GE Additive

Binder Jet Line

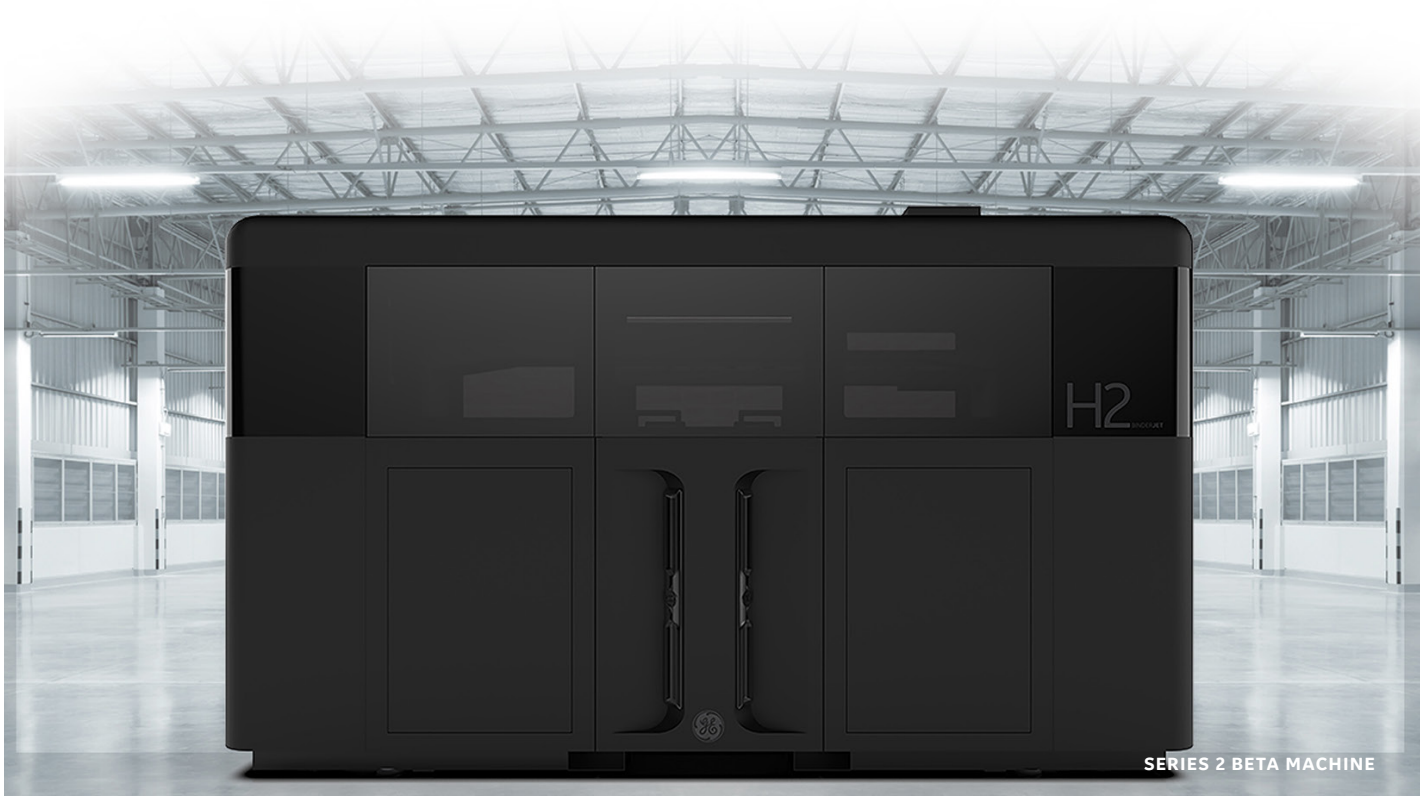
Delivering Quality Parts, At Cost, At Scale

PARTNERSHIP PROGRAM

What does it take to manufacture parts at the speed and scale your business needs today?

GE's Binder Jet partnership program works closely with strategic partners and customers in a co-development, knowledge-share relationship. The core tenet of these partnerships is a mutual commitment to formally identify, design, and productionize specific applications at cost, quality, and needed scale.

By partnering closely, we are ensuring that our technology will align with each company's production expectations/requirements.



