

Risk Assessment and Management in Practice

Updated IAM Subject Specific Guidance for Practitioners

Laith Alfaqih – PhD, PE, AMP, MIAM, CRL, SDRM
Dennis Zadery – P.Eng., MIAM

IAM North America Conference

Today's presentation will discuss:

- Why the SSG update?
- What changed?
- How the Framework Works?
- How to Apply it?
- Case Studies
- Discussion

Today's Focus

Purpose & Context
- Organizational Purpose and Context
- Stakeholder Management

Leadership & Governance
- Asset Management Leadership
- Asset Management Policy
- Asset Management System
- Asset Management Assurance and Audit
- Technical Standards and Legislation

Organization & People
- Organizational Arrangements
- Organizational Culture
- Competence Management
- Organizational Change Management

Strategy & Planning
- Demand Analysis
- Sustainable Development
- Asset Management Strategy and Objectives
- Planning
- Shutdown & Outage Strategy & Planning
- Contingency Planning & Resilience Analysis
- Resource Strategy and Management
- Supply Chain Management
- Life Cycle Value Realization
- Asset Costing and Valuation

Asset Management Decision-Making
- Decision-Making

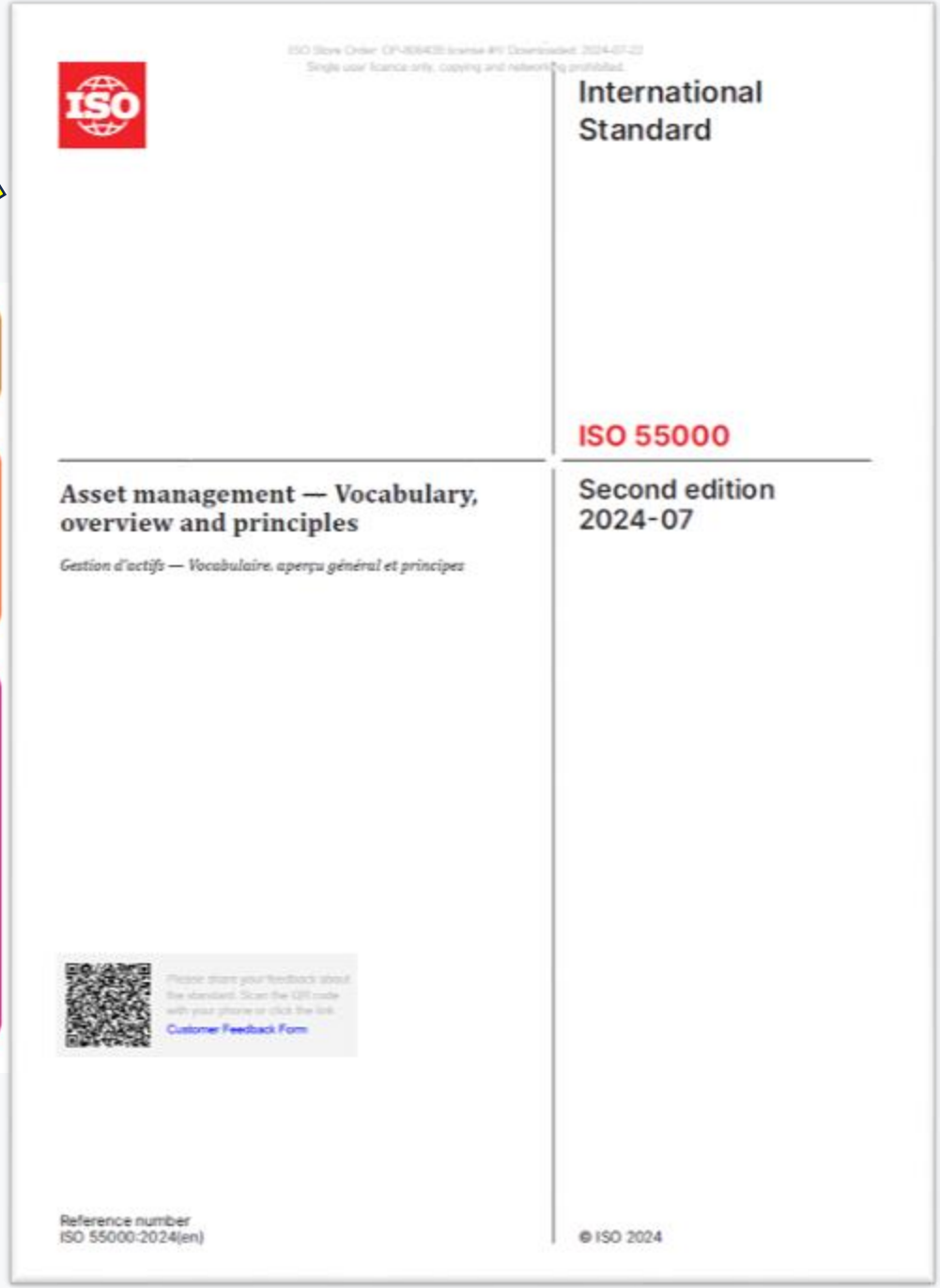
Life Cycle Delivery
- Asset Creation and Acquisition
- Systems Engineering
- Integrated Reliability
- Asset Operations
- Maintenance Delivery
- Incident Management & Response
- Asset Repurposing & Disposal

