

Overcoming the challenges of aging advanced manufacturing facilities

Modernize your real estate portfolio to meet talent, cost-cutting and sustainability goals

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Aging facilities guide

The U.S. advanced manufacturing sector is facing a significant aging infrastructure challenge, with half of plants now between 30 and 60 years old. The problems are pervasive: years of deferred maintenance have left many such buildings with leaky roofs, outdated electrical systems, and obsolete equipment. These issues extend beyond mere cosmetic concerns and are threatening companies' ability to remain competitive amid a U.S. advanced manufacturing resurgence.

Whether your advanced manufacturing business is striving to modernize production in your current facilities or looking to relocate or expand, aging building stock presents multifaceted challenges. This guide provides an overview to help you navigate these obstacles to create a more resilient and future-proofed real estate portfolio.

Key takeaways

- Many older facilities are in poor condition, presenting significant business risks to advanced manufacturers, including production disruptions, weaker profits, and employee recruitment and
- Smart strategies, such as renovations to improve energy efficiency and enhance the employee experience, can help advanced manufacturers maximize the potential of their current facilities.
- When selecting new advanced manufacturing sites in a market dominated by aging inventory, companies should carefully weigh the pros and cons of building from the ground up versus redeveloping brownfield sites. Brownfield sites can offer quicker access to critical infrastructure such as power, but they also present more risks compared to to greenfields.
- Adopting a portfolio-wide approach to facility management can lead to significant long-term cost savings and improved operational efficiency.
- Embracing Industry 4.0 technologies and sustainable practices is crucial for future-proofing advanced manufacturing facilities.



Common issues in older manufacturing facilities

- Leaky roofs
- Ineffective insulation
- Poor air quality
- Outdated production equipment
- Inefficient layouts
- Narrow column spacing
- Uneven slabs
- Antiquated electrical and mechanical systems
- Inadequate loading docks
- Insufficient power capacity for modern machinery
- Lack of digital infrastructure for smart advanced manufacturing
- Non-compliance with current safety and environmental regulations

Understanding the cost of aging facilities

The recent regionalization trend across the American advanced manufacturing landscape has spurred a flurry of new development, with the amount spent on advanced manufacturing construction having tripled over the last four years. However, old inventory still dominates the sector. The average age of advanced manufacturing facilities in the U.S. is 51 years, highlighting the urgent need for modernization.

Prioritizing short-term profit margins has led advanced manufacturers to cut operations and maintenance budgets. As a result, many aging buildings suffer from inadequate upkeep, resulting in facility issues that range from decreased productivity to safety and compliance violations. These problems have far-reaching impacts across the business, such as:



Production uptime

Unexpected failure of critical building systems can impact worker productivity or even shut down production lines, leading to significant financial losses.



Safety

Poorly maintained facilities introduce many safety hazards, putting workers at risk and potentially causing Occupational Safety and Health Administration (OSHA) violations. This not only endangers employees but can result in costly fines and legal issues.



Employee experience

Dilapidated buildings create poor working conditions that can affect employee morale, productivity and overall job satisfaction. This is a significant concern, as the U.S. advanced manufacturing resurgence has made talent attraction and retention a top priority for many companies, particularly as their legacy workforces retire and new advanced manufacturing techniques and technology require highly skilled labor.



Sustainability

Older buildings typically consume lots of energy, making it difficult to achieve sustainability goals. Many plants do not have measures to capture comprehensive energy and emissions data, which is becoming increasingly important as states like California introduce new emissions-reporting regulations. Companies may face compliance issues and potential fines if they fail to meet these new standards.



Profit margins

While delaying renovations and preventative maintenance can reduce costs in the short term, it often leads to higher costs down the line for emergency repairs, cutting into profits. The cumulative effect of deferred maintenance can significantly impact a company's bottom line over time.



Reputation

For companies striving to position themselves as innovative and cutting-edge, an outdated advanced manufacturing facility can clash with brand goals. Moreover, safety incidents resulting from deferred maintenance can have far-reaching consequences, including negative publicity and loss of consumer trust.