SERIES 2 BETA MACHINE

How GE's Binder Jet Line addresses four critical business objectives:

1 Quality

- Achieve repeatable and reliable printing of complex small to large parts
- De-powder intricate parts without destroying fine features
- Sinter parts within the desired tolerances
- Develop high-quality parts faster using distortion simulation, management and control
- Print parts with low surface roughness

2 Cost

- Drive down product cost from powder to part in hand
- Spend less on raw material by recycling unused powder
- Enable low-cost, high-volume part production
- Open space for new applications and innovation
- Introduce new applications and innovations difficult or impossible to manufacture with other methods

3 Scale

- Achieve high productivity with automation-ready technology
- Print 100X faster than other additive manufacturing (AM) methods
- Minimize operator contact with machines and powders
- Integrate into factory cells for smooth operations

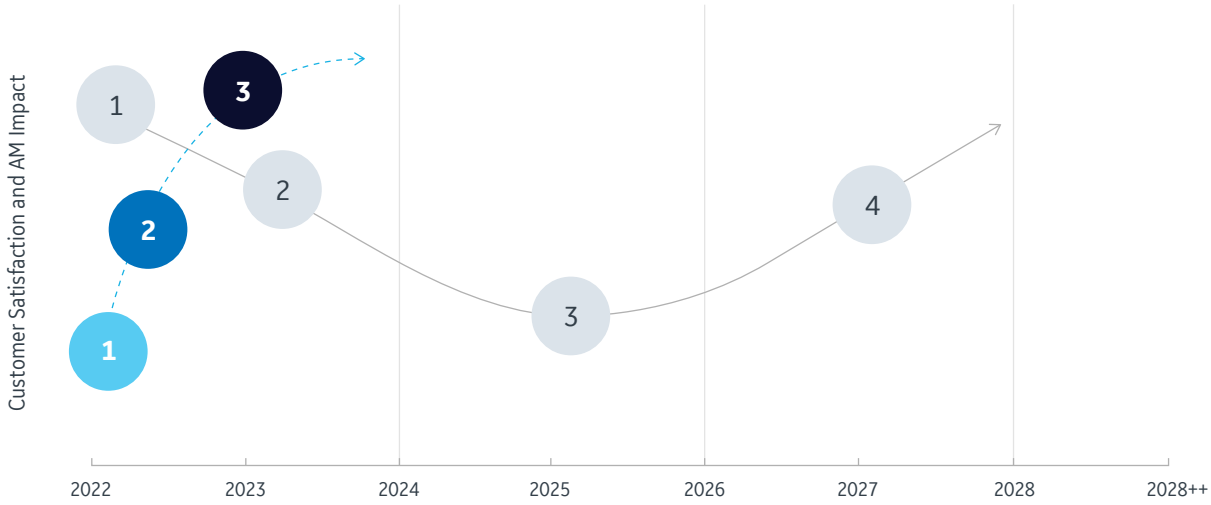
4 Safety

- UL and CE certification
- 100% inert and sealed environment
- Powder-free exposure
- Automation enabled
- Fully capable of reactive and flammable binders and powders
- Installation and operation without hazard zoning required

Additive partnership— where scale meets speed.

Getting to full production with additive can be a long journey with time often in short supply. With GE's Binder Jet Line, you can combine your business and technical expertise with our additive expertise to shorten your path to full metal additive industrialization from eight-plus years to three or less.

Partnerships accelerate industrialization

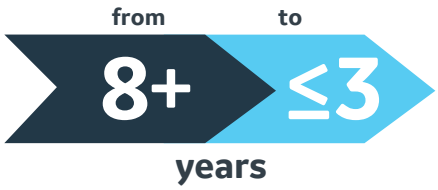


Partnership journey

1. Technology development
2. Qualify & LRIP
3. Production readiness

Individual journey

1. R&D/Experimentation
2. Low-risk, initial testing
3. Process refinement & production planning
4. Part qualification & ramp-up



With support from GE Additive

- Significantly reduce the timeline to full additive production
- Lower capital investments by leveraging GE's facilities, resources and intellectual property
- Drastically reduce risk by incorporating proven methodologies
- Scale operations seamlessly, internally or via outsourcing

Without support from GE Additive

- Undergo a steep, long learning curve to reach full production
- Front a considerable investment for resources and expertise
- Risk your business case and part decision failing during development
- Face unanticipated expenses and obstacles alone

PARTNERSHIP PROGRAM

Production development

Here's what you can expect during our work together:

Phase 1

Part Development

1-2 Binder Jet, Series 2 units

- Embedded GE design and engineering teams drive additive enablement
- Part geometry and material property development
- Prototyping/low-rate printing for testing/validation
- OEE data monitored to build out needed platform improvements
- Development of machine and process towards a production needs (machine, software, binder, process, and materials)
- Co-development and option to utilize existing global GE infrastructure

Phase 2

Pilot Line

4-8 Binder Jet, Series 3 units (volume/parts dependent)

- Scale to Binder Jet Line pilot lines
- Machine to machine variability, scalability, yield, and throughput monitored to prioritize industrialization work
- Platform maturity achieved
- More parts added in development phases
- Automation concepts testing

Phase 3

Factory Solution

12+ Binder Jet, Series 3 units

- Automation solutions developed with customers per industry
- Software industrialized
- Customer can choose to build factory internally or outsource scaled production to other early partners of GE Additive

Ready to get started? Let's tackle your top challenges.