Information Management
- Asset Management Data and Information Strategy
- Knowledge Management
- Asset Management Data and Information Standards
- Asset Management Data and Information Management
- Asset Management Data and Information Systems
- Configuration Management

Risk
- Risk Management

Review & Continual Improvement
- Monitoring
- Continuous Improvement
- Management of Change

Value & Outcomes
- Outcomes and Impacts



The practitioner definition

RISK = **EFFECT OF UNCERTAINTY** ON **OBJECTIVES**

The effect can be positive, negative or both.
Risk is usually expressed through sources, events, consequences and likelihood.

Why update the 2016 SSG?

Strong foundation

Policies and processes

Risk matrices and registers

4Ts, alignment and monitoring

Evolving practice

ISO 55001:2024 and Anatomy v4

Value frameworks and multi-capitals

Digital models and analytics

Practitioner need

More explicit context and criteria

Maturity pathways

Opportunity, uncertainty and assurance

Other professional organizations have updated their material

Old and new emphasis

The update moves risk management closer to the center of decision-making

2016 emphasis

Asset and system failure

Risk registers

Probability × consequence

Mitigation and controls



Updated emphasis

Purpose and objectives

Risks and opportunities

Value and performance

Resilience and decisions

SSG learning objectives

Define “good”

Explain risk management in an asset management context

Align with ISO 55001 and ISO 31000

Apply proportionately

Select fit-for-purpose approaches

Match complexity, maturity and decision needs

Integrate decisions

Connect strategic, tactical and operational risk

Strengthen value, performance and resilience

Why risk management matters?

Asset-intensive organizations face more interconnected uncertainty

Operating environment

Volatility, uncertainty, complexity and ambiguity

Climate and external shocks

Technology and supply-chain change

Decision environment

Competing objectives Affordability and resource constraints

Long asset lives and irreversible choices

Accountability environment

Stakeholder expectations

Regulatory and governance requirements

Need for defensible trade-offs

Scope: what is inside the SSG?

