

Pennsylvania Industrial Hemp Engine
Industrial & Consumer Product Development R&D- Stakeholder Meeting Notes
Tuesday, March 12, 2024

SUMMARY: 50 Attendees

- A. This is the 2nd of 12 meetings set up for PAIHE Stakeholders. Industrial and Consumer Product Development R&D is the 2nd Stakeholder group to formally meet regarding the PAIHE. We are committed to meeting every 2nd Tuesday of the month until June 2024.
- B. The three (3) Pillars/Groups who are meeting each week are:
 - 1. Production & Processing;
 - 2. Industrial & Consumer Product Development R&D; and
 - 3. Economic Development & Public Policy
- C. Speakers will be identified to address the Stakeholder group to bring increased awareness and interest in the Stakeholder topic area, and also to obtain direction from the Stakeholder community about what is working, what needs improvement and what needs to be discontinued
- D. Speakers:
 - 1. Ron Kander- Associate Provost, for Applied Research at Thomas Jefferson University. He works with Hemp derived composite materials; using hybrid materials - which include composites such as metals, ceramics, polymers, glass, elastomers. Hybrids combine two (2) or more of these materials to produce hemp derived products. Traditional composites used include metal, ceramic, polymers, and materials reinforced with fabrics, fibers, particles, or yarns including woven knits. Hemp derived materials include natural hybrid materials such as fibers, yarns & fabrics. Then composites such as paper, cardboard etc. can be added and finally, polymers and chemicals are used. US Hemp Markets predicted to grow 20% every year with the use of industrial applications of Fiber and Hurd. This is a \$6Billion industry. Technical sustainability of products will inform if the product is “economically sustainable” (generating profit).
 - 2. Cameron McIntosh- Caste Hemp (Americhanvre) - Hempcrete for construction & green buildings. Hempcrete is a bio-composite used for insulation and walling materials. Hempcrete is not concrete, it is a non-toxic, healthy material. The Hempcrete material is used inside walls to help brace the wall. Hempcrete can also be used as insulation by spraying on site which reduces labor & overall costs by 60%. McIntosh is using Hempcrete spray in his Idaho and Washington DC projects. He has received numerous grants to further develop Hempcrete. In 2023 he was awarded \$1.9 Million from a US Army Phase 2 SBIR Award. In PA Housing Research Center (PHRC) Project Hemp Home- he is using Hempcrete to form walls and insulate affordable housing units. McIntosh plans to deliver training on spray techniques- April 27-30 - cost is \$1500 but will give credit towards purchase of materials. His goal is to use the US Army grant award to also deliver training on the use of

Hempcrete in the construction industry for wider appeal and access to the new technology for insulation and wall formation.

3. Dr. Ali Memari, Professor of Civil Engineering, Penn State presented methods of using Hempcrete through spray or pre-cast. Hemp is an industrial variant of cannabis. You can make rope, rugs & hemp insulation made from hemp fibers. Hemp is sustainable, low or non-toxic material used in hemp shingles for roofing, hemp wall boards, ceiling tiles, particle board, and hardwood floors. The grow cycle is 4 months vs tree grow cycle is 10 years. Hempcrete is made of lime, hemp hurds, fiber, and water. Hempcrete is now commercially available for use in construction. Hemp is carbon negative so no carbon emissions. In the future will use 3-D printing of clay-hemp walls installation; mixing clay with hemp for a more durable product.
4. Greg Wilson- Entrepreneur- developed and produced “Hempwood” see hempwood.com for product information. Took 22 years to bring product to commercial market. Currently has 24 employees, 4-24 acres of hemp planted each year, 1Million sq ft of flooring produced each year. Developed zero waste factory and is focused on producing all green products. A solution is to grow and produce bio-degradable materials like hempwood for use in the construction industry. Hempwood is USDA certified as a “bio-based” product. Their marketing strategy is – healthy construction products, commercially carbon negative products and USDA Bio-Based products. In 2023 made \$1.85 Million in revenue, to date made \$5.1 Million investment in Hempwood product.

The recurring themes for Industrial & Consumer Product Development R&D seem to be identifying capital to produce the hemp products highlighted here. The process is still costly for the producer. Most entrepreneurs have not received federal R&D grant money to grow and develop these bio-degradable products. The hemp products seem to have a zero carbon footprint making the products safer for use in construction than traditional construction products. Investment capital needed for production.

Question

1. When will you see commercial application of the product (Hempcrete) - It is being used now. Received funding from a SBIR Phase 2 grant through US Army. More capital is needed to support further development and production of Hempcrete.
2. Have you completed research on the sustainability & degradation of the product due to variations in temperature such as cold, warm and hot?
Yes, the changes in temperature do not seem to affect the Hempcrete product being used in the construction of houses.
3. Can a low-cost process be developed where the fibers come directly from the field where the hemp is being grown? Yes, we need to use other organic processes and stop using chemicals to strip the fiber. Instead of using sulfuric acid, use organic acid such as citric acid.

4. Can we strip acid from the process? How can we become fully bio-degradable? We need more research on the use of organic materials in how we process the hemp and create hemp derived materials.