Challenge 1

Proving ROI and building a business case

A short-term or part-focused business case often fails to capture the larger impact that additive can have on your business, limiting your ability to innovate and resulting in a perceived negative ROI .

GE Solution: Develop your business plan with a team of additive experts.
Our team collaborates with you to solve your toughest challenges and identify how AM can affect all areas of your business. We help you develop an ROI plan from powder to part that includes piece part cost, capital expenditures, operating expenses, and facilities layout and planning.

Challenge 2

Getting to full-scale production with Binder Jet

It's not as easy as installing a machine and pressing the print button. Reaching full-scale additive production involves careful design consideration, material and application development, business case execution at scale and much more.

GE Solution: Leverage AM industry knowledge and expertise throughout the process.
At GE Additive, we have a proven track record in scaling additive production. Here's how we can support you:

OEM partners:

- Identify, design and productionize specific applications at cost, quality, and needed scale.
- Support applications in production, meeting business cases, part specifications and material properties.
- Develop foundational skills so you can continue on your own.

Tiered suppliers:

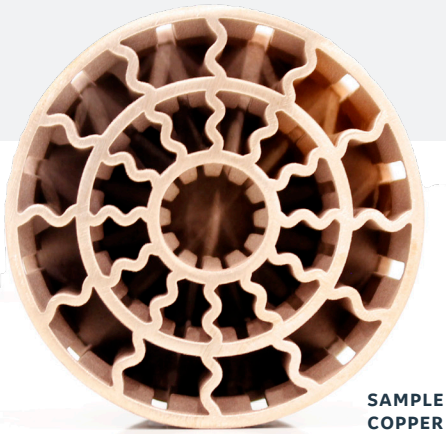
- Specify application details to make the parts to quality, cost and scale.
- Establish baseline capabilities for part development.

Challenge 3

Outsourcing part production

Many organizations want to achieve full-scale additive production, but producing additive parts in-house is not feasible for their short- or long-term strategy.

GE Solution: Partner with a supplier to produce your parts for the long term.
A service bureau with GE technology can support your AM ambitions by producing your parts for you. We can help lower investment and adoption timeline risks by leveraging GE Additive's facilities, resources and intellectual property.



SAMPLE COPPER PART

Together, we'll accelerate your path to AM industrialization.

The Binder Jet Line is customizable and built to address your specific business challenges. That's why we start with meeting with your team to define your production roadmap—one that helps drive your goals and gain the competitive advantage you need.

As we work together, we can:

- Plot your production roadmap to achieve your business goals
- Identify and document your "critical Xs" and quality-control measures to enable the entire production of your application
- Leverage GE Additive's facilities, resources and intellectual property to offset some initial capital investments to decrease overall investment and adoption timeline risks
- Scale operations safely by minimizing operator contact with machines and materials
- Gain access to GE's advanced technical capabilities and Amp™ software platform to qualify parts faster

Checklist: Prepare for the Binder Jet Line.

- ☑ **Part and product use case identification**
- ☑ **Business case or ROI plan**
  This must include the buy in from engineering, top-level management, supply chain, product leaders and finance
- ☑ **Long-term plan for additive impact on supply chain**
- ☑ **Facility layout or initial scaling plan (three- to five-year outlook)**
- ☑ **Corporate financial planning around additive strategy**
  This requires a minimum $5M investment toward people, facility, technology and future-state development to begin.
- ☑ **Desired outcome of full-scale production**

Tip: *GE's AddWorks team can work with you to refine any any of these elements.*

GE Additive

Ready when you are.

To transform the way your business approaches today's toughest challenges.
To reimagine the shop floor and how you create products.
And cement a true competitive advantage.

With GE's Binder Jet Line, your company can shorten the path to metal additive industrialization and see the return on your investment faster.

Let's work together to overcome your AM challenges and build a fully realized additive factory floor fit for your business.

Let's go. Talk to GE today.
ge.com/additive/binderjet