# Designing Environment, Social, and Governance (ESG) within an Asset Management Framework

# ASSET MANAGEMENT SERVICING ESG PRINCIPLES

Corporate responsibility with respect to Environment, Social, and Governance (ESG) concerns is increasingly viewed as necessary and of strategic importance. There is a growing desire in many organizations to implement and practice ESG principles across the enterprise. While the drivers for ESG advancement may vary, the implementations tend to follow several parallel paths.

At the senior level of most organizations, ESG practices may include board, executive, and management representation; policy that directs environmental and safety initiatives; public engagement and participation; and a management system to measure and report on those practices and their impact.

While these senior management measures represent leading ESG practice, operationalizing ESG such that the purpose and intent is represented (and sustained) in day-to-day activities can be complex. Such commitment, implicit in ESG, requires a deeper view of how fundamental business activities are managed. Organizations must consider how their daily operations and decision making ensure that:

- The environment is respected
- Employee and public health and safety is top priority
- Operational impacts on the community are understood and the public is engaged
- Management oversight systems represent the facts on the ground and enable course correction

This level of organizational Involvement can be daunting; however, it can also lead to enhanced overall performance and profitability. The deep thinking and organization competencies that will deliver meaningful and sustained ESG results are well aligned with the goals and objectives of comprehensive Asset Management (AM). In fact, industrial organizations that view AM as a vehicle to achieving sustained ESG success can have their cake and eat it, too.

ESG maturity can and should be in step with AM maturity – delivering improved performance, reliability, risk management, and positive effects on other strategic goals.

Typical ESG elements have direct lines to AM aspects (usually, multiple AM aspects), as illustrated in the Pathway to ESG table below.

| PATHWAY TO ESG → | | |
|---|---|---|
| **ESG: TYPICAL ELEMENTS** → | **RELATED AM ASPECTS** → | **PROGRAMMED SUCCESS** |
| **Environment** | **Environment** | **Assess Present State** |
| • Energy Use<br>• Waste<br>• Pollution<br>• Resource Utilization | • Performance Assessment<br>• Asset Condition<br>• Asset Strategy<br>• Optimization | • Operational Practices<br>• Work Management<br>• Reliability Programs<br>• Performance Programs<br>• Planning<br>• Strategic Alignment |
| **Social** | **Social** | **Identify Strengths and Weaknesses** |
| • Supply Chain ESG<br>• Community Engagement<br>• Employees (H&S)<br>• Customer (Quality) | • Criticality Assessment<br>• Risk Profiling<br>• Operational Excellence<br>• Employee Engagement | • Maturity<br>• Best Value Opportunities<br>• Cost<br>• Change Challenges |
| **Governance** | **Governance** | **Roadmap/Journey** |
| • Transparency<br>• Reporting<br>• Stakeholder Engagement<br>• Conflict of Interest | • Program Implementation<br>• Performance Measurement<br>• Management Oversight<br>• Scorecards and Dashboards | • Timing and sequence of change<br>• Articulation of Plan |

Achieving specific ESG objectives requires multiple AM competencies. The identification of AM competencies necessary to achieve specific ESG goals is not difficult; however, assessing present state, designing roadmaps, and deploying these competencies can be challenging for many organizations. Nevertheless, the prize is great. Doing due diligence (of both the ESG plan and its compliance) is of strategic importance; and naturally, operational effectiveness, reliability, and profitability are important to all organizations.

This series of papers is intended to demonstrate how ESG and AM are intrinsically related, and how achieving emerging business goals (ESG, for example) along with traditional success measures can be a win-win proposition.

This paper, the second of three, builds on the general discussion in the first, which [outlines the relationship between AM and ESG](). The third paper will dive deeper into “Mapping Your AM Journey” to fulfill your ESG goals.

## ESG FROM AN OPERATIONAL PERSPECTIVE

The Image to the right lists AM competencies that are directly related to elements of ESG. While there are many strategic activities that organizations should undertake to advance ESG, this paper is focused on how ESG principles can be operationalized and sustained, so that an ESG culture will be pervasive in an asset-intensive business.

Key AM elements that are foundational or common to all three streams of ESG include:

- Criticality
- Maintenance strategy design and optimization
- Asset health determination
- Risk calculation
- Risk-based decision making

This paper illustrates how these key elements should be applied to systematically include ESG goals and objectives within AM processes.

The result will be a transparent and sustainable approach that demonstrates responsible business operations and provides the basis for advancing all strategic business goals.

# OPERATIONALIZING ESG: CRITICALITY

Criticality assessment is about establishing how important each significant asset is to the business. It provides a basis for:

- Designing maintenance strategy (preventive maintenance, condition-based maintenance, operator surveillance, testing, analysis, assessment, and application of analytics)
- Rigor in operating practices
- Mitigation design, including critical spares, redundancy, and contingency plans

In short, the goal is to understand the impact of a failure or impact of an asset not working to specification. For example, if a pump were to fail, it is important to understand what production loss would ensue and the associated cost of repair and return to service. But these are just the obvious financial impacts. It is also important to understand impacts related to:

- Employee safety
- Public safety
- Environment
- Product quality
- Reputation

In other words, many of the impact considerations to determine criticality are clear ESG considerations.

