gathering Checklist
60	Good Environmental Practice Criteria for Construction Projects Checklist
61	Zero Injury Techniques Checklist
62	Safety Self-Assessment Instrument
63	Guidelines for Managing Subcontractor Safety
64	Safety Program Guidelines for Contractors and Subcontractors
65	Integration Opportunity Assessment Tool
66	BIM Project Execution Plan Template
67	LEVER Technology Prediction Tool (Productivity)
68	EPC Macro Model Logic Diagram for Impact of Process Change
69	D/B/B Macro Model Logic Diagram for Impact of Process Change
70	EPC Macro Model Activity List (Information Management)
71	Advanced Construction Technology Systems (ACTS) Database
72	Lessons Learned Self-Assessment Questionnaire
73	Security Rating Index Tool
74	FEP Alignment Thermometer
75	PDRI for Industrial
76	PDRI for Building
77	PDRI for Infrastructure

When you don’t know where the bar should be, you’re only going to do a disservice by putting it anywhere.

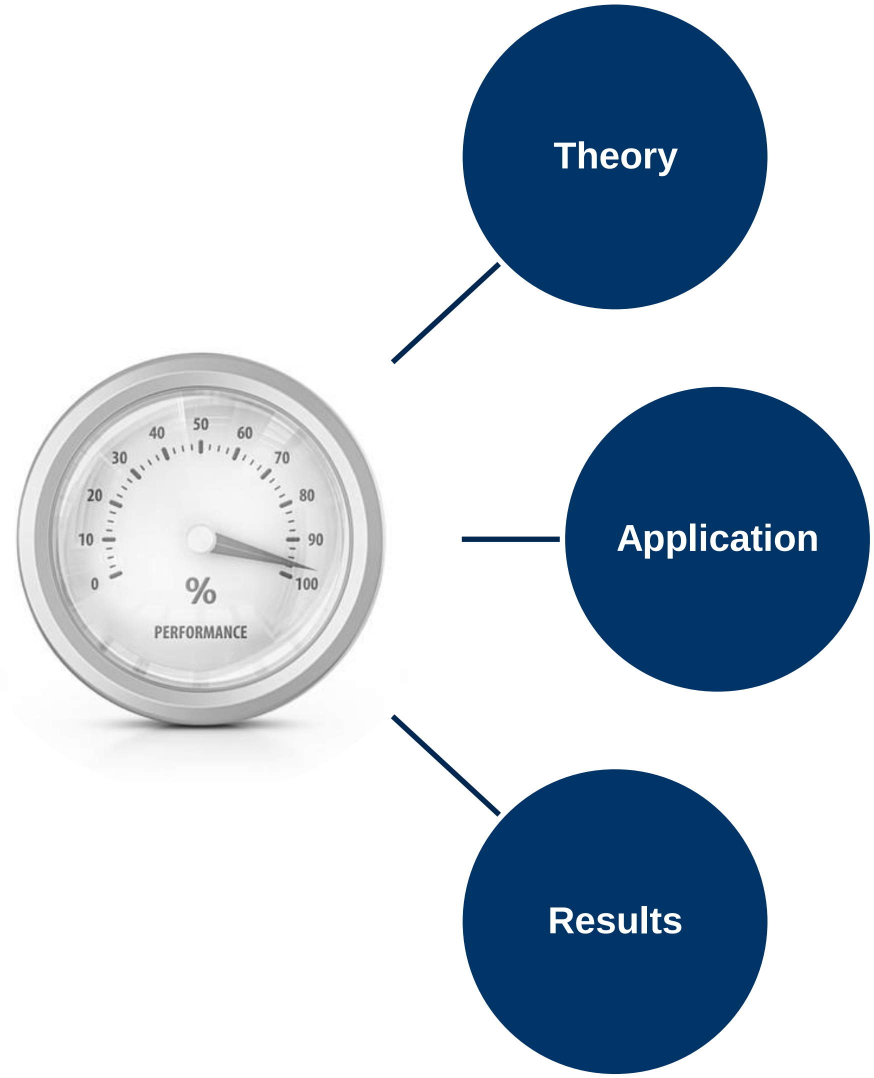
– Andries van Dam

Questions?

- How Do I Maximize Project Performance?