Included

Physical asset risks

Asset-system risks

Asset management system and process risks

Interfaces with enterprise risk

Also considered

Functional failure

Lifecycle decisions

Upside opportunities

Resilience and contingency

Not the primary focus

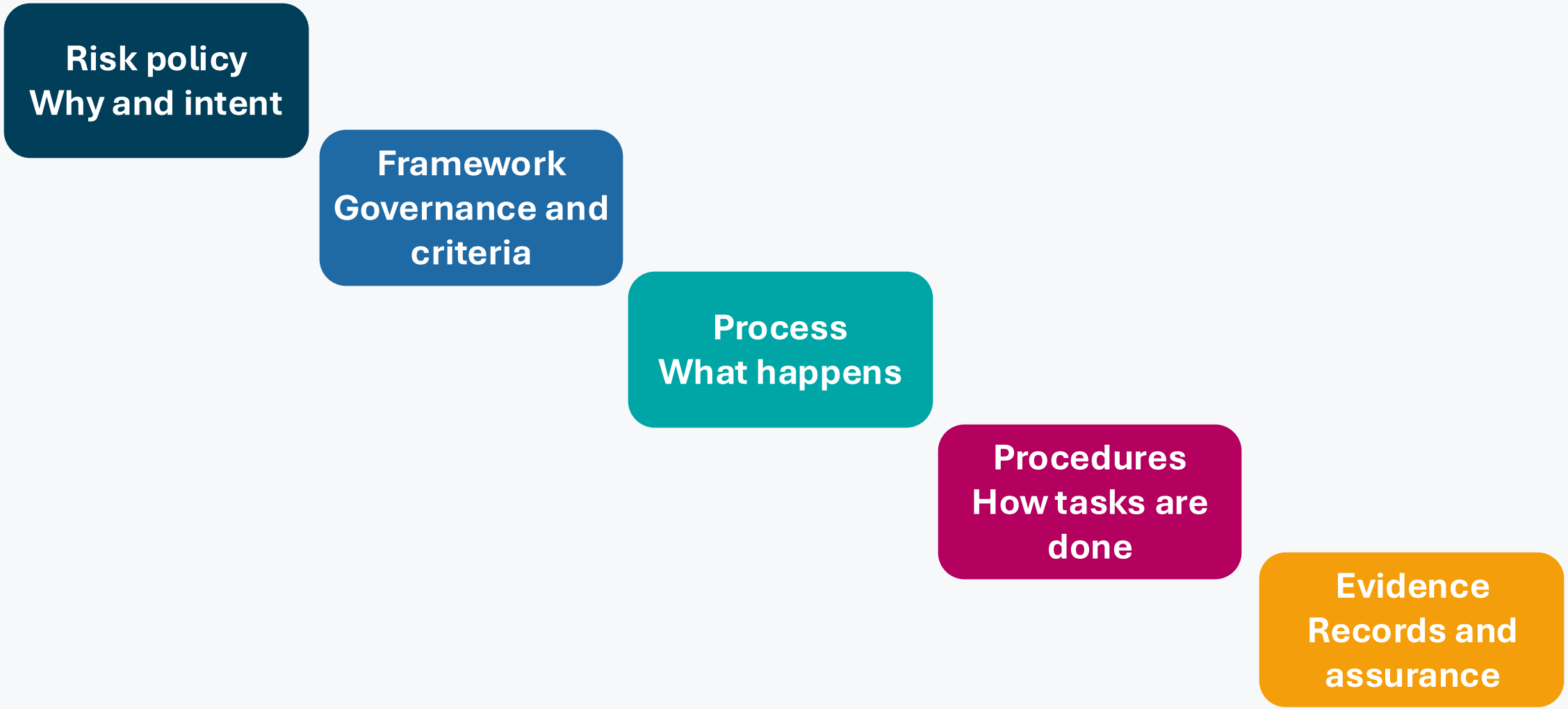
General corporate market risks

Point-of-work safety assessment

A definitive sector-specific rulebook

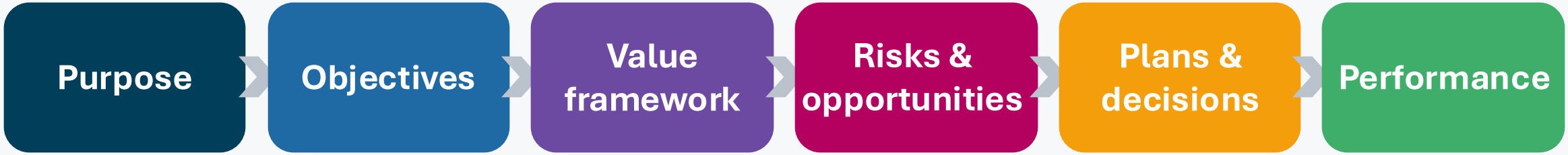
Framework architecture

Policy sets direction; framework creates structure; process turns it into action



Line of sight

Risk becomes useful when it connects objectives to action



If a failure mode cannot be connected to an objective, either the objective set is incomplete or the analysis is misplaced.

