

## IMPACT

# Engineering Maryland's Clean Energy Economy

## HOW MEI<sup>2</sup> IS SEEDING GROWTH

The Maryland Energy Innovation Institute (MEI<sup>2</sup>) supports the development of clean energy technology innovations from universities and companies across Maryland. Its goal: guide researchers through a commercialization pathway that enables breakthroughs to go from bench (or laboratory) to boardroom. Working with all facets of clean energy technology, MEI<sup>2</sup> is making significant economic and environmental opportunities in Maryland possible. All it needs is stronger state investment.

### PHASE 1 Proof of Concept

MEI<sup>2</sup> guides academic researchers through the unfamiliar process of turning a paper into a prototype via the Innovation Commercialization pathway. In the first stage, clean energy R&D must demonstrate the technical potential for practical and transformative use.

#### IN THE LAB

In their labs at Maryland Engineering, Liangbing Hu and Eric Wachsman made remarkable discoveries. Through cellulose-based nanotechnologies, Dr. Hu created sustainable and biodegradable materials that give wood, nature's most abundant biomaterial, the same attributes as man-made glass, steel, and insulation. Through advanced ceramic processing, Dr. Wachsman developed the first solid-state battery capable of achieving Department of Energy Fast Charge Goal at room temperature.

### PHASE 2 Early Commercialization

Next, a new technology must demonstrate its ability to go to market. Identifying markets, scaling up manufacturing, and producing a working prototype are all crucial to this stage.

#### SEEDING GROWTH

With potential to transform wood use, Dr. Hu and his team named the endeavor InventWood and began the commercialization process. After receiving its patent, InventWood applied for a MEI<sup>2</sup> seed grant. Sustainable and biodegradable, its ready-to-deploy materials met the selection criteria, and InventWood was awarded a \$100K in funding.

With potential to transform the energy storage market, Dr. Wachsman and his team founded Ion Storage Systems. Having demonstrated record high energy densities and rate capabilities with their patented technology, the company was awarded \$100K to develop the battery packaging necessary to provide prototypes for independent evaluation and attract private funding.

**FUELING THE GROWTH**  
Different types of support are needed for each stage of the Innovation Commercialization pathway.

**MEI<sup>2</sup> SEED GRANTS AND INCUBATORS,** made possible by state-allocated funds, enable clean energy innovations to keep moving forward.

### PHASE 3 Early Deployment

The company now builds up their business and manufacturing infrastructures, develops supply chains, and raises private capital.

#### TEAM BUILDING

A close collaborator of MEI<sup>2</sup>, the Maryland Energy Innovation Accelerator (MEIA) provides select start-ups with essential business training and mentoring, as well as networking and private investment opportunities. Utilizing MEI<sup>2</sup> and MEIA resources, InventWood and Ion Storage Systems became commercial entities, hiring CEOs and other members on the business side of the company. Ion Storage Systems raised \$8M+ in private investment, set up a 20,000-sq-foot manufacturing facility in Maryland, and established supply chains for commercialization.

**VALLEY OF DEATH**  
Promising technologies are often lost between stages of development due to a lack of resources.

**ANGEL AND VENTURE INVESTORS** show interest in companies that successfully demonstrate early commercialization.

**PRIVATE SECTOR INVESTMENT** helps start-ups with significant development and scale-up costs needed to reach commercial manufacturing—typically 5-10 times that of the innovation prototype.

### InventWood and Ion Storage Systems,

two MEI<sup>2</sup> startups, were named to Governor Hogan's *Future 20*.

# #1

in per capita R&D expenditures.

# \$79 million

MEI<sup>2</sup> investments have returned significant federal funding to Maryland's economy.

## Ranked in the top 5

most innovative states by *Bloomberg*, the *Milken Institute*, and *WalletHub*.

### PHASE 4 Market Growth

Technologies in this final stage are commercially available and have established regulatory, infrastructure, and workforce parameters in place. With continued support from MEIA, they become more competitive, less costly, and increasingly attractive to banks and experienced industry partners.

#### GIVING BACK

Ion Storage Systems has created 25 high-paying jobs so far, launched a larger Series A investment round, and is negotiating battery supply agreements with several potential customers. The company looks forward to giving back to Maryland by repaying its investment through economic activity and continued job growth.

#### MORE IN FOUR

The majority of Maryland's clean energy funding is provided in phase four. Prior to the formation of MEI<sup>2</sup> there were no dedicated state funds for the early stages of clean energy development. Assessments of comparison states indicate that expanding financial support to the first stages will significantly increase the number of clean energy firms formed each year.

Learn more [energy.umd.edu](http://energy.umd.edu)