Resources

- www.10-10program.org
- CII Website
- Internet Surveys
  - Industrial (now)
  - Buildings (Oct.)
  - Infrastructure (Dec.)
- Stephen Mulva, Ph.D.
  - smulva@cii.utexas.edu
  - (512) 232-3013



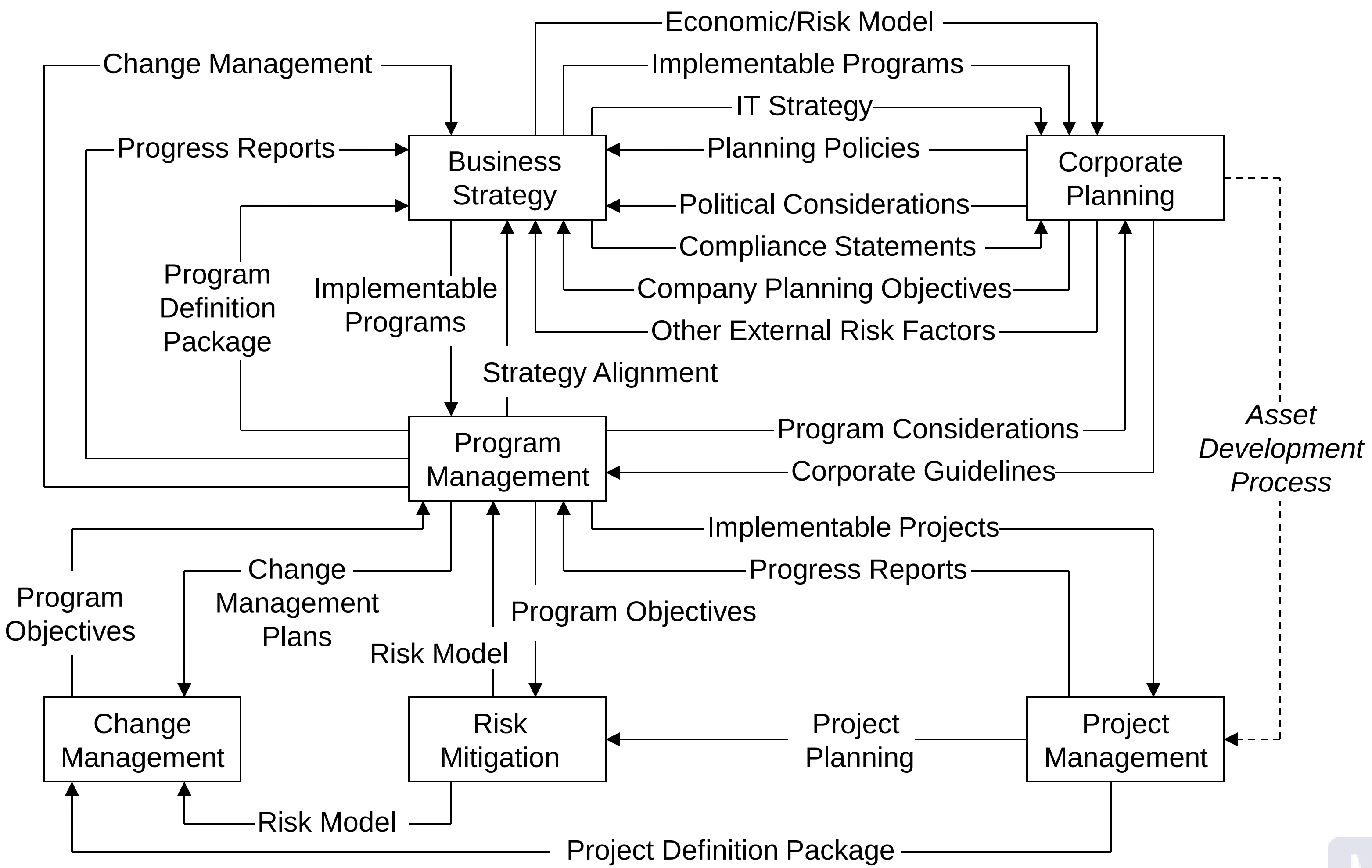
PROGRAM RENEWAL

Background

- Owner’s Capital Budgeting Process
  - Used to select projects for funding
  - Based on financial prioritization (NPV, ROR)
- Asset Development Processes (ADP’s)
  - Track each project through its phases
  - Do not examine portfolio benefits
- Program Renewal
  - Links business and project leadership
  - Ensures that projects are ‘built right’
  - Ensures that ‘right’ projects are ‘built’