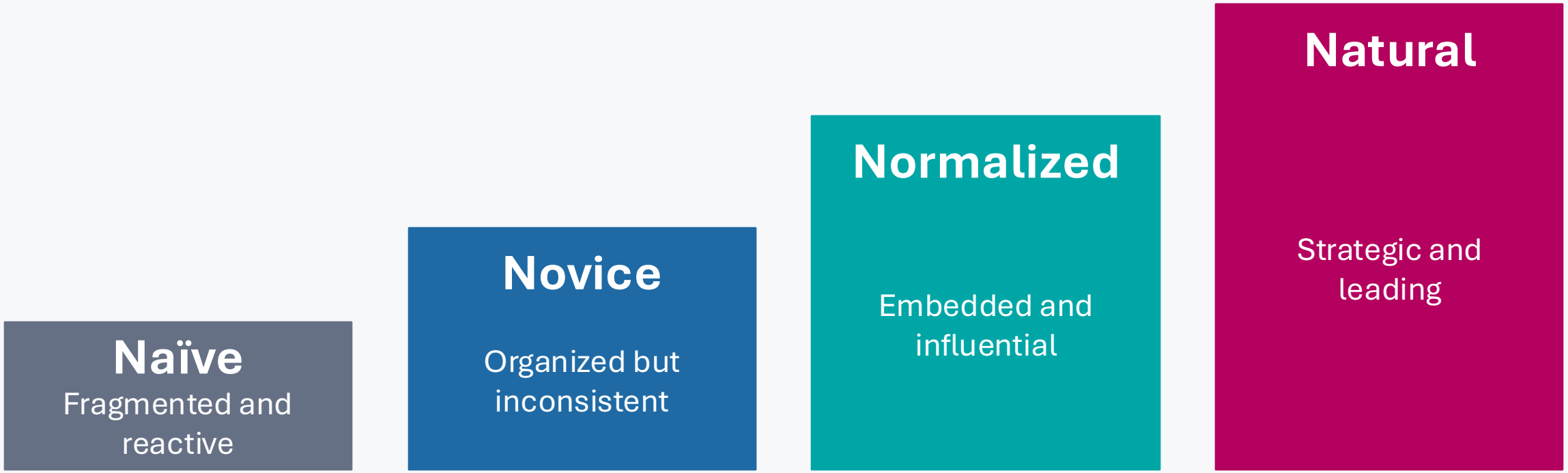
Risk identification

Look beyond the obvious failure mode



Use multiple perspectives:
operations, maintenance, engineering, finance, customers, regulators and external partners.

Risk management maturity pathway



Focused on legal compliance activities, such as health and safety.

Actions are planned to co-ordinate risk management activities across all types of risk, although plans may not have been fully implemented.

Embedded ERM processes are influencing processes and management behaviors, but this may not yet happen consistently or reliably.

Consideration of risk is a substantial factor in making business decisions, and strategy decisions are led by ERM considerations.

Risk management policy

The strategic “why” that directs consistent risk and opportunity management

Strategic direction

Intentions • objectives • alignment with organizational and asset management strategy

Consistent decisions

Principles for identifying, assessing, managing and monitoring risks and opportunities