Energy inefficiency

Older buildings typically have poor insulation, outdated HVAC systems, and inefficient lighting, leading to unnecessarily high energy bills. This not only increases operational costs but also contributes to a larger carbon footprint.

Insurance premiums

Insurers may charge higher premiums for older facilities due to increased risk of equipment failure, accidents, or property damage. This additional cost can further strain budgets and reduce profitability.

Compliance costs

As regulations evolve, older facilities may require significant upgrades to meet new standards, particularly in areas like environmental protection and worker safety. The cost of these upgrades can be substantial and may come with tight deadlines for implementation.

Lost productivity

Outdated layouts and equipment can slow down production processes, reducing overall efficiency. This can result in longer lead times, increased labor costs, and reduced competitiveness in the market.

Technology integration

Implementing modern advanced manufacturing technologies in outdated facilities can be more complex and costly than in purpose-built modern structures. This can hinder a company's ability to adopt Industry 4.0 practices and maintain competitiveness.

Demand for advanced manufacturing space in the U.S. is likely to remain strong as the domestic advanced manufacturing resurgence continues. Outdated facilities will increasingly require significant updates to meet the demands of modern advanced manufacturing processes, improve energy efficiency, and maintain competitiveness in a rapidly changing industrial landscape.



Breathing new life into old facilities

When facing a mountain of deferred maintenance, advanced manufacturers may find the idea of starting fresh in a new facility appealing, but it is not always an option. Constructing a modern new facility can be cost-prohibitive and disruptive, and making the most of your current space is often the more sustainable choice.

However, staying put doesn't need to mean settling for a dilapidated building. There are many ways to update older buildings and manage them more efficiently and cost effectively.

The best place to start is by assessing the current state of your facilities. Once you understand the age and condition of all equipment and building features, you can create a plan to tackle the biggest issues. To make a substantial impact:



Save energy by going after the low-hanging fruit: It can be surprisingly inexpensive to reduce energy costs and support sustainability goals. For example, installing LED lighting and sealing leaks typically do not require a big investment — and are often offset by lower utility bills. Consider implementing smart building systems that can automatically adjust lighting and HVAC based on occupancy and time of day.



Prioritize sustainability: Reducing energy use is not the only sustainability fix. Zero-waste and water conservation initiatives support corporate sustainability programs and can help reduce costs. Consider adding rainwater harvesting systems, installing low-flow fixtures, and exploring renewable energy options like solar panels or wind turbines where feasible.



Adopt predictive maintenance and proactive replacement: Predictive maintenance strategies involve using technologies to monitor equipment for early warning signs, such as abnormal vibrations or temperature changes, and then proactively addressing issues before they arise. This approach is proven to extend equipment lifespans, reduce unexpected downtime, and reduce operating expenses and capital expenditures.

It is common for older buildings to require major investments – such as new roofs or HVAC systems – and you should not wait for them to fail before replacing them. Such a "run-to-fail" approach with critical assets can cause business disruptions and require costly emergency replacements. Instead, create a capital plan based on the expected life and current condition of each system or piece of equipment. This enables you to budget for the expenses and thoughtfully plan for replacement to mitigate disruptions.



Champion safety: A robust safety program helps employees feel that their employer cares about them, supporting talent retention. In addition to promptly addressing potential safety issues in the facility, plant managers can foster a stronger safety culture through communications campaigns, awards, and other initiatives. Consider implementing regular safety training sessions, creating a safety committee with employee representatives, and using technology like wearable devices to monitor and improve workplace safety.

Invest in the employee experience: Advanced manufacturers operating in older buildings must be able to effectively compete for talent with companies that can offer their workers bright, beautiful new facilities. To design better employee experiences:

- **Fix any climate control and ventilation issues** that create an uncomfortable working environment.
- **Upgrade your break room, cafeteria, and restrooms** to provide comfortable, functional, and welcoming spaces.
- **Add amenities** that matter to the workers you are trying to attract, such as prayer rooms or mothers' rooms.
- **Implement health and wellness programs,** including healthy food options in the cafeteria and enhanced wellness benefits.
- **Create outdoor spaces for breaks and relaxation,** such as gardens or walking paths.
- **Offer on-site fitness facilities** or partnerships with local gyms.
- **Provide comfortable and ergonomic workstations** to reduce physical strain and increase productivity.

