

Process Safety Management in Upstream and Gas



Human Energy®

AIChE/SACHE 2013 Faculty Workshop
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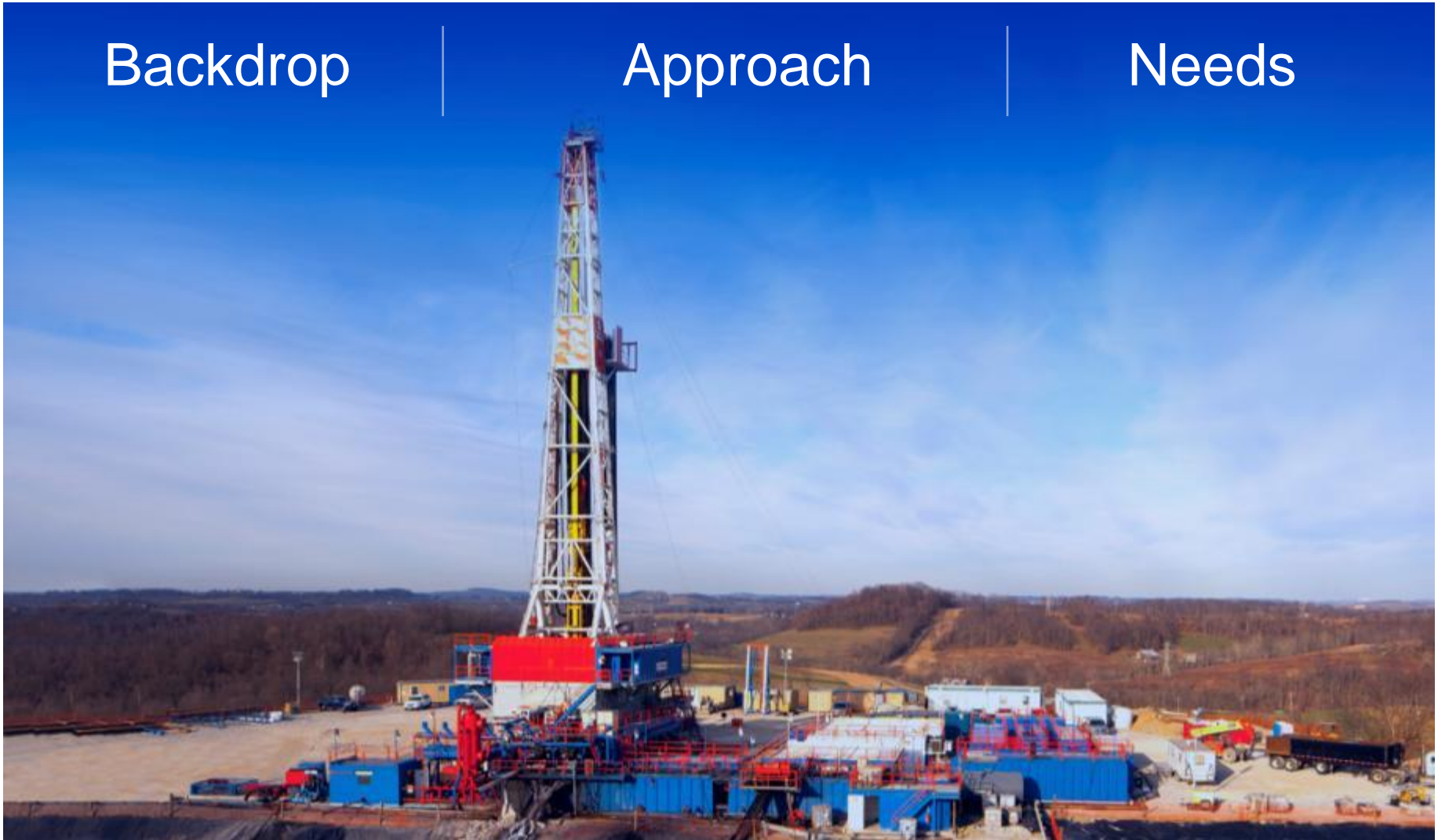
Areas of Discussion



Backdrop

Approach

Needs



Backdrop: Geographic Diversity



2.61 Million bbls per day
Production in 2012

20+ Countries
outside of the United States



Operational Diversity



Continued Development of Existing Production

- Reliability and efficiency improvement
- Enhanced recovery
- Expanded production