Roles & accountability

Executive commitment • risk and control ownership • clear responsibilities

Governance & compliance

ISO 55001 alignment • regulatory and stakeholder obligations • assurance

Risk-aware culture

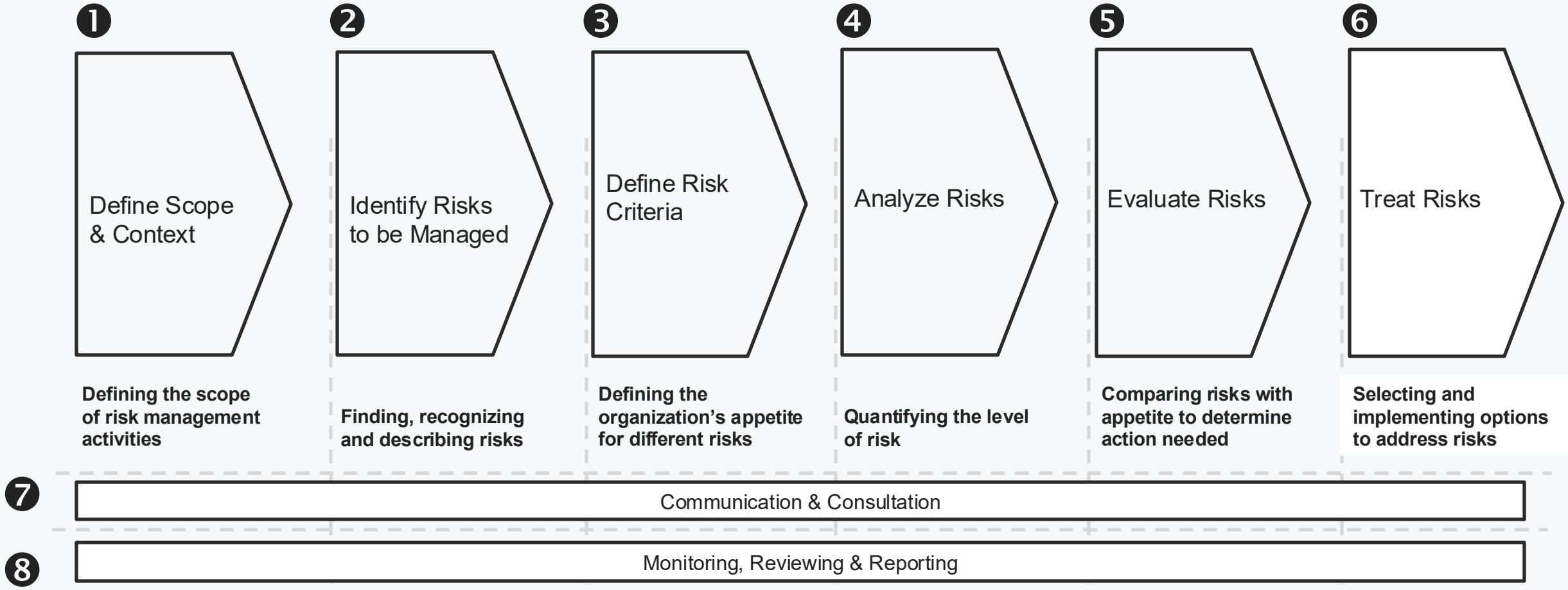
Proactive lifecycle thinking • informed decisions • communication and transparency

Continuous improvement

Review effectiveness • learn from performance • update processes and strategies

Policy intent is delivered through the risk management framework, processes and procedures, then embedded in day-to-day practice.

Risk management process



Scope, context and criteria

The step most often skipped is the one that prevents inconsistency

Scope

Assets, systems and portfolios

Lifecycle stages

Functions, sites and exclusions

Context

Internal capability, culture and governance

External climate, regulation, markets and technology

Criteria

Impact categories

Likelihood scales

Appetite, tolerance and decision thresholds

Monitoring: KPIs, KRIs and control assurance

Move from reporting outcomes to anticipating exposure

Lagging KPI

What happened?

Asset failures last quarter

Service interruptions and costs

Leading KRI

What may happen?