To have a structured ESG approach in any asset-intensive business, a comprehensive criticality assessment must be conducted. The list shown at the bottom of this page illustrates typical information included in a criticality assessment.

The general process should be applied to all significant assets. Typically, there are many small or "non-critical" assets in asset-intensive businesses. To effectively apply a criticality assessment, some assumptions must be made about exactly what would fall within a rigorous scope of assessment and what would not.

Organizations typically start with their asset database (often contained in their CMMS) and apply the process on either an asset class basis or a system basis. Where there is uncertainty about the starting point, early assessment efforts will usually clarify those assets that can be simply deemed non-critical and those that need rigorous assessment, using a model such as discussed herein. When the right mix of staff are engaged (Maintenance, Operations, Technical Support, etc.), the effort can progress quickly.

A word of caution – It is common for organizations to try to "boil the ocean" when doing criticality assessments. Getting it done reasonably well and swiftly is crucial to avoid getting stuck in the mud of unimportant precision.

| Asset Identification | | | | | Asset Failure Impact | | | | | | Existing Design Mitigations | | | Criticality |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Description | Equipment ID | System | Section | Class | Safety | Env | Org Rep | Downtime | Repair $ | Quality | Redundent | Spare | Lead Time | |
| Pump 1 | | | | | | | | | | | | | | |
| Pump 2 | | | | | | | | | | | | | | |
| Motor 1 | | | | | | | | | | | | | | |
| Motor 2 | | | | | | | | | | | | | | |
| Fan 1 | | | | | | | | | | | | | | |
| Fan 1 | | | | | | | | | | | | | | |
| Valve 1 | | | | | | | | | | | | | | |
| Valve 2 | | | | | | | | | | | | | | |
| UPS | | | | | | | | | | | | | | |
| Fire Pump | | | | | | | | | | | | | | |
| Conveyer 1 | | | | | | | | | | | | | | |
| Conveyer 2 | | | | | | | | | | | | | | |
| Breaker 1 | | | | | | | | | | | | | | |
| Breaker 2 | | | | | | | | | | | | | | |
| Transformer 1 | | | | | | | | | | | | | | |

How the assessment is conducted can greatly simplify the effort, ensure quality, and demonstrate some core ESG principles in its execution. For example, the criticality assessment should engage those who are potentially impacted.

- Operators and maintenance workers may be at risk should an asset fail. Therefore, they should have representation (not to mention their technical input).
- There may be a risk related to the public safety or the environment if an asset were to fail. Therefore, there should be some level of engagement (sometimes required by regulation).

Naturally, everyone cannot be engaged in every facet of a criticality assessment; however, an organization should endeavor to find reasonable engagement as opposed to avoiding it. This, I would suggest, represents the essence of the ESG principle of engagement.

ESG aside, the proper engagement is usually enlightening, contributes to best understanding of criticality, and, therefore, provides best criticality intel for maintenance strategy design, risk determination, and risk-based decision making.

There are as many criticality assessment models, approaches, and degrees of depth as there are providers. There are also many factors to consider. One common fact among all models is that there is a lot of "subjectivity" involved. Sure, many attempt to reduce the subjectivity to calculation (a good thing to simplify the effort), but it is important to understand that all models are only as good as the organization know-how, experience, and subject matter expertise applied. How well the right people are engaged will determine the quality of a criticality assessment. The complexity or depth of the effort does not drive the quality and, in fact, bigger (more expensive) efforts often lose their way on the journey to being a practical and useful assessment.

Ultimately, organizations must understand the impact of equipment failures (or reduced performance), and they must understand those impacts from a safety, environmental, production cost, repair, product quality, and reputation perspective. This list of impacts is typical, but not exhaustive, and should be a function of strategic goals and objectives. Clearly, ESG goals and objectives are important impact factors.

The exercise of applying values to factors is, conceptually, very easy. The right people, in a structured format, discuss and agree on ratings. Again, there are many rating schemes, but I prefer that it be simple (1-5 representing least to most critical), and all the ratings must be considered as a whole to determine the aggregate criticality rating (1-5). Certainly, some of the factors can have calculations applied (downtime or repair costs can often be well calculated to support the effort). Other factors, such as safety and environment, are much more difficult to monetize; although, the exercise can be illuminating. Nevertheless, landing on a rating for most impact factors is subjective and reliant on the appropriate experience and expertise. Businesses should be cautious about highly complex and/or calculated mechanisms that deliver great precision but are not meaningfully engaging. All too often, organizations become mired in the detail of the exercise and lose focus on translating their expertise into a meaningful criticality assessment.

Done well, criticality assessments set the foundation for the most important elements of AM:

- Maintenance strategy
- Risk determination
- Optimization
- Program rigor

Thus, criticality assessment is a key means by which organizations embody ESG goals and objectives and other strategic goals throughout the business.