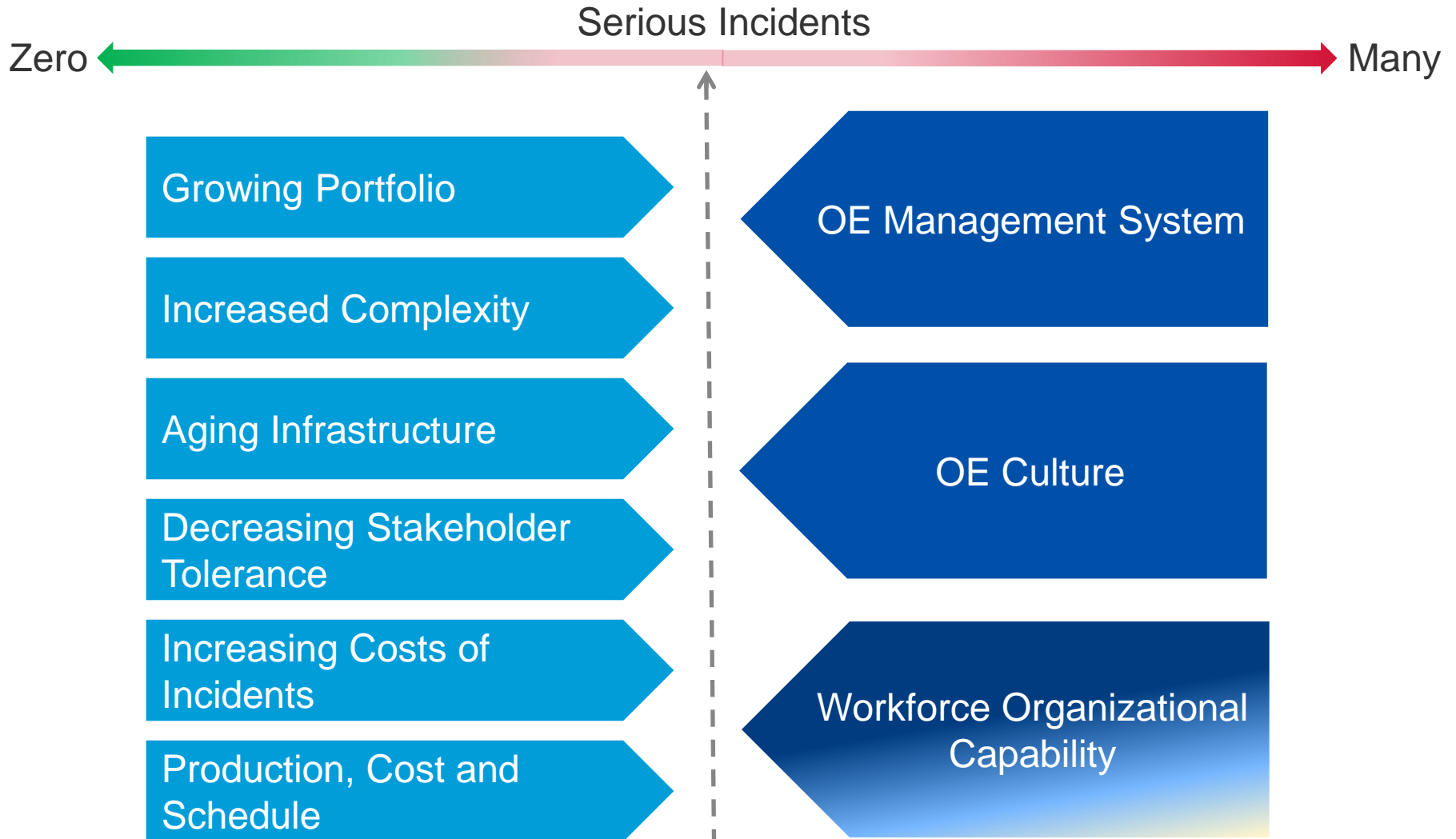
New Development Areas and Opportunities

- Deepwater
- LNG
- Sour gas
- Shale gas
- Gas to liquids
- Oil sands



OE Equation

Potential for occurrence of a high impact incident in our expanding, complex portfolio is mitigated by our OEMS, OE culture and workforce OC