Overdue critical inspections

Loss of spares or rising degradation

Control assurance

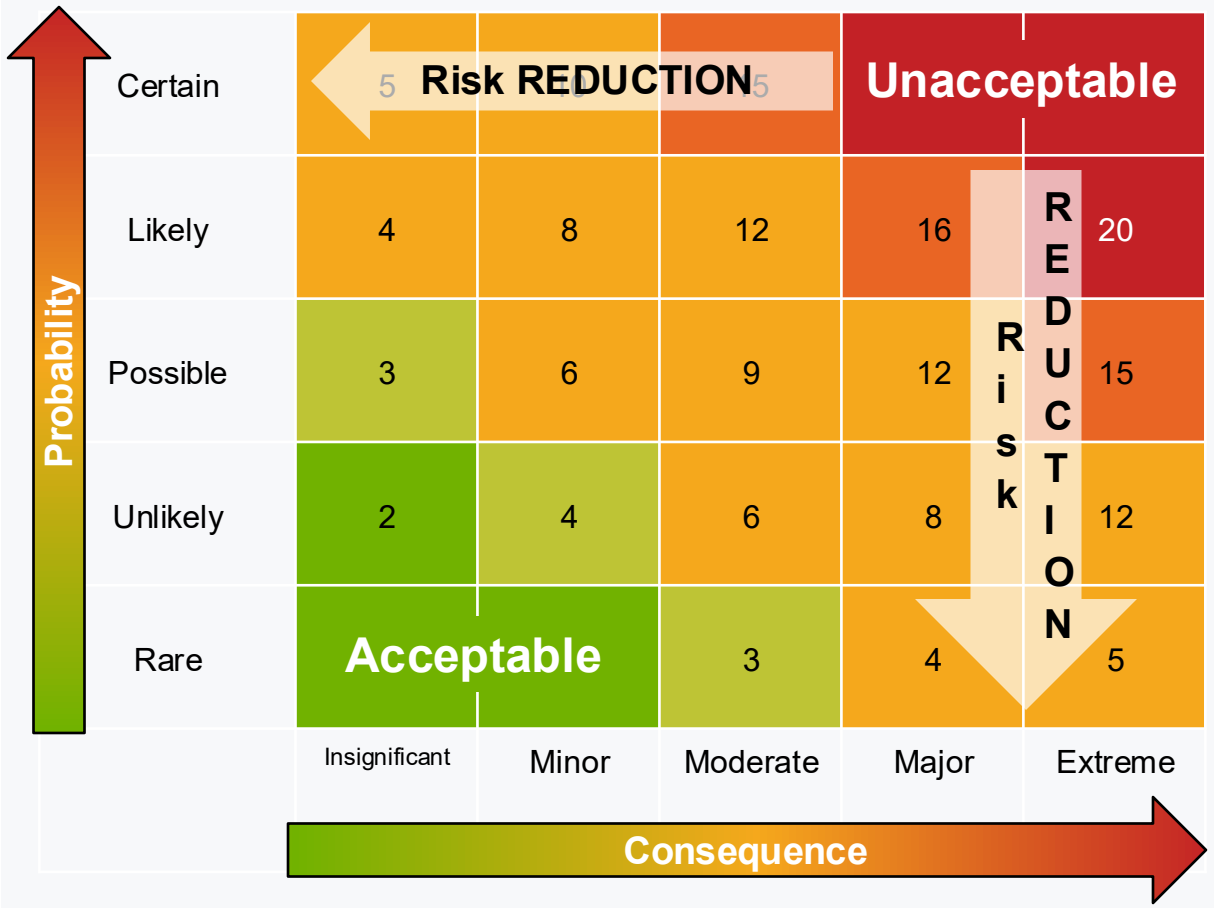
Are barriers working?

Design, implementation and operating effectiveness

Independent review proportional to criticality

Risk Reduction / Treatment / Mitigation

Transfer (Risk to another party) the consequence of a risk can be transferred on to a second or third party by mutual agreement, contractor or insurance being the obvious recipients. Note certain risks cannot be transferred for example, strict H&S liabilities.	**Terminate** (The activity generating the risk) the ultimate treatment of any risk is to stop the activity which generates the risk.
Tolerate (Risk and its likely impact) after an appropriate assessment, choose to take the risk.	**Treat** (Risk by reducing the likely Impact / exposure) – treatments are the widest group of risk management options, these are actions take to reduce the probability or consequence of any risk. (e.g. diversifying supply chain, vertically integrate engineering or process controls, etc).



Source: Institute of Asset Management (IAM) – An Anatomy, 3rd Edition, 2015

What amount and type of risk are we willing to pursue or retain?

Risk Appetite:
The amount and type of risk willing to pursue or retain.

What residual exposure are we ready to bear within defined limits?

Risk Tolerance:
The readiness to bear the risk, after risk treatment, in order to achieve objectives.

What evidence demonstrates that enough has been done?

Residual Risk:
Residual risks, with controls in place, must be **"tolerable"**. Further risk reductions judged impractical or too costly.