In addition to physical upgrades, technological ones can breathe new life into aging facilities:

Internet of Things (IoT) sensors: Deploy IoT devices throughout the facility to monitor equipment performance, energy usage and environmental conditions in real-time. This data can be used to improve operations and predict maintenance needs.

Digital twins: Create virtual replicas of your facilities to simulate process changes, enhance layouts and predict maintenance needs before implementing them in the real world. This can significantly reduce the risk and cost associated with facility upgrades.

Augmented reality (AR): Equip maintenance teams with AR devices to access real-time information about equipment, improving repair efficiency and reducing downtime. This can be particularly useful for complex machinery or in situations where expert guidance is needed remotely.

Artificial intelligence (AI): Introduce AI-driven systems to analyze production data and suggest improvements in real-time, helping to maximize the efficiency of existing equipment and processes. This can lead to significant improvements in productivity and quality control.

Robotics and automation: Add collaborative robots and automated systems to work alongside human workers, increasing efficiency and reducing physical strain on employees.

Advanced analytics: Use big data analytics to gain insights into production processes, supply chain efficiency and predictive maintenance needs.

The benefits of a portfolio-wide approach

Forward-thinking manufacturers know they need to modernize outdated facilities. However, it can be challenging to know where to begin or make time to plan when plant managers are laser-focused on running day-to-day business operations.

For companies with large real estate portfolios, reviewing all sites at the corporate level is often a smart first step. By gaining a comprehensive understanding of the conditions across all facilities, you can prioritize sites in urgent need of investment and identify ways to support and incentivize plant managers in tackling backlogs of deferred maintenance issues.

Additionally, companies can achieve significant cost savings by negotiating volume discounts with vendors and applying consistent design standards across their portfolios. For example, if you know that the office space in most of your factories will require updates within the next few years, you can hire one architect to create a common design for all facilities and standardize furniture to get better pricing. Each renovation project will be faster and less costly with a repeatable process.



Benefits of a portfolio-wide approach include:

- Economies of scale in procurement and implementation
- Standardization of best practices across all facilities
- Improved data collection and analysis for informed decision-making
- Better allocation of resources based on portfolio-wide priorities
- Enhanced ability to implement company-wide sustainability initiatives
- Increased leverage in negotiations with suppliers and service providers

Case study: Transforming advanced manufacturing facilities with centralized facilities management

For a global HVAC manufacturer, all facilities management (FM) technology, data collection, and decision-making occurred at the plant level, creating obstacles for organization-wide analytics, governance, efficiencies, and innovation. Within this decentralized structure, some sites were underfunded and understaffed, leading to poor equipment conditions.

The advanced manufacturer partnered with JLL to turn things around. Together they created an integrated FM platform, with a central team overseeing all sites. The client quickly began reaping the benefits of the partnership, saving $2.25 million annually.

Individual facilities are seeing benefits, too. At one underfunded site, for example, JLL partnered with the company to increase staffing levels and began self-performing several maintenance projects, saving money, and avoiding costs while improving conditions.

Key outcomes of the centralized approach:

- Standardized maintenance procedures across all facilities
- Improved data collection and analysis for better decision-making
- Enhanced ability to prioritize and address critical maintenance issues
- Increased operational efficiency and reduced downtime
- Better alignment of facility management with overall business objectives





Navigating a market of aging inventory

While many companies are updating their aging facilities to stay competitive, some are also looking for new sites to expand their operations, optimize supply chains, or access new labor pools. In many cases, the aging building inventory in the U.S. is complicating those searches — particularly in historical advanced manufacturing hubs.