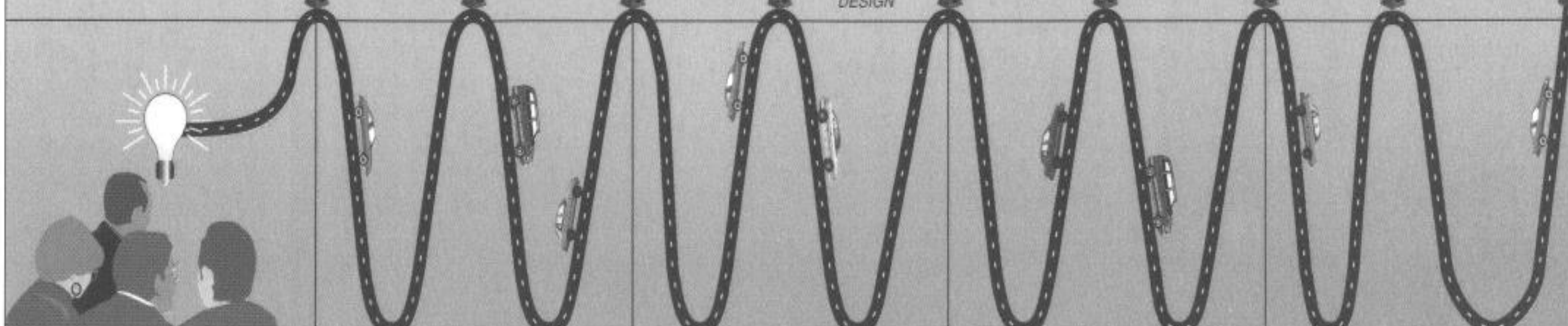
Program Management – A 'Strategic Fit'

- The coordinated management of a portfolio of projects to achieve a set of business objectives (CCTA 1995)



