VALUE BY DESIGN

Cost Planning for 21st Century Labs

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Laboratories for the 21st Century Conference

Agenda

- Cost Management
- Value Alignment
- Major Cost Drivers
- How to Improve Project Value

COST MANAGEMENT

- Scope
- Expectations
- Cost

Scope

- Determine type of Lab
- Define the Program
- Define the Biosafety Level (BSL)
- Determine the staffing/occupancy plan
- Determine likely churn rate
- Choose the site

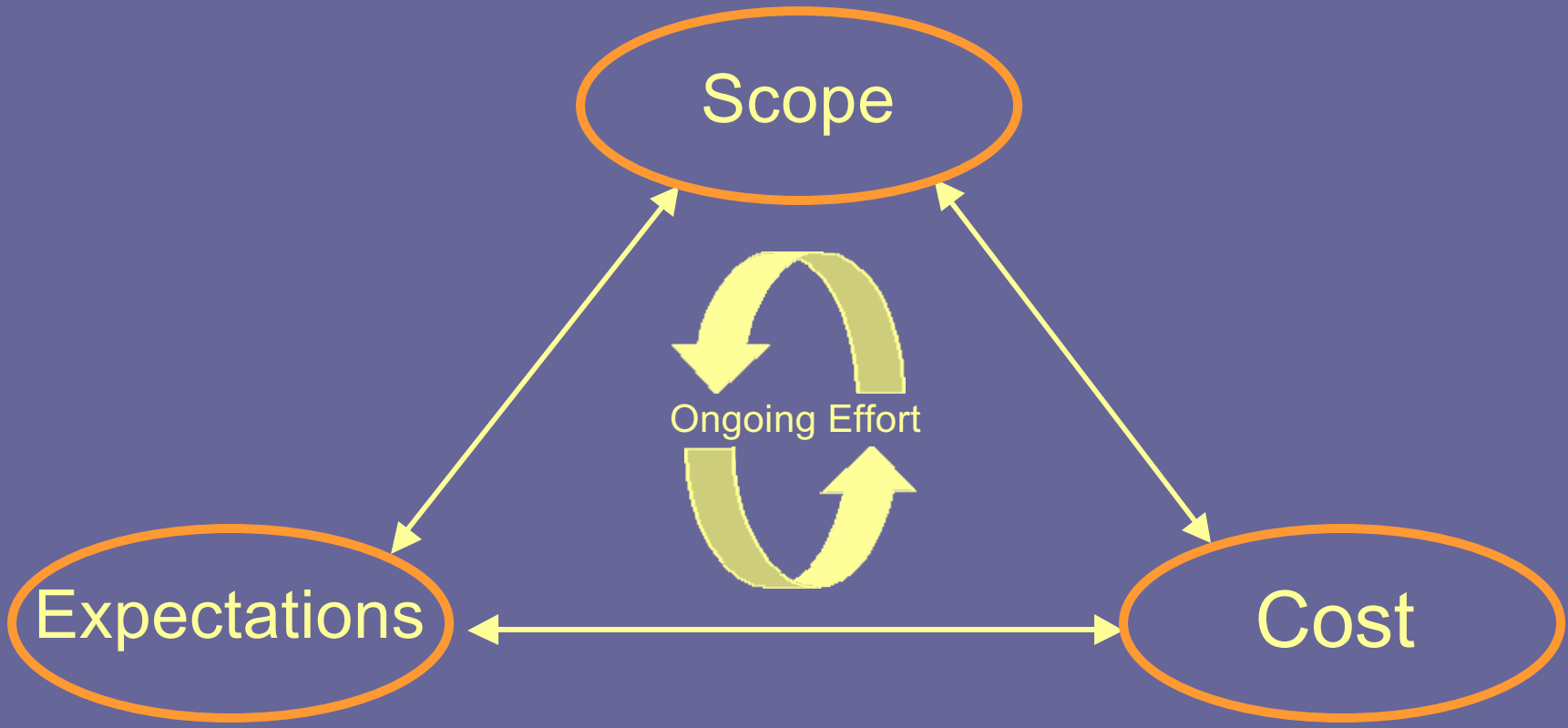
Cost

- Identify available funding sources
- Determine revenue streams
- Identify funding request
- Identify funding allocation
- Determine estimate format & protocols
- Prepare a Cost Plan for the project

Expectations

- Define desired level of quality
- Determine project schedule
- Determine desired flexibility
- Determine desired durability
- Determine required accreditations
- Identify governing mandates & guidelines

