INFOGRAPHIC REPORT

3 The defining decade: challenges for the nuclear industry

Challenge #1: Governments have great ambitions, but limited budgets

At COP28, 22 heads of state committed to tripling nuclear energy capacity worldwide. Achieving this objective will not be easy. It will require building a large number of new reactors on-time and on-budget, a challenge that has proven particularly complex in the past. Meeting this demand will depend in part on the successful delivery of the 60 reactors currently under construction and the 110 reactors in planning. New technologies such as small modular reactors (SMRs) can play a role, but their contribution remains difficult to quantify.

x3

22 governments have committed to triple nuclear energy capacity by 2050

31

is the median age of the world's nuclear plants

Challenge #2: Aging plants will represent a financial burden on operators

While the average nuclear plant is 31 years old globally, this figure can mask important regional disparities: 80% of China's plants have been built in the last 10 years, while 80% of reactors in the EU and the US are more than 30 years old.

In Western countries, challenges related to maintenance, extension, corrosion and decommissioning will take center stage, placing a significant financial burden on operators: more than 200 reactors are expected to start decommissioning by 2040.

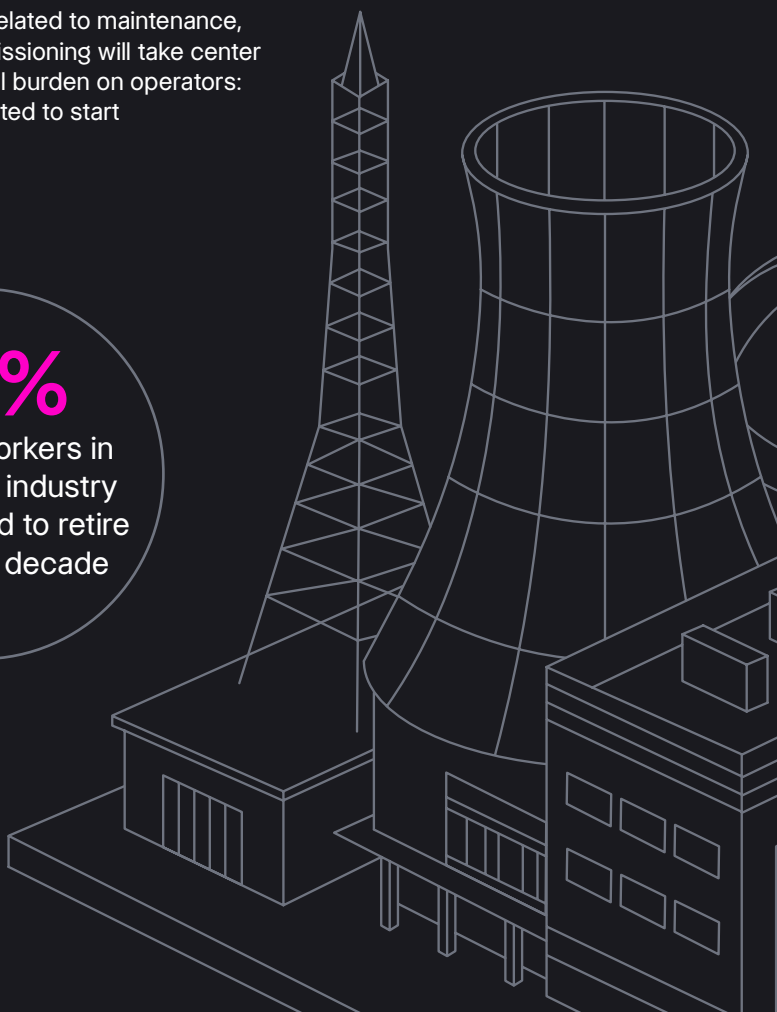
Challenge #3: The great retirement will worsen skill shortages

According to McKinsey, achieving global nuclear capacity objectives would require the nuclear industry's global workforce to grow to 5 million people.

Several major challenges stand in the way. The industry's workforce today is rapidly aging, with one in four workers expected to retire in the next decade. Second, finding large numbers of specialized workers with industry experience, such as welders or pipefitters, is increasingly difficult – a challenge that has led several operators to start large training programs.

25%

of global workers in the nuclear industry are expected to retire in the next decade



3 digitalization challenges for companies in the space

	Possible symptoms	Consequences
Complexity of new projects, leading to delay and budget overruns	• Highly complex projects that involve complex supply chains, rare skills and specialized manufacturing • Varying nuclear-specific regulations and complexities make it difficult to leverage learnings from other projects • Large number of stakeholders with contractual arrangements that do not match the risks	• Frequent delays and cost overruns • Poor public perception • Low replicability across projects
Lack of software integration across the plant lifecycle	• Specialized, scattered industry-specific software • Different evolving codes and regulations • Risk of information loss between project phases • Difficulty in connecting various sources of data, such as SCADA systems, PLCs or the company's ERP	• Silos and challenges in accessing important information, leading to wasted time and resources • Difficulties in measuring performance, improving maintenance practices or conducting change
Lack of digitalization in operations and maintenance	• Limited digitalization of and difficult access to critical procedures • Maintenance interventions are reactive and not data-driven • High volumes of manual and clerical work and low levels of automation (e.g. for work orders) • Communication issues between teams leading to delays and errors	• Poor maintenance scheduling • Increased outages, downtime and reliability issues • Low productivity of maintenance workers • Subject-matter experts acting as bottlenecks