Asset health is more than condition

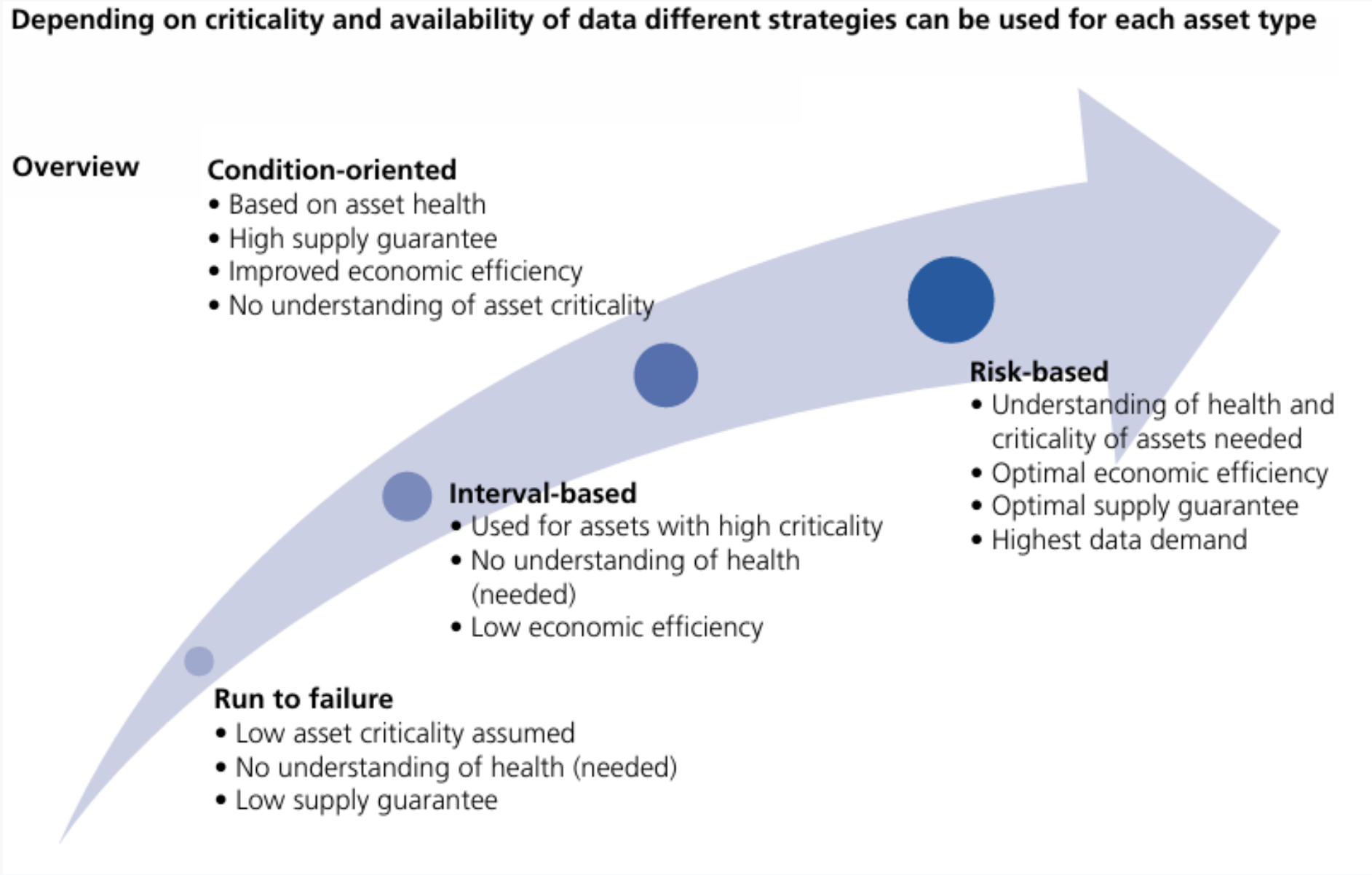
Focus on the ability to perform now and in the future



Condition at a point in time is less useful than understanding the direction and rate of change.