In metropolitan areas such as Chicago, Detroit, Los Angeles and New Jersey, a significant portion of the advanced manufacturing inventory is more than 30 years old. These markets will increasingly require updated facilities capable of integrating advanced technologies to enhance productivity, efficiency and adaptability as the current inventory ages.

Despite the deteriorating condition of many older buildings, second-generation manufacturing plants are in high demand as companies race to get new facilities up and running quickly. Theoretically, moving into an existing building can be quicker than building from the ground up, but that depends largely on the building's condition.

Adaptive reuse strategies for advanced manufacturing

When considering older buildings for advanced manufacturing use, companies can explore adaptive reuse strategies to transform nontraditional spaces into modern production facilities:

- **Warehouse-to-manufacturing conversion**
  Many warehouses offer high ceilings, open floor plans and robust electrical systems that can be adapted for advanced manufacturing use. These spaces often require less extensive renovations and can be quickly transformed to meet advanced manufacturing needs.

- **Office-to-manufacturing transformation**
  In some urban areas, vacant office buildings can be converted into light manufacturing spaces, particularly for industries like electronics or medical device production. This approach can breathe new life into underutilized urban spaces and provide advanced manufacturers with prime locations close to talent pools.

- **Retail-to-manufacturing adaptation**
  With the decline of traditional retail, some large retail spaces can be repurposed for advanced manufacturing, especially in areas with good transportation access. These spaces often come with ample parking and loading areas, which can be advantageous for advanced manufacturing operations.

- **Mixed-use developments**
  Consider integrating advanced manufacturing space with other uses like offices or R&D facilities to create a more dynamic and efficient environment. This approach can lead to improved collaboration between different departments and create a more attractive work environment for employees.

When considering adaptive reuse, it is important to:

- Conduct thorough structural and environmental assessments
- Evaluate zoning regulations and obtain necessary permits
- Consider the long-term flexibility of the space for future expansion or changes in production needs
- Assess the availability of skilled labor in the area
- Evaluate the potential for energy efficiency upgrades and sustainability improvements

Site selection decision: brownfield vs. greenfield

Deciding whether to build a new plant on a greenfield site or purchase an existing building — often referred to as a "brownfield" site — typically boils down to two primary factors: time and money.

Buyers must conduct extensive due diligence on existing buildings to determine the cost and time required for renovations and whether the site is suitable for the intended use. Some issues could be too difficult to overcome, such as low ceiling heights, uneven slabs or conflict with neighbors. Additionally, there is always the risk that unforeseen conditions may not be discovered during due diligence.

In contrast, greenfield sites present a blank slate to develop a project. They can be fully customized and often are located on large plots of land that allow for future expansion, in areas welcoming to new development. Although there is always some degree of risk with a greenfield site, it is far lower than the risks associated with brownfields, making it easier to achieve an accurate development timeline and budget.

However, brownfields offer the advantage of having key infrastructure in place, such as roads, power, and water. With the U.S. electric grid increasingly constrained, having power capacity in place can save significant time compared to building on a greenfield site.

If speed-to-market is crucial, the following questions can help determine if an aging structure is suitable for your business:

- Is the structure in good condition?
- Is the layout conducive to your advanced manufacturing processes?
- Can the roof structure support rooftop-mounted equipment if needed?
- Does the site have the appropriate electrical capacity and other utilities in place?
- Is the site located near major roads, rail, or other transportation infrastructure?
- Are the existing lots and roads large enough to accommodate your processes, vehicles, and storage needs?
- Does the site offer possibilities for future expansion?
- Is major equipment, such as the HVAC system, in good enough condition to avoid a replacement expense?
- Are there any environmental concerns or contamination issues that need to be addressed?
- How does the site align with your long-term sustainability goals?
- What is the availability of skilled labor in the area?
- Are there any local incentives or tax benefits for redeveloping the site?

Spotlight: Getting a jumpstart with a second-generation site

Many advanced manufacturers choose second-generation facilities to get their operations up and running faster. For example, Ingrasys Technology, a subsidiary of Foxconn specializing in cloud infrastructure, recently acquired a six-building tech campus in Sunnyvale, California, that originally served as Fujitsu's headquarters after completion in 1974. The company is able to use some of the buildings for immediate needs while they build out the rest of their facilities.