Texaco’s ADP

BUSINESS ROADMAP FOR ASSET & VALUE ENHANCEMENT

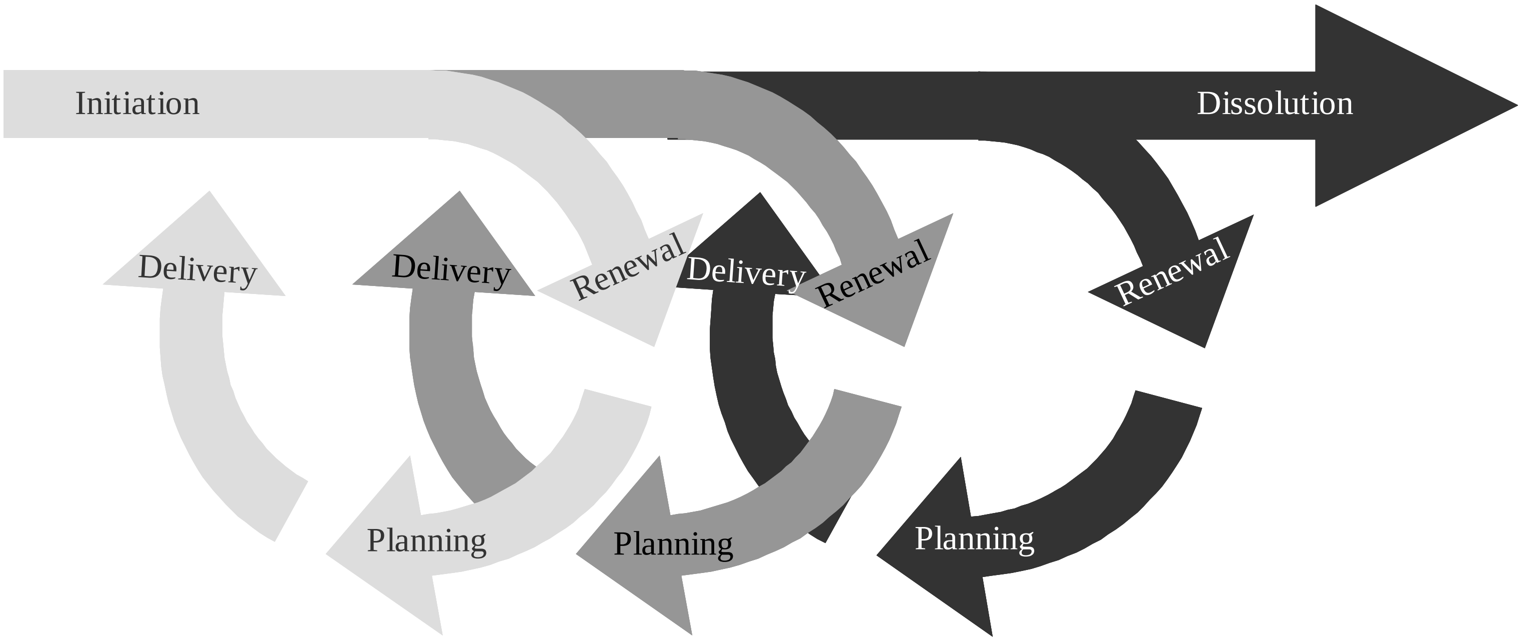
PHASE	SCOPING	BUSINESS PLANNING/SCREENING	COMMERCIAL AND ENGINEERING DEFINITION	PROJECT EXECUTION	MANAGE OPERATIONS AND FOLLOW-UP
TYPICAL DECISION MAKERS	CHAIRMAN, VICE CHAIRMAN LEADERSHIP COUNCILS BUSINESS UNIT MANAGEMENT FACILITY MANAGEMENT	BOARD OF DIRECTORS LEADERSHIP COUNCILS BUSINESS UNIT MANAGEMENT FACILITY MANAGEMENT	BOARD OF DIRECTORS LEADERSHIP COUNCILS BUSINESS UNIT MANAGEMENT FACILITY MANAGEMENT	BUSINESS UNIT MANAGEMENT FACILITY MANAGEMENT	BUSINESS UNIT MANAGEMENT FACILITY MANAGEMENT
DECISION GATES		*SCOPING NOTICE* *BUSINESS PLAN & PROJECT PLAN*	*ENGINEERING FUNDING* *PROJECT EXECUTION PLAN & PRELIMINARY DESIGN*	*PROJECT FUNDING* *OPERATIONS PLAN*	*HANDOVER TO OPERATIONS* *STRATEGIC REVIEWS* *DIVEST*
COMMUNICATION					
WORK TEAMS	SCOPING TEAM	SCREENING TEAM	DESIGN TEAM	EXECUTION TEAM	OPERATIONS TEAM
INPUTS	INVESTMENT OPPORTUNITY IDEAS	APPROVED SCOPING NOTICE	APPROVED BUSINESS PLAN APPROVED PROJECT PLAN	PRELIMINARY DESIGN PACKAGE APPROVED PROJECT EXECUTION PLAN	OPERATIONS PLAN
FOCUS AREAS	• IDENTIFY SCOPING TEAM • DEFINE OPPORTUNITY CONCEPT • AGREE ON STRATEGIC & BUSINESS FIT • EVALUATE OPPORTUNITY • DOCUMENT ASSUMPTIONS & DRIVERS • PREPARE INITIAL COST ESTIMATE & ECONOMIC EVALUATION • PREPARE SCOPING NOTICE	• IDENTIFY SCREENING TEAM • IDENTIFY CRITICAL SUCCESS FACTORS • PREPARE FEASIBILITY STUDY • PERFORM PRELIMINARY RISK ANALYSIS • IMPROVE COST ESTIMATE & ECONOMIC EVALUATION • DEVELOP BUSINESS PLAN • DEVELOP PROJECT PLAN • PERFORM PEER REVIEWS	• IDENTIFY DESIGN TEAM • PREPARE PRELIMINARY DESIGN • DEVELOP PROJECT EXECUTION PLAN • BENCHMARK FRONT-END DEFINITION • PERFORM VALUE ENGINEERING • DEVELOP OPERATING & RESOURCE REQUIREMENTS • PERFORM LIFE CYCLE COST ANALYSIS • CONFIRM CRITICAL SUCCESS FACTORS • PERFORM FULL BUSINESS RISK ANALYSIS • PREPARE & NEGOTIATE COMMERCIAL AGREEMENTS	• ASSIGN EXECUTION TEAM • PREPARE DETAILED DESIGN • IMPLEMENT PROJECT EXECUTION PLAN • DEVELOP OPERATING & RESOURCE PLAN • EXECUTE CONTRACTS • CONSTRUCT • IMPLEMENT PROJECT CONTROLS • CAPTURE BENCHMARKING RESULTS • TRACK CRITICAL SUCCESS FACTORS • COMPLETE CLOSE-OUT REPORT • STAFF OPERATIONS • START-UP FACILITIES	• OPERATE & MAINTAIN FACILITIES • BENCHMARK PERFORMANCE • MONITOR CRITICAL SUCCESS FACTORS • PERFORM POST-PROJECT REVIEW • PERFORM PERIODIC STRATEGIC REVIEWS
LESSONS LEARNED	FEEDBACK • FROM PAST & ONGOING PROJECTS • TO FUTURE & ONGOING PROJECTS		SHARE • SUCCESSES • IMPROVEMENT OPPORTUNITIES	ACCESS TO DATA • ADD • RETRIEVE	PREVENT REPETITIVE MISTAKES

