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# **Market Guide for Asset Investment Planning Solutions for Energy and Utilities**

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2 November 2022

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## Market Guide for Asset Investment Planning Solutions for Energy and Utilities

Published 2 November 2022 - ID G00768991 - 18 min read

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Initiatives: Energy and Utilities Technology Optimization and Modernization

Energy and utility companies must optimize capital planning for industrial assets to better meet disruption and comply with evolving regulatory and environmental requirements. CIOs can use this research for insights on AIP vendor offerings to make informed capital investment technology decisions.

### Overview

#### Key Findings

- A multitude of factors including market volatility, geopolitical risks, regulatory scrutiny and unprecedented weather events impact short- and long-term capital planning decisions of energy and utility companies. Many of these organizations don't have modern asset investment planning (AIP) approaches to respond to these factors and optimize their capital spending.
- Capital investment decisions for critical assets have often relied on historical practices, rules of thumb and end users' recommendations processed in spreadsheets. These legacy processes are ineffective, error prone, subject to confirmation bias and often complicated. The current decision-making process is not repeatable or auditable.
- The success of AIP solutions depends on the valuation methodology to quantify a return on investment (ROI). AIP solution providers have similar core functionalities, but their suitability varies by how effectively they can map additional benefits through their AIP optimization algorithms to generate insights.

#### Recommendations

Energy and utility CIOs responsible for technology optimization and modernization must:

- Assess asset investment capability requirements against business goals, digital maturity, project success prerequisites and business outcomes by identifying functionality gaps in the existing AIP solution to support the optimization of asset-related capital spending to create systematic, robust investment planning.
- Evaluate AIP vendor offerings against your organization's short- and medium-term capital planning goals. Focus on vendors with strong solution roadmaps and a commitment to interoperability and automation to support existing legacy AIP solutions and ensure parallel implementations.
- Create a holistic strategy by seeking support from your IT and business unit leaders to define how AIP will ingest data sources and integrate with systems to extract supporting good, quality, and the right data to support capital expenditure decisions.
- Identify and map the potential quantifiable benefits (such as capital efficiency, reliable service, workforce protection and environmental decision making) expected from your organization's AIP solution. Use this list to evaluate vendors and determine a product demo focus to set the foundation for a solid business case for choosing a particular AIP.

## Strategic Planning Assumption

By 2025, 40% of energy and utilities companies will face a 50% increase in capital demands triggered by resource scarcity and soaring demands.

## Market Definition

AIP solutions provide decision support in asset-intensive enterprises by identifying and prioritizing capital investment across the life cycle of their asset base, along with future demand forecasts. AIPs collect and integrate data such as asset conditions, failure forecasts, maintenance costs, criticality, budgets and risk from many enterprise solutions including ERP, enterprise asset management (EAM), program and portfolio management (PPM), asset performance management (APM) and geospatial information systems (GIS). AIPs assemble insights to analyze cashflow, performance and reliability under various scenarios to identify optimal investment plans.

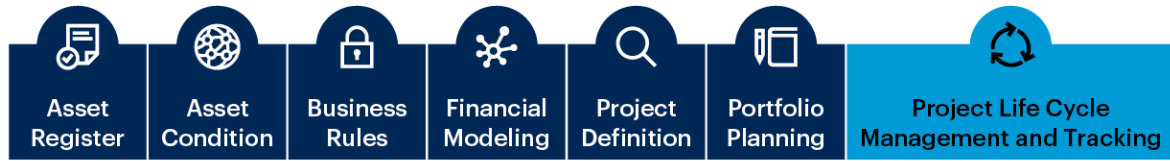
## Market Description

AIP solutions replace spreadsheet-centric approaches for analyzing spending alternatives by combining seven capabilities into a holistic solution as can be seen in Figure 1.