# OPERATIONALIZING ESG: MAINTENANCE STRATEGY DESIGN

A maintenance strategy (or asset strategy) is essential to all asset-intensive businesses, as it establishes:

- Care programs to monitor and manage asset condition
  - Specifies preventive maintenance (PM) and condition-based maintenance (CM) programs
- Contributes to a basis for:
  - Maintenance resources identification
  - Maintenance costing

These values are well understood in industry, but maintenance strategy can provide much more.

A more comprehensive view of maintenance strategy provides for:

- Operations programs
  - Regular surveillance requirements (rounds)
  - Operations functional and performance testing
- Asset assessment requirements

And increasingly, a maintenance strategy should guide the implementation and utilization of digital strategies (advanced pattern recognition, rules engines, and prognostics).

Furthermore, as digital and analytical tools become more feasible, the maintenance strategy will be central to the synthesis of asset data, thereby, enabling advanced technologies.

So, how does maintenance strategy relate to ESG? The short answer is:

- The specific activities (PM, CM, round, test, etc.) and frequency (shift, week, month, etc.) are a function of criticality, and ESG concerns are a primary driver of criticality (or should be!).
- A mature maintenance strategy also prescribes how data is turned into intelligence to drive an understanding of condition, performance, and risk factors.

To elaborate on the important (and necessary) link between maintenance strategy and ESG, the following discussion will include:

- Designing a maintenance strategy
- Designing the data
- Compliance measurement
- Performance
- Optimization

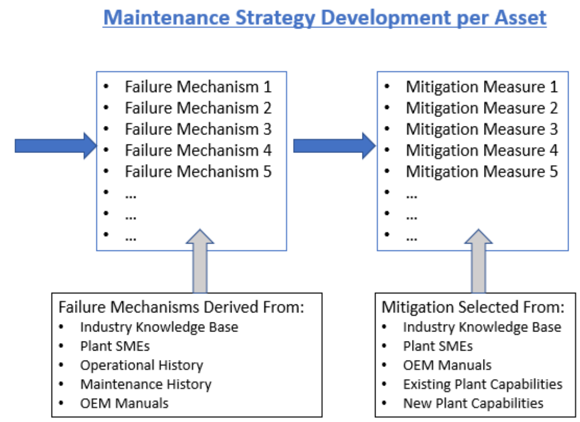
The following two graphics support the maintenance strategy discussion and its connection to ESG. The first one (below) lists some streams of maintenance strategy activities and specific tasks commonly performed in relation to each. Note that this is not a comprehensive listing.

| MAINTENANCE STRATEGY | | | |
|---|---|---|---|
| **PREVENTATIVE** | **PREDICTIVE** | **SURVEILLANCE** | **DIGITAL** |
| • Calendar Based<br>• Cycle Based<br>• Operating HR Based<br>• Triggered | • Vibration Analysis<br>• Infrared<br>• Oil Analysis<br>• Ultrasonic Examination<br>• MCM | • Operator Rounds<br>• Operations Testing<br>• Assessment<br>• Performance Analysis | • Advanced Pattern Recognition<br>• Rules Engines<br>• Prognostics |

The second graphic (next page) is a simplification of how maintenance strategies are designed. It includes consideration of failure mechanisms and related mitigating measures, and the sources of key information to enable maintenance strategy design.

| Equipment Description | Criticality |
|---|---|
| | |
| Pump 1 | 3 |
| Pump 2 | 4 |
| Pump3 | 3 |
| Motor 1 | 3 |
| Motor 2 | 3 |
| Motor 3 | 3 |
| Fan 1 | 4 |
| Fan 2 | 3 |
| Fan 3 | 2 |
| Valve 1 | 3 |
| Valve 2 | 3 |
| Valve 3 | 3 |
| Holding Pond | 3 |
| Clarifier | 3 |
| Dionizer | 4 |
| RO Unit | 4 |
| Actuator 1 | 4 |
| Actuator 2 | 4 |
| Control Network 1 | 4 |
| Control Network 2 | 4 |
| UPS | 5 |
| Emergency Diesel | 5 |




Designing a maintenance strategy includes some basic steps:

1. Identify failure mechanisms – This needs to be done for each asset. Failure mechanisms refer to the way in which assets fail or degrade. Degradation of electrical insulation, pipe erosion, and bearing deterioration are common examples.
2. Apply mitigating measures – These are things that can be done prior to failure or significant performance degradation to detect whether the mechanism is progressing and/or interceding in a planned fashion.

While these steps are not conceptually complicated, there are a vast number of asset types, each with their own set of failure mechanisms. And there are dozens (with numerous variations) of mitigation measures that may be applied to protect against these failures. To complicate matters further, it is important to take criticality into consideration, so that the right amount of effort is applied to each asset.

When all these factors are considered for thousands of assets in a business, one can understand the maintenance strategy effort can be hard to design, and even harder to implement and sustain.