3 key solutions for a data-driven nuclear plant

Enterprise project performance (EPP) addresses the nuclear industry's project woes

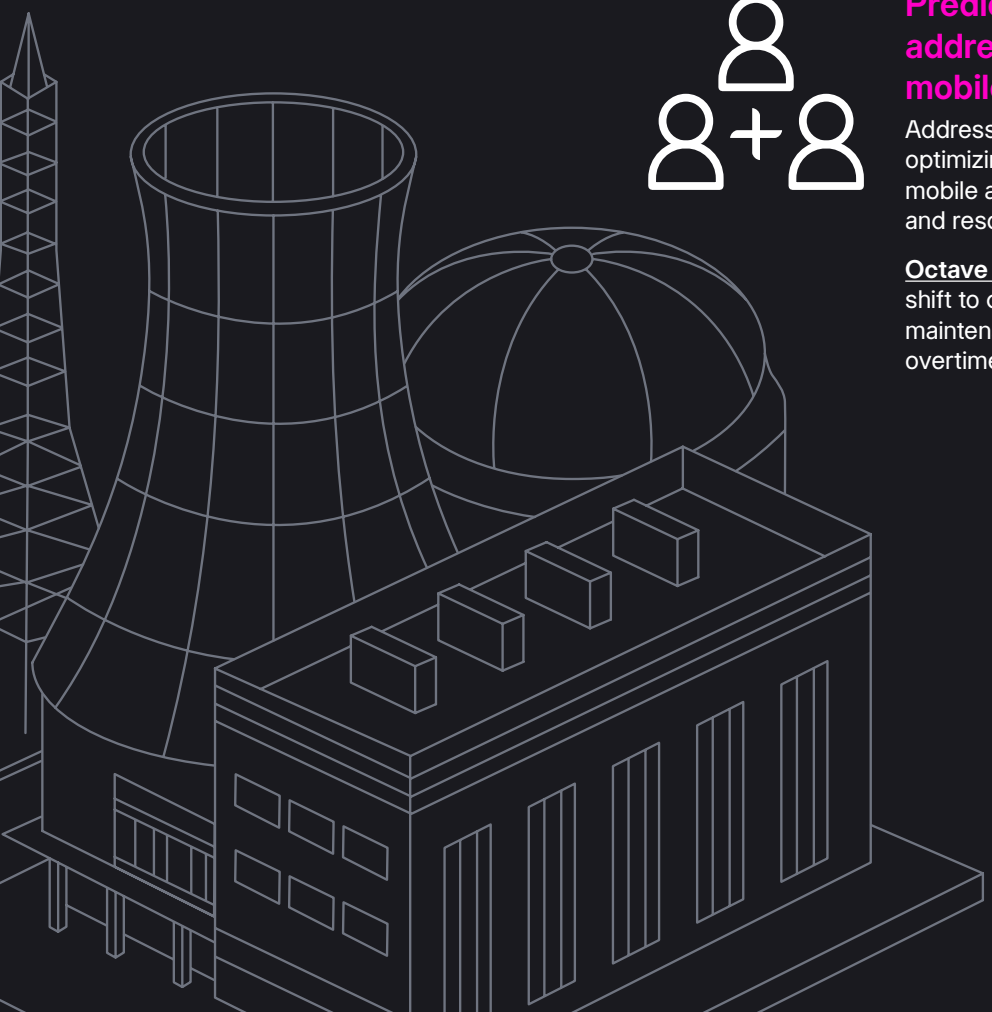
EPP integrates all project portfolio management and project management processes, including risk analysis, resource planning, estimating and cost control, into one single product.

Octave Sequence Enterprise (formerly EcoSys) helps address issues that commonly plague nuclear projects, such as data silos, lack of visibility across multiple projects with common resources and low collaboration. It also helps avoid waiting until construction to identify issues that originated during the design or procurement phases of the project. As a result, it contributes to effectively bridging strategy and execution, maximizing returns and margins and avoiding project delays.

Operational processes such as shift handovers get a much-needed update

Even as older generations exit the workforce, some operational processes, such as inspections and shift handovers, continue to rely on outdated practices.

Octave Tempo Operations Management (formerly j5 Operations Management Solutions) is the perfect solution for companies struggling to abandon a culture of paper and spreadsheets. Its intuitive and flexible interface helps achieve rapid user adoption, improved information flows and reduced risks.



Predictive maintenance helps address skill shortages and empower mobile workers

Addressing the shortage of maintenance workers requires optimizing schedules and interventions while providing mobile access to relevant asset information to save time and resources.

Octave Attune EAM (formerly HxGN EAM) supports the shift to data-driven nuclear plants and predictive maintenance – delivering 30 to 50% gains in maintenance overtime, labor and contractor costs.

Learn more about how Octave can help to elevate the quality, efficiency and safety of your nuclear power plant.

octave.com

©2026 Octave Intelligence plc and/or affiliates. All rights reserved.