This approach allows Ingrasys to:

- Quickly establish a presence in a key tech hub
- Leverage existing infrastructure and utilities
- Gradually modernize the facility while maintaining operations
- Potentially benefit from local incentives for revitalizing an older property

Ready to future proof your manufacturing portfolio?

As you modernize your facilities, it is crucial to consider not just current needs but also future trends in advanced manufacturing:

Industry 4.0 readiness

Ensure that facility upgrades include the necessary digital infrastructure to support advanced automation, data exchange and cyber-physical systems. This may involve installing high-speed internet connections, setting up secure cloud systems, and implementing IoT sensors throughout the facility.

Flexibility and modularity

Design spaces that can be easily reconfigured to accommodate changing production needs and modern technologies. Consider using movable partitions, modular workstations and adaptable conveyor systems that can be quickly rearranged as needs change.

Sustainable advanced manufacturing

Incorporate green building practices and circular economy principles into facilities design and operations to meet increasing environmental regulations and consumer demands. This could include installing renewable energy systems, implementing water recycling systems, and using sustainable building materials.

Collaborative spaces

Create areas that foster innovation and collaboration between different departments and external partners. These might include open-plan office areas, innovation labs or even on-site coworking spaces for suppliers and partners.

Advanced materials

Consider how emerging materials like composites or nanomaterials might impact future production processes and facilities requirements. This may involve designing spaces with enhanced ventilation systems, specialized storage areas or dedicated testing facilities.

Additive manufacturing integration

Plan for the potential expansion of 3D printing and other additive manufacturing technologies in your production lines. This might require spaces with specific power requirements, climate control, or material handling capabilities.



Cybersecurity infrastructure

As advanced manufacturing becomes increasingly digitized, ensure that your facility has robust cybersecurity measures in place. This includes secure server rooms, advanced firewall systems, and segregated networks for different operational areas.

Employee well-being

Design spaces that prioritize employee health and satisfaction. This could include natural lighting, ergonomic workstations, on-site fitness facilities, or outdoor break areas.

Smart energy management

Implement advanced energy management systems that can optimize power usage, integrate renewable energy sources, and potentially participate in demand response programs with local utilities.

Supply chain integration

Consider how your facility design can support more integrated supply chain operations, such as dedicated spaces for supplier quality checks or co-located inventory management.

By considering these future trends, advanced manufacturers can ensure that their facilities investments remain relevant and competitive in the long term.

Modern manufacturing requires modern facilities to thrive. Updated infrastructure is not simply a nice-to-have benefit — it's essential for companies to compete for talent, operate efficiently and safely, and adapt to new advanced manufacturing processes.



Implementing a comprehensive modernization strategy

To effectively modernize your advanced manufacturing facilities, consider the following steps:



Conduct a comprehensive assessment
Engage experts to thoroughly evaluate your current facilities, identifying areas for improvement in terms of efficiency, safety, sustainability and future readiness.



Develop a long-term vision
Create a clear vision for your future advanced manufacturing operations, taking into account emerging technologies, market trends, and sustainability goals.



Prioritize investments
Based on your assessment and vision, prioritize modernization efforts. Focus on areas that will provide the most significant impact on productivity, efficiency and employee satisfaction.



Create a phased implementation plan
Develop a staged approach to modernization that allows for continuous operations while upgrades are being made.



Secure funding
Explore various funding options, including traditional financing, government incentives and partnerships with energy companies or technology providers.



Engage employees
Involve your workforce in the modernization process. Their insights can be valuable, and their buy-in is crucial for successful implementation.