Figure 1: Key Capabilities of an AIP solution

## Key Capabilities of an AIP Solution

■ Must-Have Capabilities ■ Should-Have Capabilities



Source: Gartner  
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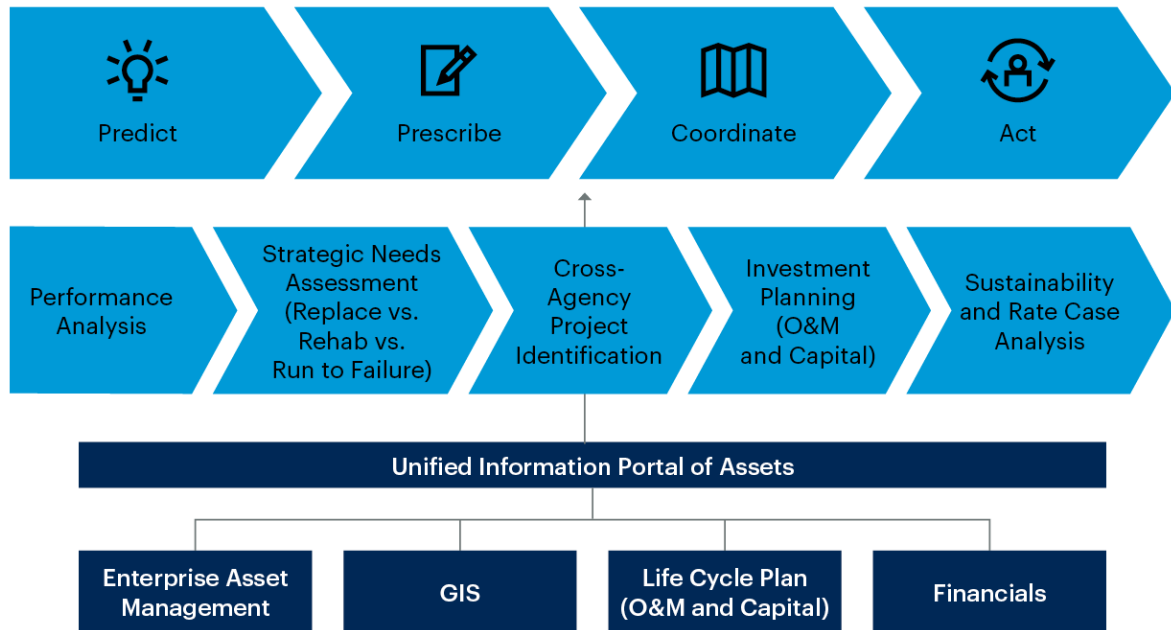
AIP solutions enable users to explore “what if” scenarios and to create a long-term investment plan that optimizes capital expenditure (capex) and operating expenditure (opex) by considering and modeling:

- Already committed investments
- Acceptable risk tolerances
- Replacement cost versus the cost of extending the life of an asset
- Recommended replacement dates for each asset
- Financial and other resource constraints
- Macroeconomic factors and regulatory requirements

AIP helps organizations make objective, data-driven decisions to optimize cost and minimize operational risk over the full economic life cycle of an asset, from predicting asset conditions, to funding for repair, reallocation or replacement. Figure 2 illustrates a typical AIP workflow.

Figure 2: Typical Workflow of AIPs

## Typical Workflow of AIPs



Source: Gartner

Note: O&M = operations and maintenance

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The key quantifiable benefits that AIP solutions offer:

- Capital efficiency
- Risk management
- Portfolio planning
- Planning efficiency
- Asset reliability
- Aligning asset investments with strategic corporate objectives
- Energy efficiency and management
- Effective environmental, social and governance (ESG) related decision making such as carbon dioxide equivalent (CO<sub>2</sub>e) reductions

- A range of financial indicators such as ROI, internal rate of return (IRR), modified internal rate of return (MIRR)
- A range of regulatory indicators such as return on regulated assets

## AIP Capabilities Rest on Data Collection and Quality

AIP is an investment decision support solution for industrial assets. It includes specific functional capabilities (organized by AIP capability) that require data collection and aggregation from other tools (such as, EAM, ERP) for the purpose of analysis (see Table 1). The seven key components of AIPs are described below.

**Table 1: Seven Core Capability Areas Provided by AIP Solutions:**

(Enlarged table in Appendix)