Fortunately, there has been much effort in the industry to provide knowledge, expertise, and tools to support the design effort and manage the resulting programs.

Knowledgebases exist that house listings of failure mechanisms for many of the most common types of assets. These listings typically include those assets that make up most of the assets in a plant or distribution system.

These same knowledgebases typically include how to mitigate or defend against each failure mechanism and reference the likelihood that the mechanism will manifest in failure.

Other sources of failure mechanism information (and mitigation) include Operations, Maintenance, and Engineering personnel closest to the assets, OEMs, and other industry SMEs.

The actual maintenance strategy design effort includes the application of the right mix of maintenance strategy items to “EFFECTIVELY” protect the health of each asset. Too much maintenance strategy activity can be costly from a maintenance budget perspective.  Not enough maintenance strategy will translate to poor performance or unacceptable safety or environment performance.

So, the question is how to strike a balance and, where does ESG come into play?

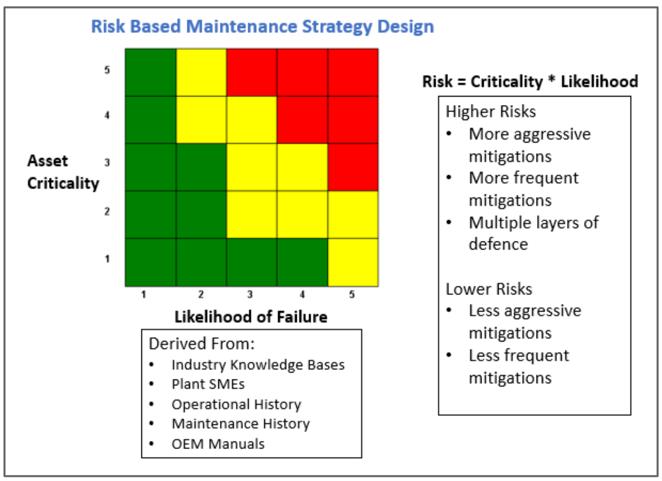
Finding the balance (right amount of maintenance activity) is determined by understanding:

- Asset criticality
- Likelihood of a failure mechanisms manifesting in a failure

While the likelihood factor is derived from industry knowledgebases and internal or external SMEs, the criticality factor comes directly from the criticality assessment, where ESG factors feed into strategic focus.

The product of Criticality and Likelihood equals Risk. Higher risk-rated assets drive more intensive maintenance activities, and lower risk assets have less intensive strategies applied. In this way, the maintenance strategy is derived and informed by ESG.




## Maintenance Strategy Optimization

But the maintenance strategy story does not end at the assignment of maintenance strategy activities. In fact, that may be the easiest part of the process. Once ideal maintenance activities are selected for an asset or family of like assets, the business needs to consider what elements of the strategy it can reasonably execute. It may be that further work needs to be done to optimize the strategy, given the organization's strengths and weaknesses.

Finally, a maintenance strategy and its optimization ought to be thought of from a continuous improvement perspective. New monitoring and diagnostic capabilities continue to enter the marketplace and, ideally, an organization's capability continues to evolve in step. Therefore, a mature AM program will continue to evolve as these competencies grow.

**MAINTENANCE STRATEGY**

| PREVENTATIVE | PREDICTIVE | SURVEILLANCE | DIGITAL |
|---|---|---|---|
| • Calendar Based<br>• Cycle Based<br>• Operating HR Based<br>• Triggered | • Vibration Analysis<br>• Infrared<br>• Oil Analysis<br>• Ultrasonic Examination<br>• MCM | • Operator Rounds<br>• Operations Testing<br>• Assessment<br>• Performance Analysis | • Advanced Pattern Recognition<br>• Rules Engines<br>• Prognostics |

As maintenance strategy competencies mature, an organization can begin to displace higher cost and more intrusive mitigations (PMs, for example) with less expensive, less intrusive measures. Furthermore, as field sensors become more affordable and digital analytical tools improve, this optimization will continue to advance. The net result will be not only lower maintenance cost, but better performance and transparency.

From a philosophical ESG perspective, optimization is one of those foundational concepts that should permeate throughout the business. From a tactical perspective, optimizing maintenance strategy has a direct impact on how well a business understands its asset condition; its ability to calculate operational risks; and, therefore, make best decisions from both an ESG and financial perspective, as well as servicing other strategic goals.

To continue the theme, optimum decision making enables the best application of resources and focus on priorities, which, in themselves, are ESG goals.

## Designing the Data

When developing a maintenance strategy, it is important to specify how the resulting information is to be managed. While the maintenance strategy items illustrated here contain an abbreviated list of mitigations, there can be dozens of data streams generated from a robust maintenance strategy. How well the data integration and synthesis are designed and managed will determine the quality of the intelligence (action, recommendation, asset health indicators, risk determination, etc.).