Approach to Applying Process Safety Management



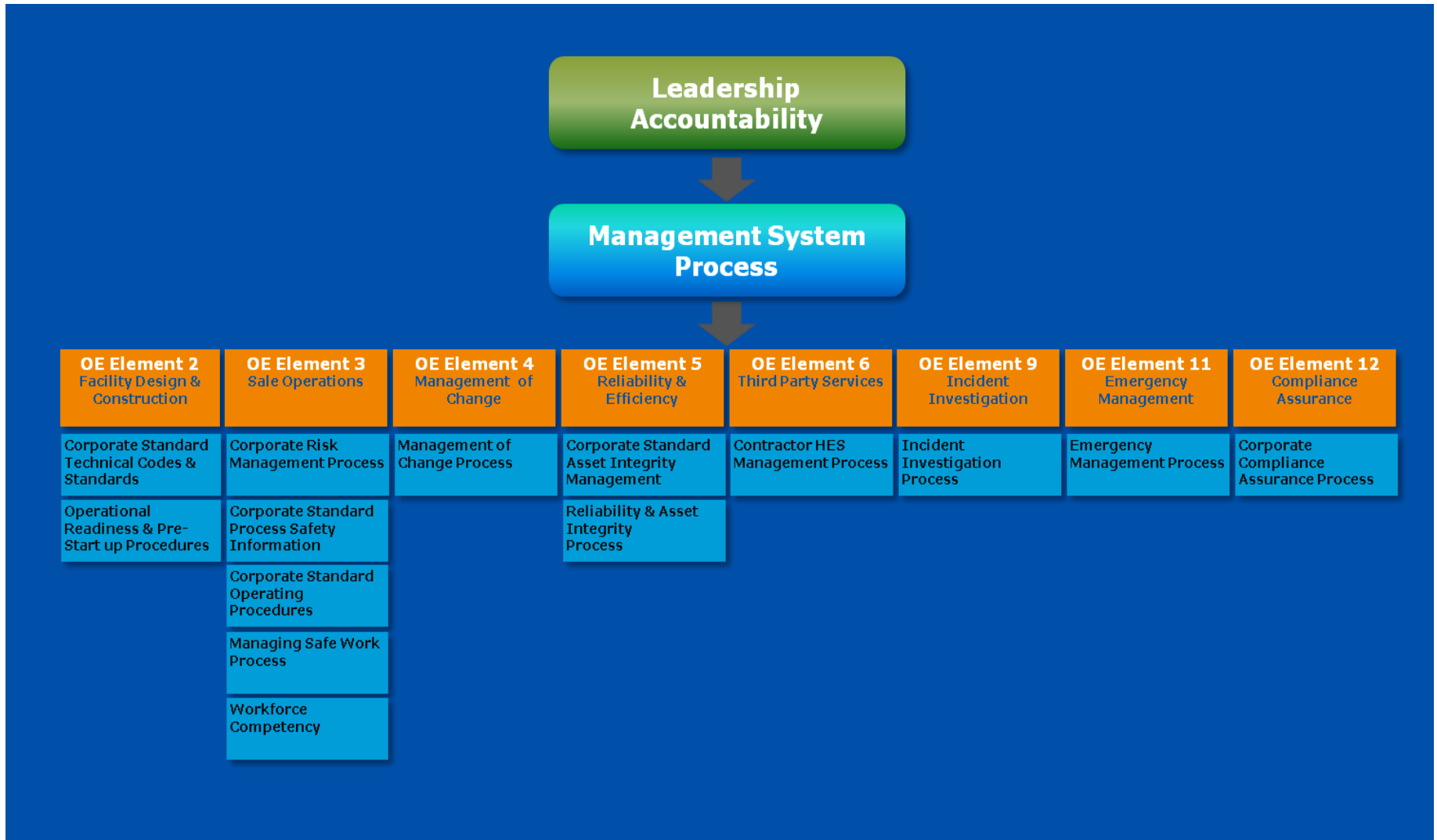
Standardize

Prioritize

Verify



Standardize



Prioritize



Key Facilities

Plants, Terminals
& Gathering
Stations
Sour Operations
Deepwater
Manned Platforms
Drilling Rigs