Capabilities	Description
Asset Register	This is a listing of all the assets in service, or planned, at a fine enough level of detail to identify them as discrete components that could be serviced, replaced or installed. These components are typically drawn down from an asset master in the ERP or EAM. The ability to build relationships between assets. For instance, the substation where a specific transformer is located and its upstream and downstream connections.
Asset Condition Assessments	These assessments measure the overall health of each asset in service, and are often drawn from the APM solution in use. They can be derived from operational data, if available, from inspections or asset degradation models that assign a condition based on an asset's vintage (date in service, make and model), utilization (if available) and failure data from other similar assets.
Business Rules	These are the organization's criteria for grading the criticality and risks associated with asset failure. Safety and reliability are the two most common criteria, and these can vary considerably from one industry to the next (for instance, water versus gas) and between types of assets within an industry.
Financial Modeling	This is the financial aspects of an organization including costs of equipment, materials, labor and contractors for different project options, which are captured and incorporated into planning alternatives.
Project Definition	This is the ability to define projects that comprise a set of assets, and the work activities needed to install, replace or repair them, enabling different options to be compared. There could be many different project options for the same or similar assets, and there could be overlap between projects as well, heightening the importance of robust data models.
Portfolio Planning	The ability to aggregate multiple projects to form a portfolio view is valuable for planning overall programs of work.
Project Life Cycle Management and Tracking	Detailed project and portfolio monitoring execution and control is its own specialized field of software. Strong API integration with PPMs ensures project visibility. Some AIP solutions have limited PPM functionalities to track planned investments and to maintain financial control. This can include stage-gate mechanisms that improve financial control over project execution.

Source: Gartner (November 2022)

Enterprises that have implemented EAM and APM have access to more robust datasets that can be used to achieve better equipment insights. This data can be used to plan upgrades/replacements and create investment scenarios. Energy and utility companies can use AIPs to rethink how they manage their assets by turning these asset data points into business insights to create long-term investment planning scenarios.

## Operating Requirements for AIPs

An EAM system with quality asset data is foundational for effective AIP deployments. Ideally, the EAM system is populated with quality historical data, for example:

- Asset vintage
- Failure rates and histories
- Maintenance activities

AIP solutions can include functionality to enrich and augment poor quality data with synthetic data where organizations face data quality challenges with legacy asset data. Operational data that is typically found in APM systems – whether from simple condition monitoring or more complex predictive analytics – can improve AIP results. Some of this data may also be configured in the EAM system.

## Market Direction

Energy and utility companies are embracing AIP solutions for their long-term capital decisions (see *Hype Cycle for Utility Industry IT, 2022* and *Hype Cycle for Oil and Gas, 2022*). The capital plans in energy and utility companies face multifaceted stress caused due to multiple factors ranging from operational to business and to unprecedented global events. The operational factors impacting AIP adoption include:

- Increased pressure to maintain physical asset integrity
- Accelerated demand for reduced environmental impact
- Energy transition
- Ongoing energy crisis and inflation
- Modernization of aging assets and infrastructure
- Increased complexities in operations

The combination of these demands, coupled with changing climate conditions and shifting consumption/production patterns, challenge capital decisions. Business-related factors, such as the 4D forces (decarbonization, decentralization, digitalization and democratization), and an aging and exiting workforce, add additional complexity to the decision tree. Global events can trigger unexpected changes such as the ongoing pandemic, the geopolitical situation (such as the Russian invasion of Ukraine), inflation and the ongoing energy crisis. This paired with regulatory and stakeholder demands for spend optimization and improved asset performance, along with timely submission of long-term capital investment plans, are fueling the growing requirement of robust AIP solutions.

Energy and utility companies are progressing in their asset strategies with an increased focus on optimizing capital spend on industrial assets; however, at a varied pace. Although the requirement for investment planning for energy and utilities is not new, the following AIP market observations will continue in 2023:

- **Limitations of existing in-house tools:** The adoption of commercial off-the-shelf (COTS) AIP applications by energy and utility companies has been limited to date. However, there has been an increasing interest to explore and evaluate COTS AIP solutions due to the range of functional capabilities and quantifiable ROI benefits provided by AIPs. This is propelled by the lack of exhaustive capabilities of in-house tools (such as spreadsheets) and the use of complementary tools such as ERP and PPM to fulfill capital decision making. While these legacy alternatives for AIP have served its purpose, it has come with a number of limitations and risks, which vendors address through their more mature, robust capabilities.
- **Confusion about the overlapping roles of ERP and PPM:** Enterprises often take a project-centric approach to achieve their capital planning goals, where end users focus on complementary horizontal solutions such as PPM and ERP for budget-centric planning. AIPs should not be confused with either of these solutions which are complementary, but are not AIP replacements. It is critical to understand that AIPs are vertical business tools that focus on the overall asset investments that may come from other sources besides the asset base, requiring a future life cycle that considers all affected assets. AIP provides more business depth into the capital needs for assets, and would integrate with ERP and PPM.