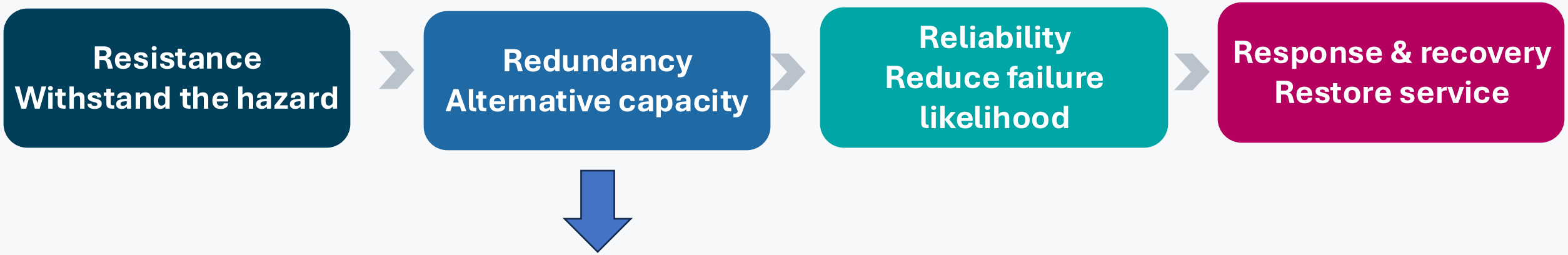
Maintenance strategies

Depending on criticality and availability of data different strategies can be used for each asset type



Resilience and the 4Rs

Treatment of disruption requires system thinking



Redundancy is only effective if capacity, controls, maintenance state and common-mode failures are understood.

Case Study 1: Town of New Tecumseth

A repeatable municipal risk framework across a multi-asset portfolio

Context

Multiple municipal asset classes

Need for a consistent and repeatable risk register

Service criticality embedded in the framework

Method

Probability of Failure derived from condition or health on a 1–5 scale

Consequence of Failure scored 1–5 across six dimensions

Risk = Likelihood × Consequence, producing a 1–25 score

What it demonstrates

Practical municipal portfolio application

Age-based and study-based deterioration

Common criteria with fit-for-purpose assessment methods

Case Study 2: Idaho Department of Lands

FOREST VALUE = TIMBER + RECREATION + STORMWATER ABATEMENT + CARBON



Annualized risk valuation supports comparison, while the natural-capital lens broadens what "value" includes.

Case Study 3: Dubai Airports

Condition- and risk-based capital intervention for critical doors

Decision inputs

Physical condition

Asset performance

Maintenance cost as a percentage of Asset Replacement Value

Remaining useful life

Integration

Multi-criteria decision-making approach

Connection to the corporate risk register

Same probability–consequence matrix used for enterprise risks

Documented results

25% maintenance-cost reduction

15% energy savings across replaced assets
Traceability from asset evidence to enterprise risk decisions

How to use this SSG?

- 📘 Expanding and enriching the discipline
- ✅ Providing consolidated good practice
- 📈 Supporting professional development & improvement
- 🛠️ Offering practical examples
- 🎯 Promoting tailored solutions
- ⚙️ Considering complexity and maturity
- 🔁 Facilitating continuous improvement

Better risk management does not eliminate uncertainty.

It makes decisions more transparent, proportionate and connected to value.

Questions & Discussion

Thank you



Laith Alfaqih - PhD, PE, CRL, SDRM, AMP MIAM
Asset Management Lead – North America
Laith.Alfaqih@stantec.com

Stantec



Dennis Zadery – P.Eng., MIAM
VP, Energy and Resources
Dennis. Zadery@stantec.com

Stantec

SSG Team

- **Qais Qawaqneh –**
  RTA, UAE (Risk SSG Group Lead)
- Victoria Hogg –
  Woodhouse Partnership
- Nick Acay – HDR
- Adrian Rees – ARC Consulting
- Brett Anderson – City of Minneapolis
- Shanmugasundaram Muthaiah –
  Ashghal, Qatar
- Dennis Zadery – Stantec
- Laith Alfaqih – Stantec