Key Activities

Major Sim Ops
Turnarounds
Drilling
Phased Start-up
Construction
Maintenance

Key Risk - Loss of Containment

Toxic release
Ignited release
(fire & blast)
Multiple causes –
integrity, design
procedural

Focus on the Future



Concept Selection

- Siting
- Technology selection
- Inherently safer concepts

Engineering

- Inherently safer design
- Human factors
- Risk assessment
- Engineering standards
- Material selection

Construction

- Materials verification
- Inspection and quality control
- Management of change
- Management of PSI

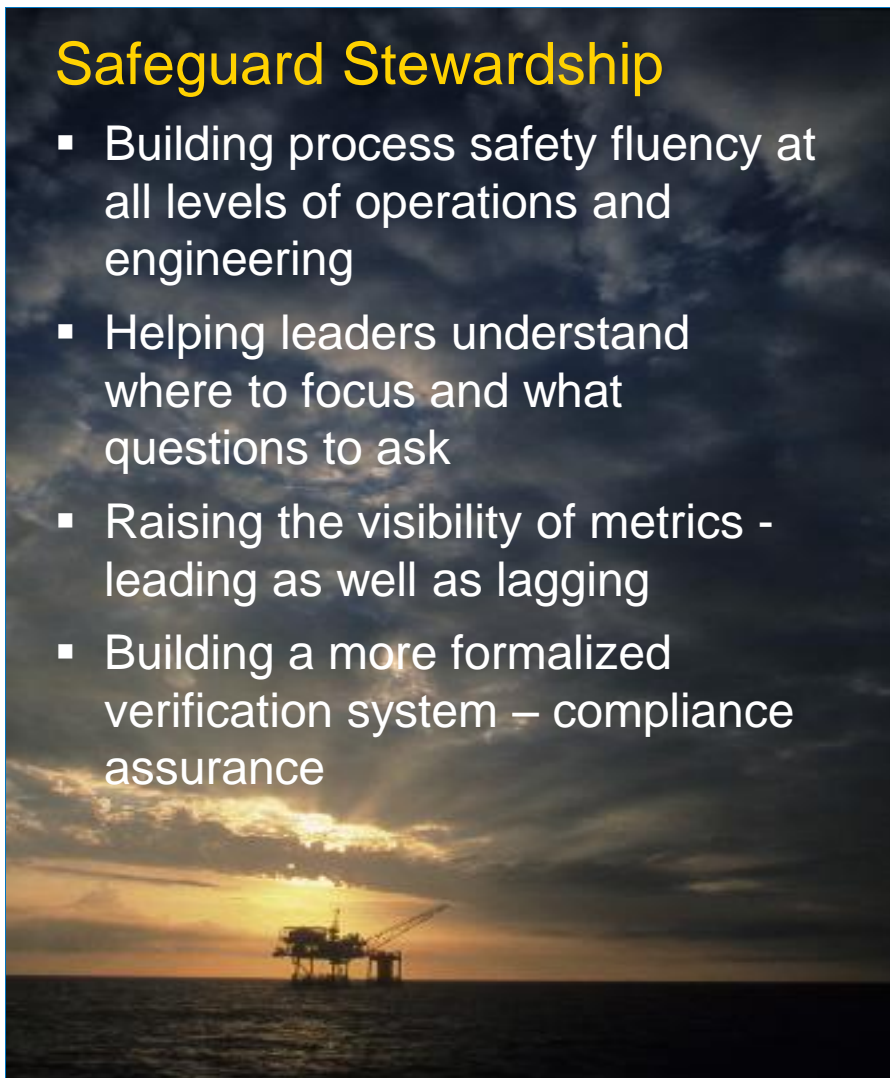
Preparing for Operations

- Procedures
- Operational readiness and PSSR
- Organizational readiness
- Operator training



Safeguard Stewardship

- Building process safety fluency at all levels of operations and engineering
- Helping leaders understand where to focus and what questions to ask
- Raising the visibility of metrics - leading as well as lagging
- Building a more formalized verification system – compliance assurance