- **Cloud-based deployments of AIP dominate the market, unlike other asset-related software:** Many enterprise application markets, such as CRM and HR management, have witnessed significant adoption of cloud deployments over the last decade, and the AIP market is no different. Unlike other asset management solutions like EAM and APM, AIP deployments in cloud/SaaS environments dominate the market. Cloud- or SaaS-based AIP product versions may include more up-to-date enhancements than the on-premises versions. As vendors evolve their products leveraging artificial intelligence (AI), machine learning (ML), industrial Internet of Things (IIoT), and improved analytic techniques and tools, cloud enables improved capability, scalability and enhanced security as opposed to monolithic on-premises deployments.
- **Industry expansion:** AIP continues to expand across energy and utility subsectors and other asset-intensive industries with higher adoption rates and maturity, and it is proliferating other industries, such as water, oil and gas, transportation, facilities, public sector, and telecom. Market takeup of AIP has increased in recent years, in part, spurred by the advances in computation and analytics and big data. Advanced analytics provide more insights, allowing organizations to adjust and action their asset management strategies using tools such as AIP in capital planning.
- **ESG decision making:** It is relatively new for carbon emission estimates (and or estimation) to be part of AIP. Increasing pressures from stakeholders, coupled with sustainability goals of energy companies, are working toward reducing their overall carbon emissions from their aging leaky assets. Some AIP vendors have introduced carbon accounting (emissions) into their value functions, which are helping organizations in analyzing the impact of carbon emissions on their decision making, and consequently, supporting assessing steps to achieve net zero.

## Market Analysis

### AIP Compliments Other Tools

As the AIP market matures, there is increasing overlap driving data exchange and integration demands between AIP and EAM, AIP and ERP, and AIP and other solutions.

Asset management solutions are designed to enable efficient and optimized asset management, maintenance and planning for industrial assets. For example, EAM is an asset management transactional workflow system of record for assets. APM is a decision support tool designed to support safe, reliable and efficient operation of equipment and infrastructure. Integration of AIP with both APM and EAM is common in order to include data on asset condition, maintenance costs, criticality, budgets and risks, followed by analyzing the wrangled data to produce capital investment plans over extended time. AIP is designed to support both short- and long-term capital investment decisions. While EAM, APM and AIP are considered separate solutions markets, the technologies complement each other and provide data-sharing capabilities and bidirectional integration. Some vendors have an offering in two of the three markets (such as CGI-EAM and AIP, SAP and Oracle-EAM/APM and AIP), in some instances, overlapping each other. Few vendors have technology solutions in all three (EAM, APM and AIP). These vendors include Hitachi Energy, IPS and Siemens. Siemens recently acquired Brightly Software, who previously acquired Assetic.

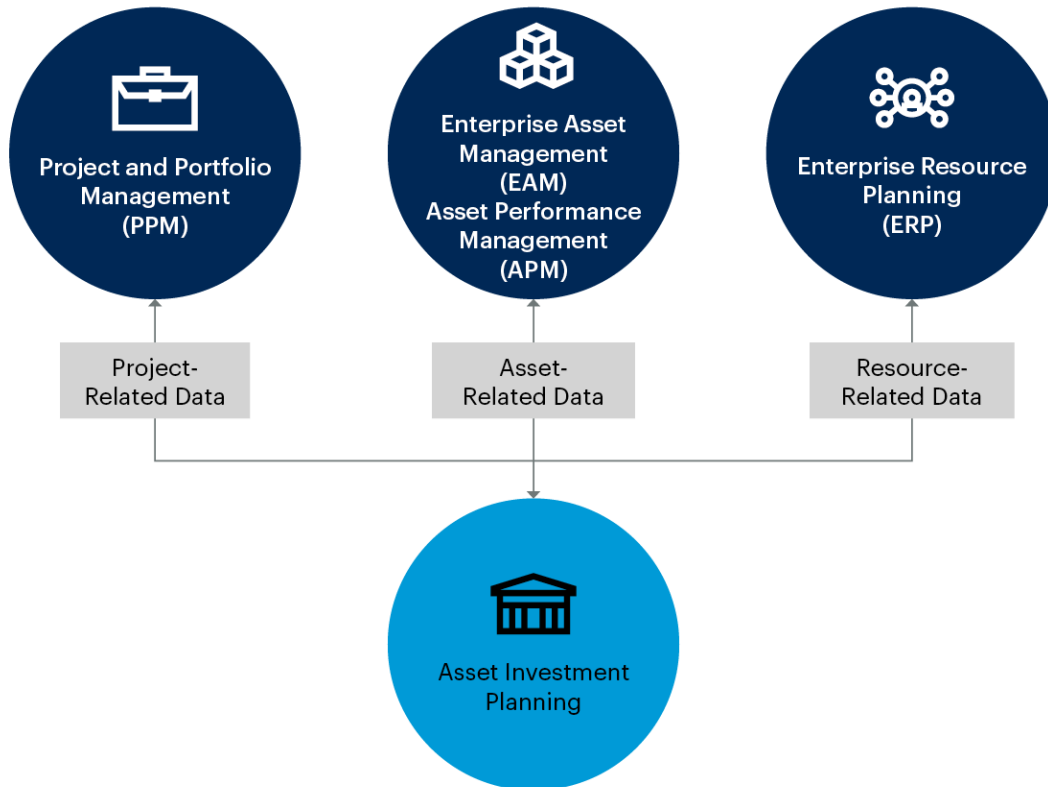
Adjacent vendor offerings create market confusion. Further, some vendors have completely separate tools, while other vendors deliver AIP capabilities as modules on top of ERP and EAM, blurring the AIP market boundary.