# OPERATIONALIZING ESG: ASSET HEALTH DETERMINATION

| Asset Health Indicators | | | | |
|---|---|---|---|---|
| | Pump1 | Condition | Compliance | Condition History |
| | Vibration | 2 | High | |
| | IRmech | 1 | High | |
| | UE | 1 | Med | |
| A | OA | 3 | Low | |
| H | APR | 2 | High | |
| I | Rule1 | 1 | High | |
| s | Rule2 | 2 | High | |
| | Performance | 2 | High | |
| | B/L Severity | 3 | High | |
| | Test | 2 | Med | |
| | Pump2 | Condition | Compliance | Condition History |
| | Vibration | 2 | High | |
| | IRmech | 1 | High | |
| | UE | 1 | Med | |
| A | OA | 3 | Low | |
| H | APR | 2 | High | |
| I | Rule1 | 1 | High | |
| s | Rule2 | 2 | High | |
| | Performance | 2 | High | |
| | B/L Severity | 3 | High | |
| | Test | 2 | Med | |

The Asset Health Indicators (AHI) graphic above illustrates a view that should drive data design and integration as the maintenance strategy is designed. This should not be an afterthought. It should be a requirement! There is too much value to be realized by “designing the data.”

Again, as more advanced monitoring, diagnostic, and analytical tools become available, the capability to design and manage these data streams will become more important and of more value.

In addition, this organization competency will determine how well a business can:

- Measure program compliance in a transparent and automated fashion
- Determine performance (asset and program) accurately and provide highly transparent reporting

Compliance and performance reporting are essential elements of ESG and AM, and should be inherent in all aspects of AM.

As outlined in maintenance strategy design, the data streams resulting from the maintenance and operations activities are as important as the basic care program (finding corrective actions) they represent. Maintenance strategy designed within a broader thinking AM program will manage these data streams as assets unto themselves. Asset data requirements include:

- Collection
- Initial processing
- Integration in a broader environment, along with other related data streams
- Accessibility by other analytics, measurement, and reporting facilities

It is important to apply the right systems and integration rigor based on the nature of the data and the nature of the associated assets. Beware of placing “all data” in “one system” for “all purposes.” That approach will be big on cost and low on deliverables. Data requirements should be designed and fit for purpose.

Nevertheless, the goal is to create central, visible, and accessible repositories for like families of asset classes (e.g., pumps, fans, blowers, compressors, drives, valves, motors, and other electrics with datasets that can be treated in a common way).

This capability enables a host of important AM capabilities:

- Centralize plant-wide or fleet-wide data to enable technical review by SMEs
- Allow SMEs to be more effective and spend their time analyzing, as opposed to managing information
- Assess performance by asset class
- Distribute and share asset information and collaboration
- Calculate CBM and quality risk (most Importantly)
- Support RCFA
- And the list goes on…

Beyond these traditional objectives, there are increasingly more opportunities to derive value from well managed data streams and AHIs. Analytical tools are increasingly available, such as:

- Advanced pattern recognition
- Rules engines
- Prognostics

These capabilities represent deeper levels of AHI to further understand condition and risk; and, through an ESG lens, AHIs and advanced AHIs enable:

- Performance measures on specific classes of environmental or safety related assets
- Condition determination and action identification of environment, safety, or public facing assets
- Compliance measures related to associated maintenance strategies
- Detailed and transparent reporting
- Excellence in risk determination

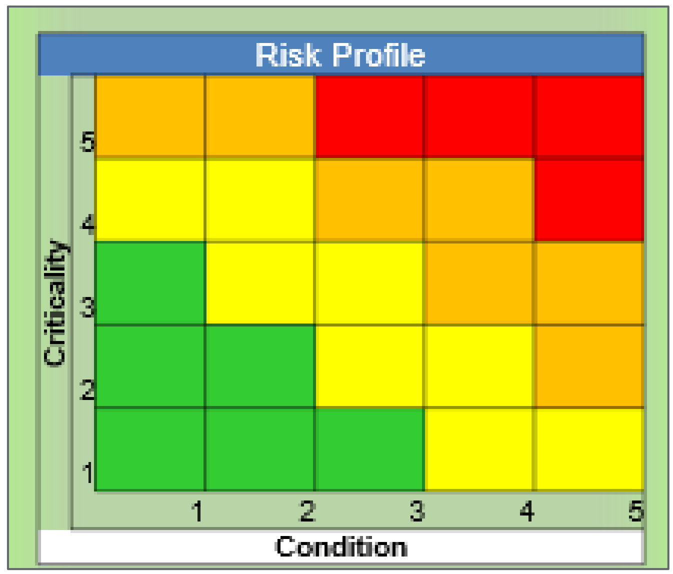
## OPERATIONALIZING ESG: RISK CALCULATION

Risk determination is an essential ESG capability. Furthermore, quality and "transparent" risk determination is an ESG requirement.