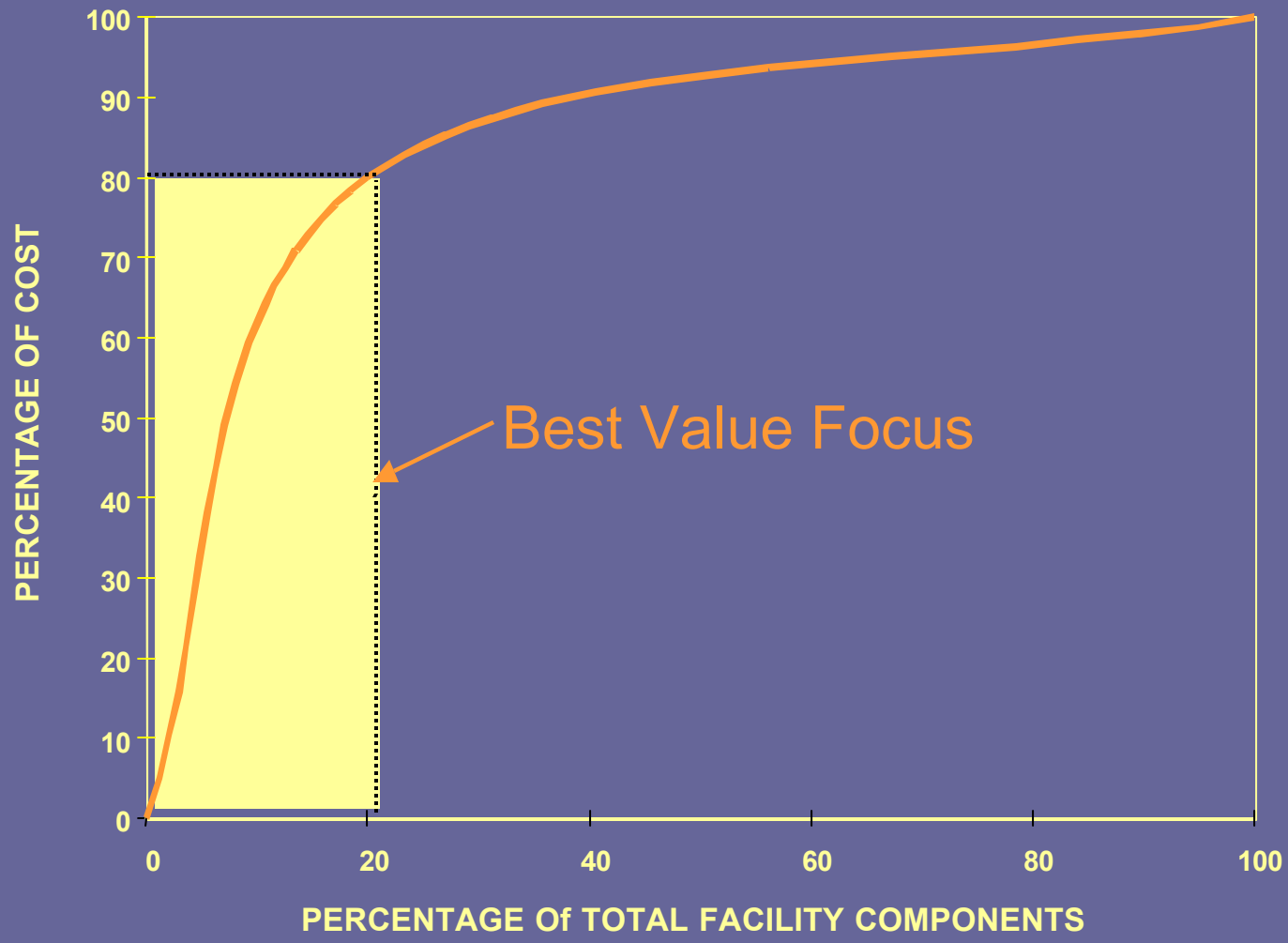
VALUE ALIGNMENT



Intelligent Value Management

- Value basis - Not just cost cutting
- Formal approach
- Include “outside” expertise as necessary
- Identify project goals and objectives
- Retain essential elements of design
- Define sensible options & associated cost
- Promote communication

PARETO'S LAW OF DISTRIBUTION



FOCUS ON MAJOR COST DRIVERS

- Programmatic & Architectural considerations
- Structural requirements
- MEP requirements
- Economic conditions

Program & Architectural

- Type of Lab
- Mix of Space
- Building Configuration
- Safety & Security
- Efficiency

Efficiency

Efficiency is the relationship of:

$$\frac{\text{Program Area (USF)}}{\text{Total Building Area (GSF)}} = \text{Efficiency}$$

$$\frac{\text{Program Area}}{\text{Program Area + Non-Program Area}} = \text{Efficiency}$$

REMEMBER

The More Non-Program Area the Lower the Efficiency

$$\frac{\text{Program Area}}{\text{Program Area + Non-Program Area}} = \text{Efficiency}$$

How Efficiency Impacts Cost

EXAMPLE 1 High Efficiency (66%)

Tenant Improvements	100,000 USF		$44.4 M
Shell & Core @ 66% efficiency	151,000 GSF	$131 /GSF	$19.8 M
TOTAL S&C + TI	151,000 GSF	**$425 /GSF**	**$64.2 M**
		COST/GSF	TOTAL COST

EXAMPLE 2 Low Efficiency (50%)