- **PPM solutions** are a similar adjacency to manage the process of prioritizing and executing capital investments. While, on the surface, this approach appears to be feasible, it suffers from a number of shortcomings. First, PPMs do not have capabilities to assess the collateral impacts of asset-related risks. Second, PPMs are not designed to deal with the impact of time-based risk, such as corrosion or adverse weather events on assets' expected life, which are critical for energy and utility company operations.
- **ERP solutions** provide key operational data to AIPs for optimizing performance, reducing costs and increasing the operational performance of enterprises.

The interdependencies of other systems can be seen in Figure 3.

Figure 3: AIP and Other Complementary Systems

**AIP and Other Complementary Systems**



Source: Gartner  
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**AIPs Versus In-House Tools**

The biggest competitors for AIP vendors are in-house spreadsheets that many energy and utility companies still rely on. While using spreadsheets for AIP has served its purpose, it does come with a number of limitations, including:

- The issue of spreadsheet “ownership” and the consequent complexities on collaboration and scalability
- The lack of automated data entry and aging of the data
- Exposure to data entry errors, with investment implications
- Some organizations create degradation models in-house; others outsource them or buy COTS software
- Poorly implemented adjacent systems such as EAMs and APMs

- The lack of purpose-built analytical tools for filtering inputs, calculating asset life cycles and performing “what if” analysis
- A static view of assets and their condition
- Time- and resource-consuming planning processes
- Limited auditability
- Poor repeatability of decision-making process
- Unmanaged data quality
- Security issues
- Data synchronization challenges as data integration from multiple systems is required

## Representative Vendors

*The vendors listed in this Market Guide do not imply an exhaustive list. This section is intended to provide more understanding of the market and its offerings.*

### Market Introduction

AIP solutions must demonstrate that they are native (stand-alone) products offered by the vendor (see Note 1). Table 2 displays details of the representative vendors in asset investment planning included in this research.

**Table 2: Representative Vendors in Asset Investment Planning**

(Enlarged table in Appendix)

Name of Vendor	AIP Solution/Offering
Arcadis Gen (SEAMS)	Enterprise Decision Analytics
Asset Investment Manager	AIM
CGI	CGI OpenGrid Asset (Asset Investment Planner module)
Copperleaf	Copperleaf Suite
Cosmo Tech	Cosmo Tech Asset
DIREXYON	DIREXYON Suite
IPS	IPS Asset Investment Planning (AIP)
Ovarro	PIONEER
Oxand	AIP
PowerPlan	PowerPlan Asset Investment Optimization
Siemens (Brightly Software)	Assetic

Source: Gartner (November 2022)

## Market Recommendations

CIOs of energy and utility companies with extensive asset bases should explore AIP solutions to plan and optimize long-term capital allocation decisions. AIPs can support the ability to make asset investment decisions based on transparent data and extensive scenario testing to optimize asset investment in a cost-effective manner (both time and staffing) in a **repeatable auditable process** that disparate legacy in-house solutions cannot.

Asset-intensive companies evaluating AIP solutions should consider a number of criteria, including:

- **Robust asset management strategy:** This includes the need to develop or enhance a strategic asset management plan (SAMP) that drives business capability planning that requires support from an AIP solution(s).