| Asset Health Indicators | | | | | Summary Indicators | | |
|---|---|---|---|---|---|---|---|
| | Pump1 | Condition | Compliance | Condition History | Criticality | RISKcalc. | RISKasses. |
| | Vibration | 2 | High | | | | |
| | IRmech | 1 | High | | | | |
| | UE | 1 | Med | | | | |
| A | OA | 3 | Low | | | | |
| H | APR | 2 | High | | 3 | 2 | 3 |
| I | Rule1 | 1 | High | | | | |
| S | Rule2 | 2 | High | | | | |
| | Performance | 2 | High | | | | |
| | B/LSeverity | 3 | High | | | | |
| | Test | 2 | Med | | | | |
| | Pump2 | Condition | Compliance | Condition History | Criticality | RISKcalc. | RISKasses. |
| | Vibration | 2 | High | | | | |
| | IRmech | 1 | High | | | | |
| | UE | 1 | Med | | | | |
| A | OA | 3 | Low | | | | |
| H | APR | 2 | High | | 4 | 3 | 3 |
| I | Rule1 | 1 | High | | | | |
| S | Rule2 | 2 | High | | | | |
| | Performance | 2 | High | | | | |
| | B/LSeverity | 3 | High | | | | |
| | Test | 2 | Med | | | | |

Organizations must be able to demonstrate (and in some cases defend) that they have been diligent in their business activities, i.e. they have a firm grip on environmental, safety, and public risks, as well as other performance and profit related risks.

AM discipline (criticality assessment, maintenance strategy design, data management, asset condition monitoring, etc.) are the foundation for this deep understanding of risks. Risk determination is the outcome of these AM foundations and supporting processes.




Conceptually, determining asset risk is very simple.

**Risk = Criticality * Condition**

- Criticality does require some effort, but it is not tremendously difficult.
- Condition is more complex and a function of maintenance strategy design, data management, integration, etc. While this is not simple, the payoff is big.

Understanding risk opens the path to diligent, repeatable, unbiased, and best decision making that can optimize profitability, while demonstrating ESG compliance or excellence.

# Operationalizing ESG: Risk-Based Decision Making

With risks well developed for all asset classes, organizations can implement a risk-based decision making process. A process that is not just about ESG risks, but all asset related risks. A process that reasonably considers all risks appropriately and enables decision making to strike a prudent balance.

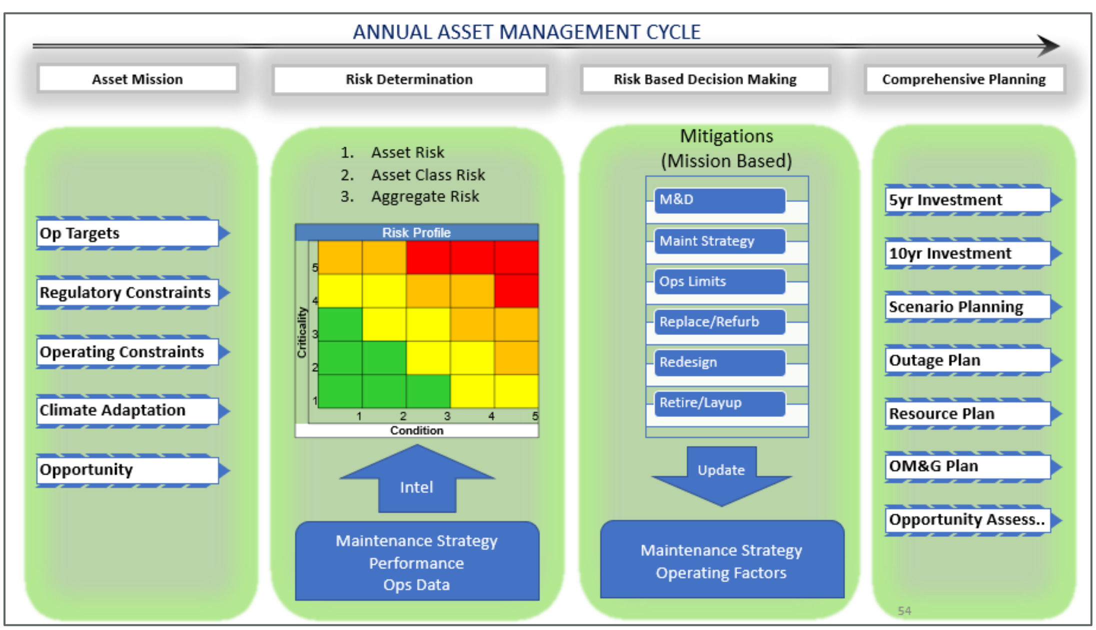
With asset risk profiles in place, organizations can overlay strategic goals and asset missions, leading to decisions that are comprehensive, utilizing latest intel from all aspects of the business to make the best decision possible. This is a primary goal of ESG and is the ultimate goal of AM.

A comprehensive risk-based decision making process, illustrated below, integrates strategy, risk determination, decisioning, and planning. This process is the culmination of the aspects of AM (described in this paper) and showcases the importance of ESG goals (managing environmental and safety risks, optimum resource utilization, to name a few).

Surprisingly (for some), with strong AM foundations in place, this annual asset management cycle is relatively easy to implement and sustain.