Benefits: Linking Business and Project Management (after Reiss 1996)

- Direct
  - Projects with direct benefits
- Enabling
  - Projects vital to the delivery of a whole range of benefits from other projects
- Passenger
  - Projects that can only add to benefits expected from other projects
- Synergistic
  - Projects which makes no (or only a small) contribution, unless combined into a program

Program Renewal

- The Program Continuum (after Pellegrinelli 1997)
  - Initiation, Planning, Delivery, Renewal
  - New ‘class’ of dynamically-benchmarked ADP’s



Study and Findings

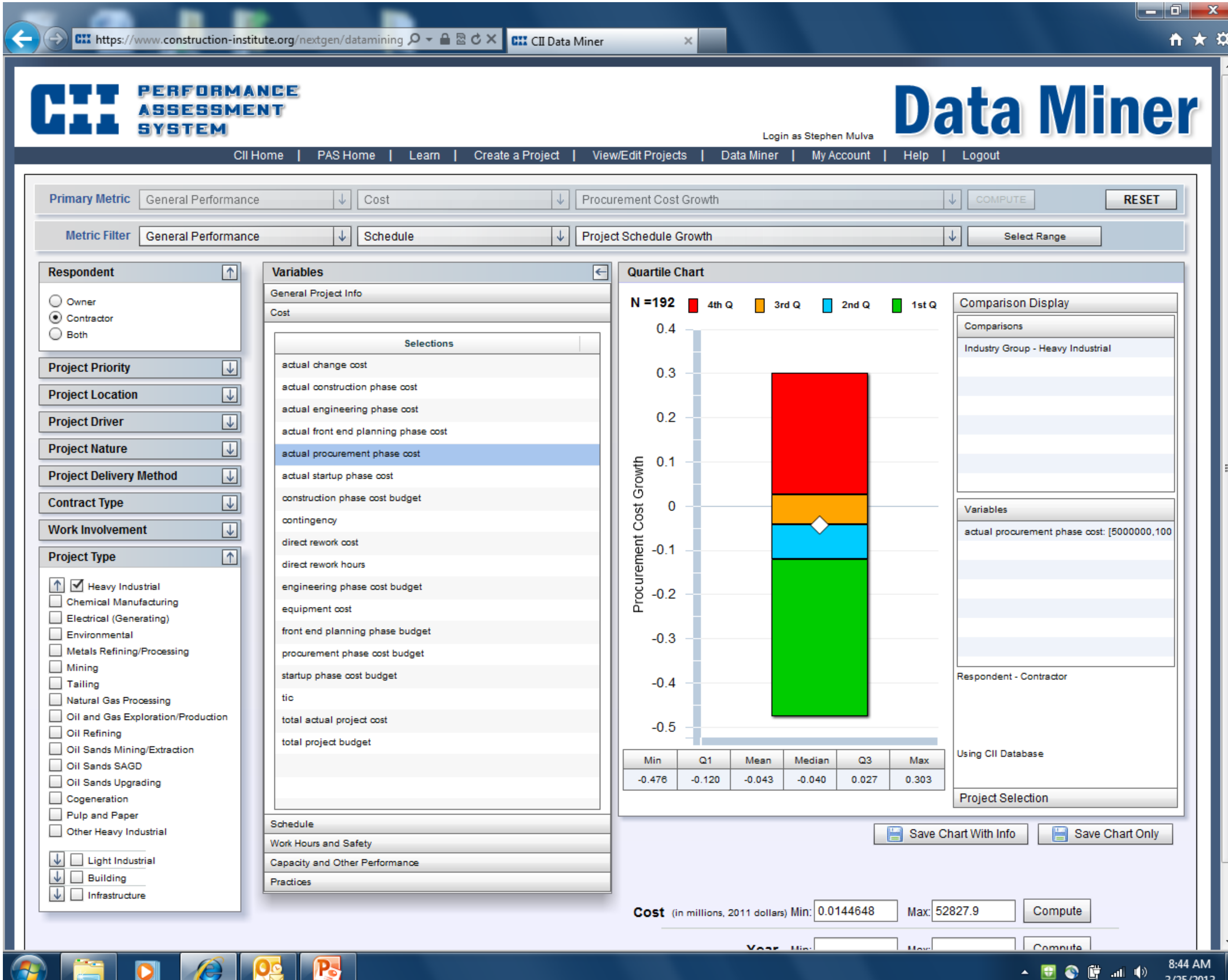
- 3 Large Building Program Owners
  - 167 Combined Projects
  - Executed Using Program Renewal
- Boeing – 11% Project Development Cost Reduction