Tenant Improvements	100,000 USF		$44.4 M
Shell & Core @ 50% efficiency	200,000 GSF	$131 /GSF	$26.2 M
TOTAL S&C + TI	200,000 GSF	**$353 /GSF**	**$70.6 M**
		COST/GSF	TOTAL COST

REMEMBER

A less efficient building costs

LESS per GSF
but
MORE in total cost

Structural Requirements

- Stiffness
- Soils Conditions
- Seismic Zone

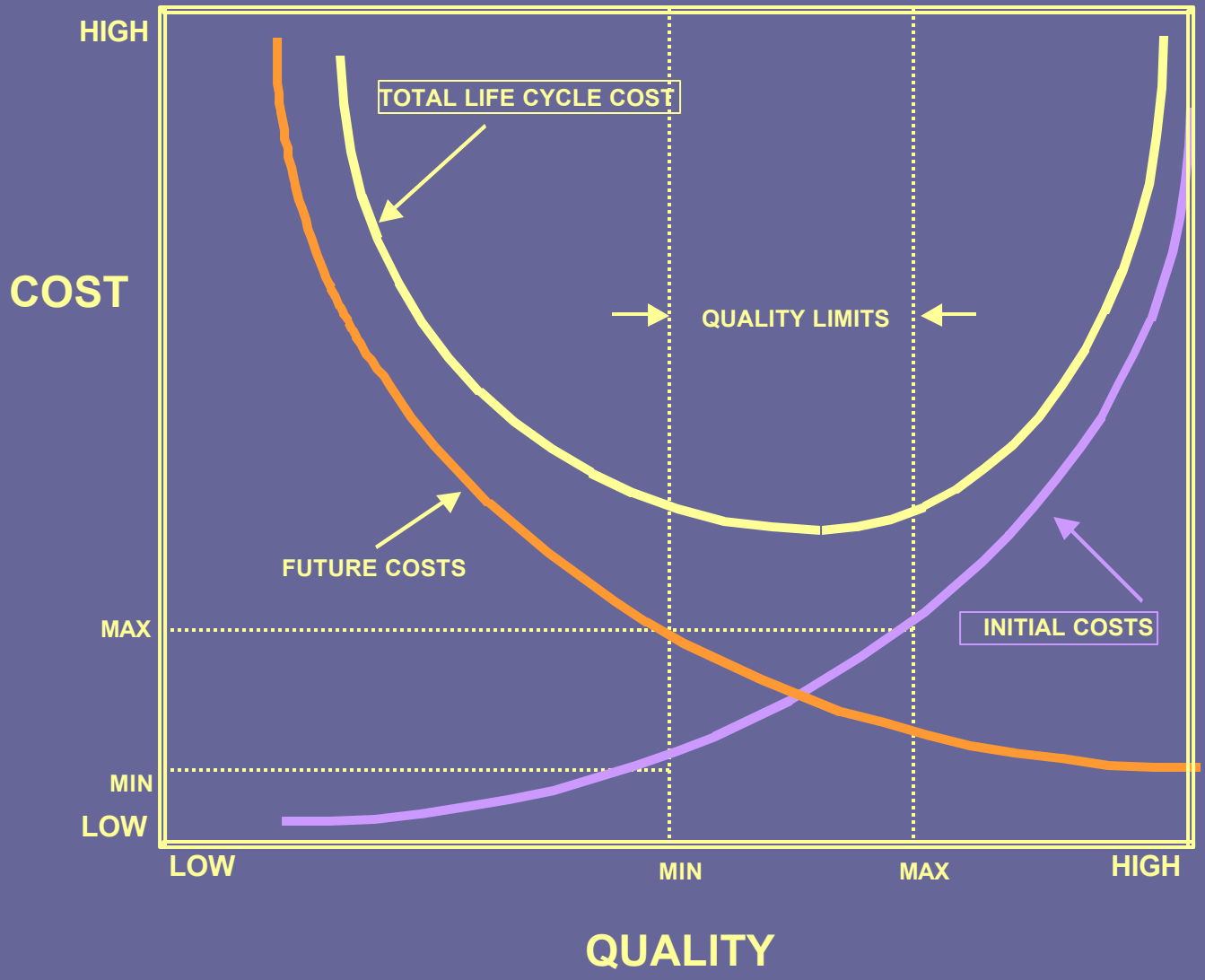
MEP Requirements

- "Air drives everything in HVAC"
  - Hood count
  - Size of hoods
  - Face area
  - Controls
- Redundancy
- Emergency Power

Market/Economic Conditions

- Escalation
- Location Factor
- Economy of Scale
- Aversion to Risk

Relationship Between Quality & Cost



Cost Management is a Design Tool

- Understand the basis of funding
- Do not rely on historic cost exclusively
- Measure consistently / set metrics early
- Monitor cost and value drivers
- Manage program
- Manage efficiency

The Benefits

- Improved communication
- Managed expectations
- Management of conflicting mandates through cost/value trade-offs
- Project that is on time & on budget
- Satisfied clients / improved profitability
- Historical track record