- **Enterprise digital maturity:** Not all organizations are mature enough to invest in AIP. In some instances, there may be immature digitalization, business capability or asset management processes; significant data gaps and inconsistencies; or no standard asset system of record (EAM/CMMS). In these situations, the better investment may be to upgrade or consolidate the existing EAM system footprint and/or invest in data management and cleansing.
- **Industry experience and regulatory requirements:** The vendor's experience in a particular industry subsector should be considered, especially keeping in mind the regulatory obligations. For example, in the case of energy companies, the regulations and standards (some of which are listed in Note 3) vary for power generation companies, electric transmission, electric distribution, gas distribution utilities and retailers, oil and gas companies, and consequently, to water or wastewater utilities. Evaluate the AIP vendor's track record with case studies depicting their respective AIP's quantifiable ROIs that match your specific AIP needs and ensure they adhere to regulatory requirements and are capable of comprehending your unique way of operating.
- **Functional capability:** While each vendor will claim its solution provides all the functional capabilities required for long-term capital decision making, the proof resides in existing deployments. Does the vendor have specific client references with successful deployments?
- **Data quality and management:** Use AIP to take a more data-centric approach for capital investment decisions, if needed. Assess the quality of existing asset data and the ability of the solution to deal with nonexistent or imperfect data. Most of the available solutions have some ability to cleanse incoming data, but the quality of the output will vary.
- **Integration requirements:** This includes integration requirements and existing interfaces delivered by the vendor. AIP solutions are dependent on data stored in other systems – most prominently, but not limited to EAM systems – and the vendor's experience working with these systems. The availability of prepackaged interfaces can impact project cost and support requirements.

## Evidence

Gartner received vendor briefings and associated material from AIP vendors (most have global reach, but some are only regional) from January through August 2022. Gartner also reviewed secondary research sources for information on market trends and vendor activity.

Gartner analysts acquired insights from several hundred asset-intensive companies for selecting an AIP solution through the Gartner inquiry process. These provided directional support for opinions derived from earlier data.

## Note 1: Representative Vendor Selection

For this Market Guide, we evaluated the most prominent AIP products for large-scale, asset-intensive industries worldwide, based on industry relevance, client interest and customer base. Software products must address most functional capabilities listed in Table 1. AIP products must demonstrate that they are native (their own IP) and stand-alone products (able to be sold and deployed separately to other software) offered by the vendor. They should be able to demonstrably integrate with multiple EAM products. They should also have a proven track record in asset-intensive organizations, and they should cover multiple geographies and industries. There are many other vendors in this category that were not evaluated or included, either because of the inclusion criteria or information was not available at the time of assessment and publication.

## Note 2

This Market Guide provides Gartner's initial coverage of the market and focuses on the market definition, rationale for the market and market dynamics.

## Note 3

### Standards

The same asset life cycle is found in the ISO 55000 suite of standards that sets out asset management and asset management systems in three parts:

- ISO 55000 sets out the fundamentals from maintenance to value creation.
- ISO 55001 sets out the asset management systems with a series of compliance statements.
- ISO 55002 sets out some general guidance.

There are other complementary, but separate, asset management systems – EAM and APM. These systems are not assessed in this research, but it is important to understand the relationship within the asset flow:

- **EAM:** AIP should have integration with the EAM system for the asset register in all levels of functional capabilities listed above in Table 1. Some EAM vendors have an AIP product strategy; many rely on partnerships with AIP vendors. Sourcing an AIP solution that is compatible with your EAM solution provides more ready-to-use integration (see Market Guide for Enterprise Asset Management Software).
- **APM:** APM integration with AIP is common for including data on asset condition, maintenance costs, criticality, budgets and risks, which then is analyzed to produce capital investment plans over extended time. This integration and solution set is increasingly deployed most heavily by local governments, utilities, oil and gas, transportation, facilities, and telecom, and is of interest to manufacturing and healthcare industries (see Market Guide for Enterprise Asset Management Software). APM is a decision support tool designed to support safe, reliable and efficient operation of equipment and infrastructure.
- **Others:** Platforms that provide APM capabilities through a combination of both native capabilities and third-party product integration partnerships.
- **ERP:** Optimize performance, reduce costs and increase operational performance through ERPs.
- **PPM:** Manage the process of prioritizing capital investments using PPM tools.

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