The key strategy streams include:

- **Asset mission:** An annual strategic review or reset helps establish high-level goals and objectives, operating targets, constraints, and other strategic drivers. ESG might be one of those drivers, for example. This strategy stream should shape many activities in the business and can be systematically implemented via criticality, maintenance strategy design, and within reporting systems. In essence, this activity establishes the mission of an organization's assets.
- **Risk determination:** Annual risk determination is applied at the asset, system, and class levels, or even for larger aggregates, such as plants or utility distribution systems. Clearly, this competency is a function of foundational AM elements, which inherently include ESG and strategic goals in their design. Criticality and maintenance strategy are at the heart of AM, and they deliver the organization's ability to determine, visualize, and act on risk.



- **Risk-based decision making:** This is where risk meets mission (short-, medium-, and long-term goals). Accurate understanding of risk (safety, environmental, financial, etc.) along with clear strategic goals enables the best business decision making possible.

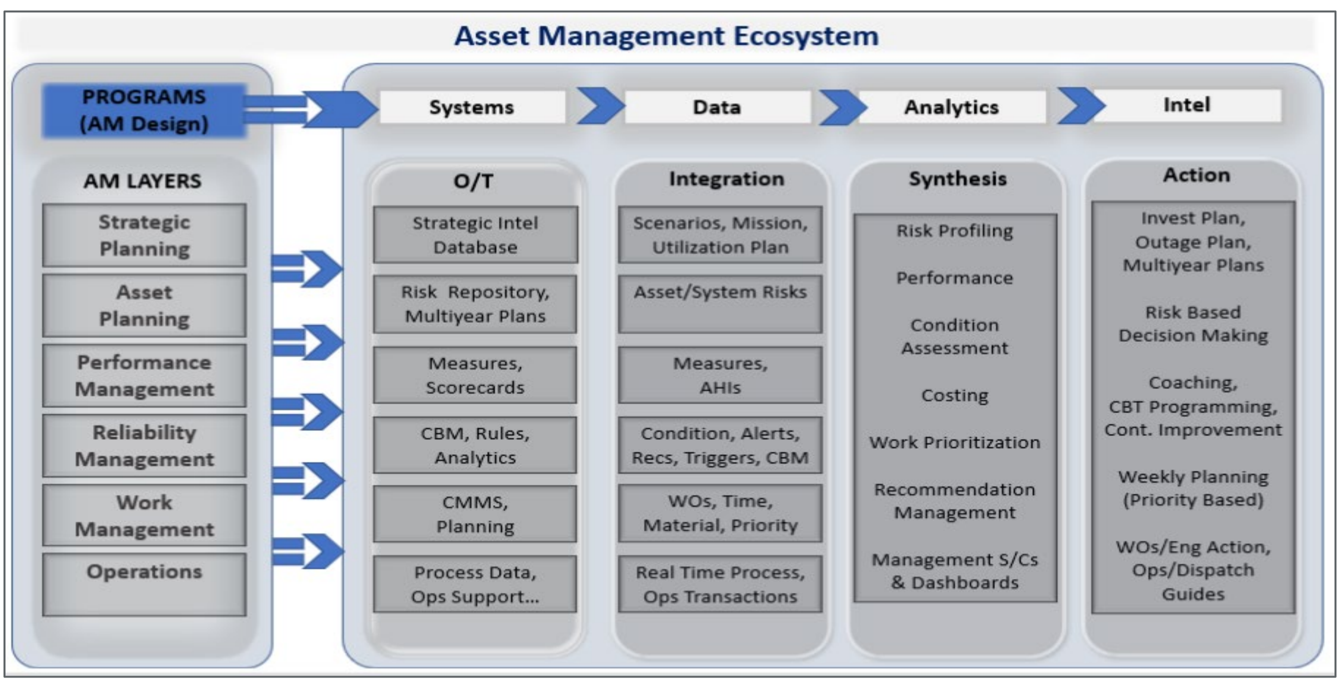
Furthermore, this same view of present risk and clear asset mission enables an organization to project risk into the future with greater precision and, therefore, make longer term plans and feed long-term strategic planning. This in turn establishes the strategic goals for next year's AM cycle.

## OPERATIONALIZING ESG: SUMMARY

AM is about establishing the processes, systems, data, analytics, and ultimately the intelligence that feeds an organization's daily, weekly, and annual decision making, as well as longer term strategic planning. This paper has provided an overview of WHAT things need to be done to build a competent AM (and ESG enabling) infrastructure.

The next paper, "Mapping Your AM Journey," is about mapping the journey for AM maturity and realizing strategic goals, such as ESG compliance or excellence. It will outline methods to assess an organization's AM present state, rate technical and non-technical factors, and use that rating to develop a roadmap toward AM development. Ultimately, for organizations that are keen to advance ESG, the roadmap should draw clear lines from AM competencies to ESG success.

