

Good morning and thank you, Chairman Laughlin for the invitation to join the Majority Senate Policy hearing today and for choosing Western Pennsylvania as a backdrop for this important discussion on energy access and affordability. Members of the committee, I am pleased for the opportunity to share perspectives from Pittsburgh's emerging Additive Manufacturing industry.

My name is Jennifer Coyne, and I serve as the Assistant Director of Programs for The Barnes Global Advisors. We serve as the strategic advisor for the ACAA on the Neighborhood 91 project. I am a mechanical engineer by trade, then transitioned my expertise into understanding how additive manufacturing, also known as 3D printing, can provide innovative solutions to problems vexing a variety of industries including defense, aerospace, and traditional manufacturing. Prior to my current role, I led the Additive Manufacturing team at Wabtec, the first anchor tenant for Neighborhood 91.

Neighborhood 91 is the first end-to-end additive manufacturing production campus that provides all the elements of advanced manufacturing in one area. Located on the campus of Pittsburgh International Airport and adjacent to four runways, nearly all of the elements of the additive manufacturing process are present, from metal powder to production, to testing. Its location means rapid part deployment for customers around the world, and the neighborhood setting offers small and startup companies the chance to work together and share resources.

Pittsburgh's strong workforce, educational resources, and recruiting opportunities from universities that are focused on machine learning, additive manufacturing, and artificial intelligence, including the University of Pittsburgh and Carnegie Mellon University; make this an ideal location for prospective tenants. Metal additive manufacturing offers Western Pennsylvania an avenue to pivot skilled manufacturing jobs into new opportunities and serve broader industries. The area's rich history in metal working and manufacturing coupled with the innovative institutions and workforce combine to create a hotbed for metal additive manufacturing.

There is competition for investment, however, with many states offering incentives to grow the metal additive manufacturing capability. Pittsburgh's manufacturing history, and workforce have created a foundation for growth, but there are critical infrastructure and policy strategies that can further support local investments in the industry. One such strategy is the cluster strategy employed by Neighborhood 91. Establishing a co-located campus delivers the following:

- Efficiencies in production/post-production and delivery
- Tenants' cost savings from printing enabling a lean production cycle
- Reduced transportation costs
- Transportation logistics including airport, interstate, and rail access

- Recycling of argon, helium and other noble gases, which are essential elements of additive manufacturing and can account for up to 60 percent of the total cost.

The energy needs of the campus are as follows:

- **High Power** – Metals production accounts for 8% of U.S. energy use (source: <https://www.eia.gov/energyexplained/use-of-energy/industry.php>). Metal 3D printing has the potential to deliver more efficient parts by optimizing part design and minimizing material waste, however, the printing process is still highly energy intensive and requires high voltage sources. Most commercial real estate is not suited for the high power requirements of AM parts producers and significant building and utility infrastructure updates are required for operation. Understanding the needs of the tenants, Neighborhood 91 was designed to grow power delivery with the needs of the campus.
- **Resilient Power** – Metal additive manufacturing machines require conditioned and consistent power and any peaks or millisecond outages can cause a scrapped build. Pennsylvania is ranked 31 for power grid reliability (source: <https://www.usnews.com/news/best-states/rankings/infrastructure/energy>), which puts residents of Neighborhood 91 at a higher risk than other states to experience power outages resulting in scrapped high-value parts. Most applications of metal 3D printing thus far are high-value, and adoption is highest in highly regulated, high-value industries such as aerospace, defense, and medical. These high-value components have strict quality controls to ensure safe operation in critical applications. It is very typical for quality controls to require scrapping a build if there is any interruption during the build process as it could introduce a defect into the parts. Even a few milliseconds of a power outage, or poor quality power, cause the machines to stop the build. This can cost a company between \$10,000 to \$50,000 in scrapped parts, materials, and wasted labor. On our campus, we are exploring solutions such as uninterruptible power supplies (UPS) and generators to sustain builds through power outages and condition the power to the machines. This can be a cost-prohibitive solution, with capital and installation costs up to 50% of the cost of the 3D printing equipment. We are exploring many options to ensure Neighborhood 91 and Pennsylvania remain a competitive landscape for the growth of the Additive Manufacturing industry.

We appreciate this committee's willingness to explore the impact of regulations and rising costs on critical pieces of our economy. With strong infrastructure, reasonable

regulations and smart policy, Pennsylvania can support all industries with high power that is resilient, affordable and accessible.

I am happy to take any questions members of the committee may have.

Thank you.