Program	No. Projects Completed	% Projects Cancelled	% Cost Improvement
1996 Restaurant	24	10.5%	12.1%
1997 Restaurant	44	29.0%	4.9%
1998 Restaurant	17	38.5%	10.4%
1999 Restaurant	23	30.0%	5.9%
2000 Restaurant	32	33.3%	15.5%
1998 Hotel	13	9.1%	10.5%
1998 Discount Retailer	14	0.0%	9.5%

CII BENCHMARKING

CII Benchmarking & Metrics (BM&M)

- 2,100 projects entered since 1995, valued at ~$300 Billion
- Confidential
- Cost Effective
- Compelling, Focused Metrics
  - unique measures of CII Best Practices and productivity for engineering and construction
  - **external** performance benchmarks of safety, cost, schedule, change, and rework
- Unique Approach
- Experienced
  - Competent, Professional Staff


https://www.construction-institute.org/nextgen/datamining
CII Data Miner
PERFORMANCE ASSESSMENT SYSTEM
Data Miner
Login as Stephen Mulva
CII Home | PAS Home | Learn | Create a Project | View/Edit Projects | Data Miner | My Account | Help | Logout
Primary Metric
General Performance
Cost
Procurement Cost Growth
COMPUTE
RESET
Metric Filter
General Performance
Schedule
Project Schedule Growth
Select Range
Respondent
Owner
Contractor
Both
Project Priority
Project Location
Project Driver
Project Nature
Project Delivery Method
Contract Type
Work Involvement
Project Type
Heavy Industrial
Chemical Manufacturing
Electrical (Generating)
Environmental
Metals Refining/Processing
Mining
Tailing
Natural Gas Processing
Oil and Gas Exploration/Production
Oil Refining
Oil Sands Mining/Extraction
Oil Sands SAGD
Oil Sands Upgrading
Cogeneration
Pulp and Paper
Other Heavy Industrial
Light Industrial
Building
Infrastructure
Variables
General Project Info
Cost
Selections
actual change cost
actual construction phase cost
actual engineering phase cost
actual front end planning phase cost
actual procurement phase cost
actual startup phase cost
construction phase cost budget
contingency
direct rework cost
direct rework hours
engineering phase cost budget
equipment cost
front end planning phase budget
procurement phase cost budget
startup phase cost budget
tic
total actual project cost
total project budget
Schedule
Work Hours and Safety
Capacity and Other Performance
Practices
Quartile Chart
N =192
4th Q
3rd Q
2nd Q
1st Q
Procurement Cost Growth
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
Min Q1 Mean Median Q3 Max
-0.476 -0.120 -0.043 -0.040 0.027 0.303
Comparison Display
Comparisons
Industry Group - Heavy Industrial
Variables
actual procurement phase cost: [5000000,100
Respondent - Contractor
Using CII Database
Project Selection
Save Chart With Info
Save Chart Only
Cost (in millions, 2011 dollars) Min: 0.0144648 Max: 52827.9 Compute
8:44 AM
3/25/2013