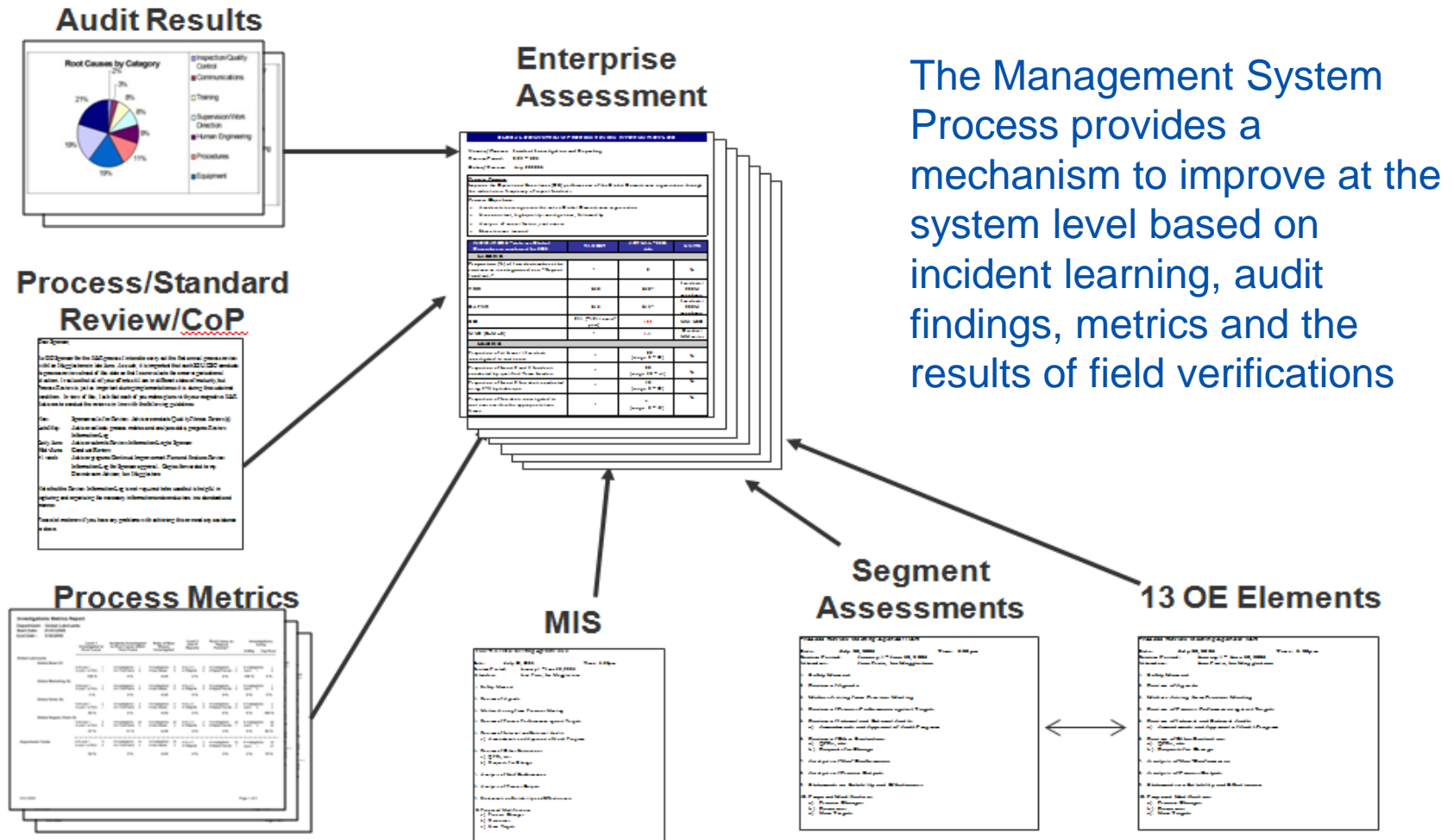


Audit

- Improving audit and assurance at all levels
 - Audits are both a critical verification step and improvement opportunity



Improvement and Learning



The Management System Process provides a mechanism to improve at the system level based on incident learning, audit findings, metrics and the results of field verifications

Needs: How can you help?



Competency of engineers in Process Safety

- Process safety competencies are needed in new hire engineers - need is not limited to Chemical Engineers
- Instill a sense of vulnerability

Research that addresses business needs

- Inherently safer technologies
- Improved understanding of risk
- Incident learning and Information Management