The following graphics illustrate a typical AM ecosystem and an AM assessment outline, which will be used to further the discussion on "Mapping Your AM Journey."



| AM Category | AM Aspect | Overall Maturity | Category Maturity | | | | | Change Considerations | | | Roadmap |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Program | System | Data Managemnt | Analytics | Action Management | Cost | Organizational Readiness | Value | |
| Ops | Ops Rounds | 2 | 3 | 1 | 2 | 2 | 3 | Medium | Low | Medium | Staged |
| | Ops Testing | 2 | 3 | 2 | 2 | 4 | 3 | Low | Low | Medium | Staged |
| | Ops Logs | 3 | 2 | 2 | 2 | 1 | 2 | Medium | Medium | Medium | Staged |
| | Ops Shift Change | 2 | 3 | 1 | 2 | 1 | 2 | Low | Medium | Medium | Staged |
| | Competency Based Training | 2 | 2 | 1 | 2 | 1 | 1 | Medium | Low | High | Staged |
| | Historian | 3 | 3 | 4 | 3 | 2 | 1 | Low | High | High | Ongoing |
| Work Management | Equipment Master | 2 | 2 | 3 | 2 | 4 | 2 | High | Medium | Medium | Staged |
| | Work Order Design | 2 | 1 | 4 | 3 | 2 | 2 | High | Medium | Medium | Immediate |
| | PM Program | 2 | 2 | 2 | 3 | 2 | 2 | High | Low | Medium | Medium Term |
| | Planning (weekly) | 1 | 2 | 3 | 2 | 1 | 3 | Low | Medium | Medium | Medium Term |
| | Outage Planning | 2 | 2 | 2 | 2 | 1 | 2 | Low | Low | High | Staged |
| Asset Programs | Criticality | 2 | 3 | 3 | 1 | 1 | 2 | Medium | Low | High | Near Term |
| | Maintenance Strategy | 3 | 2 | 1 | 1 | 2 | 2 | Medium | High | High | Staged |
| | CBM Programs (PdM, RBI, other) | 2 | 1 | 2 | 3 | 2 | 2 | Medium | Low | High | Staged |
| | Asset Class Reliability Process | 2 | 2 | 2 | 2 | 2 | 2 | Low | Low | High | Near Term |
| | Root Cause Analysis | 1 | 3 | 3 | 2 | 1 | 2 | Low | Medium | Medium | Staged |
| | Recommendation Management | 2 | 4 | 2 | 2 | 2 | 2 | Medium | Low | High | Near Term |
| | Critical Spares | 2 | 1 | 2 | 1 | 1 | 1 | Low | Medium | Medium | Staged |
| Performance - Assets | HeatRate | 4 | 2 | 2 | 2 | 2 | 2 | Medium | Medium | High | Near Term |
| | Program | 2 | 3 | 2 | 2 | 2 | 2 | Low | Low | Low | Near Term |
| | Management Oversight | 3 | 2 | 2 | 3 | 1 | 1 | Low | Low | High | Near Term |
| Performance - Programs | Asset Programs | 2 | 1 | 1 | 2 | 1 | 1 | High | Medium | Medium | Medium Term |
| | Management Oversight | 2 | 1 | 1 | 1 | 3 | 1 | Low | Low | High | Medium Term |
| Performance - Work Effectiveness | Backlog Measures | 2 | 2 | 4 | 2 | 2 | 2 | Medium | Medium | Medium | Immediate |
| | Proactive Work Measures | 1 | 2 | 4 | 1 | 2 | 4 | High | Medium | Medium | Immediate |
| | Planned Work Measures | 2 | 1 | 3 | 1 | 1 | 1 | Low | Low | Low | Medium Term |
| | Compliance | 3 | 2 | 2 | 2 | 1 | 1 | Low | High | High | Medium Term |
| | Management Oversight | 4 | 4 | 2 | 1 | 2 | 2 | Low | Low | High | Medium Term |
| Asset Planning | Health Assessment | 1 | 2 | 2 | 2 | 2 | 2 | Medium | Medium | Low | Immediate |
| | Risk Profiles | 2 | 2 | 1 | 1 | 2 | 2 | Medium | Medium | High | Immediate |
| | Next Year Sustaining Inv. Plan | 3 | 3 | 2 | 3 | 1 | 2 | Low | Medium | High | Near Term |
| | 10 Year Sustaining Inv. Plan | 4 | 3 | 2 | 3 | 2 | 3 | Low | Medium | High | Medium Term |
| | 10 Year Major Outage Plan | 1 | 3 | 2 | 2 | 2 | 3 | Medium | Medium | Low | Near Term |
| | Process | 2 | 2 | 1 | 2 | 1 | 1 | Low | Low | Medium | Near Term |
| Strategic Asset Management | Asset Utilization Plan | 3 | 3 | 3 | 2 | 4 | 3 | Medium | High | High | Medium Term |
| | Asset Management Policy | 4 | 1 | 1 | 1 | 1 | 1 | Low | Medium | Medium | Immediate |
| | Mission Update Process | 1 | 1 | 2 | 1 | 4 | 2 | Low | High | High | Immediate |

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