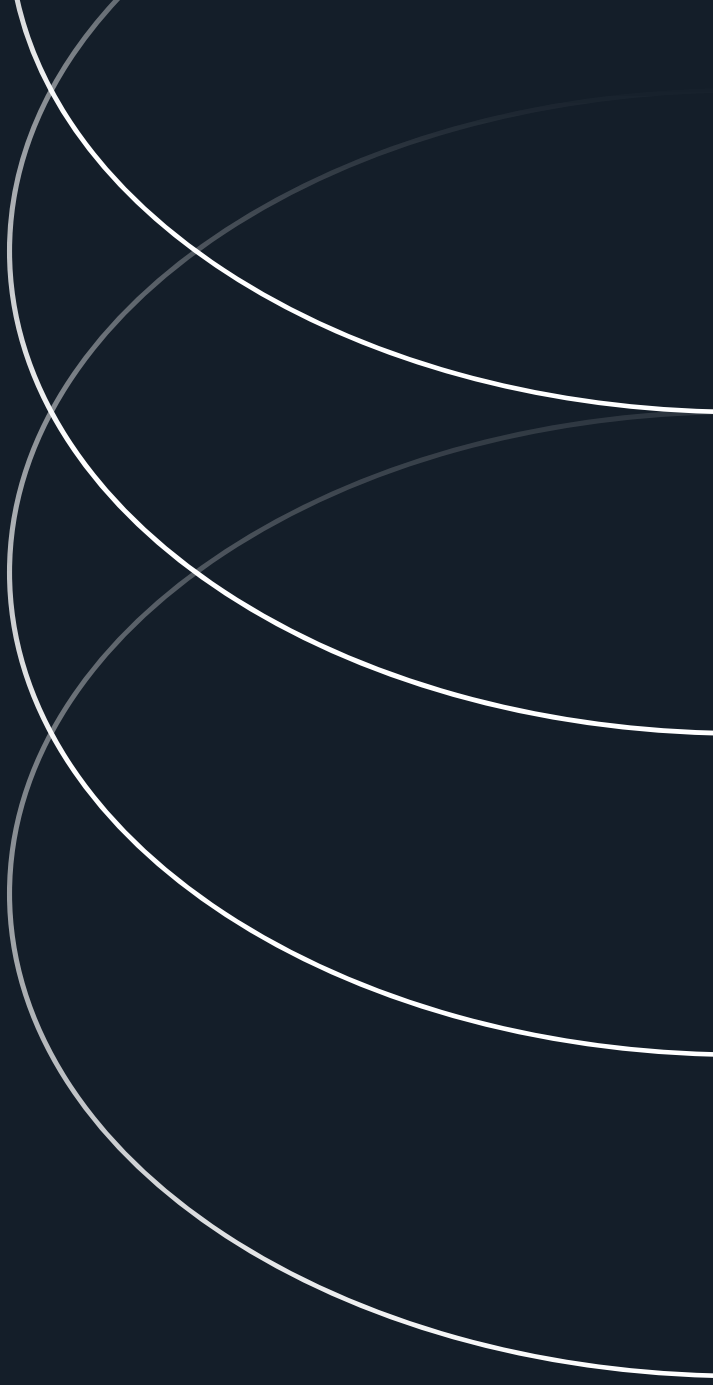


Monitor and adjust
Continuously monitor the results of your modernization efforts and be prepared to adjust your strategy as modern technologies emerge or business needs change.

JLL helps some of the world's largest advanced manufacturers operate their real estate more efficiently and effectively. Our global, vertically integrated team includes specialists in capital planning, transaction management, site selection, facility management, project management, sustainability, design, supply chains, and more. Our comprehensive approach ensures that your advanced manufacturing facilities not only meet today's needs but are also prepared for the challenges and opportunities of tomorrow. We can assist you in:

- Developing tailored modernization strategies
- Conducting thorough facility assessments
- Implementing energy-efficient and sustainable solutions
- Optimizing space utilization and workflow
- Managing complex renovation and construction projects
- Navigating regulatory compliance and permitting processes
- Integrating smart building technologies
- Creating attractive work environments to support talent recruitment and retention

Contact our advanced manufacturing experts today to modernize your real estate portfolio and gain a competitive edge in the evolving advanced manufacturing landscape.



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