

EVOLVE CAPP

Evolve Central Appalachia

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ANNOUNCING EVOLVE CAPP: ADDRESSING CRITICAL MINERALS PRODUCTION OPPORTUNITIES IN VIRGINIA'S SOUTHWEST REGION

~ University-led research spurs creation of public-private project to realize the full economic, environmental and competitive potential hidden within waste coal ~

ABINGDON, VA — A team of nearly 50 public, private, academic and business professionals is identifying a path to the creation of a brand-new industry in central Appalachia, rooted in Virginia's southwest region. Evolve Central Appalachia (Evolve CAPP) focuses on harvesting the industrial, environmental and economic potential of rare earth elements (REE), critical minerals (CM) and high-value, nonfuel, carbon-based products – all out of waste coal. It launched today from its new laboratory in the Virginia Highlands Small Business Incubator in Abingdon, Virginia, provided for by the Washington County Industrial Development Authority.

Managed principally by Virginia Tech, through the Virginia Center for Coal and Energy Research (VCCER), Evolve CAPP has assembled academic, industry and policy experts in processing, geology, mining, infrastructure, waste and impoundments, carbon products, environment and economic development. The participants seek to leverage a decades-long legacy of Appalachian leadership in energy to generate a new industry and to create better environmental conditions in the Appalachian basin by accelerating waste coal clean up. Additional benefits include economic growth and job creation. Evolve CAPP will initiate the harvesting and processing of REE and CM from coal, coal sediments, coal ash, coal refuse and impoundments, acid mine drainage and other basin-specific resources in central Appalachia. At the same time, the initiative will connect these processes to the advancement of American competitive strength in the manufacturing, energy and climate sectors. The initiative has identified *seven* objectives in this regard:

1. Determine the quantity and distribution of resources in the region.
2. Formulate strategies to utilize coal waste streams to produce useful fuels and materials.
3. Evaluate regional infrastructure and identify industries that may benefit from REE and CM production.
4. Develop strategies to encourage business development.
5. Guide research and development of new technologies.
6. Frame plans to establish technology innovation centers.
7. Implement stakeholder outreach and education initiatives.

Evolve CAPP explores economic, environment and competitive impact of critical minerals in waste coal

The team

The U.S. Department of Energy provided the initial funding of \$1.499 million to VCCER, and the Virginia Department of Energy provided a contract geologist to serve as an administrator of the project. The Virginia Tech team is led by Richard Bishop and Dr. Michael Karmis, and it includes Wencai Zhang (processing), Kevin Andrews and Gus Janson (geology), Nino Ripepi and Zach Agioutantis (mining), Danny Gray (waste and impoundments), Parans Paranthaman (carbon products), and Will Clear (economic development).

- Academic partners: West Virginia University, the University of Kentucky and Virginia's Mountain Empire Community College.
- Government research partners: the Virginia Department of Energy, the U.S. Geological Survey and Oak Ridge National Laboratory.
- Private research partners: Marshall Miller & Associates, Advanced Resources International, Crescent RI, Gray Energy Technologies and Southern States Energy Board.
- Economic development partners: InvestSWVA, Coalfield Strategies, LENOWISCO Planning District, Southwest Virginia Energy Research and Development Authority, the Virginia Highlands Small Business Incubator, the Industrial Development Authority of Washington County, Virginia, and Wise County, Virginia.
- Private technology partners: Ramco Carbon, Separation Technologies, Carbon Technology Company and Alios Pty Ltd.
- Power producing partners: Dominion Energy, Tennessee Valley Authority and American Electric Power.
- Energy producing partners: Alpha Metallurgical Resources, American Consolidated Natural Resources, Blackhawk Mining, Consol Energy, Coronado-Buchanan Minerals, EnerVest, Metinvest-United Coal Company, Ramaco Resources, Natural Resource Partners, Harrison-Wyatt & Buchanan Energy and Kentucky River Properties.
- Stakeholder advisors: Leon Boyd of Rocky Mountain Elk Foundation, Jason De La Cruz of Dominion Energy, Kevin Elkins of Buchanan Minerals, Joseph Fawbush, Mayor of the City of Norton, Frank B. Harrington of Alpha Metallurgical Resources, Neil Mosely of Blackhawk Mining, LLC, Will Payne of Coalfield Strategies, and Thomas Pruitt of Mineral Owners.

The landscape

Today, it is actually less expensive to insource critical minerals than to produce them in the U.S. Countries that do not have the environmental or worker safety regulations, or may not be aligned with U.S. interests, still can get the minerals into the U.S. at less cost. Getting to critical minerals stateside is clearly an industrial priority, and because it will require facilities, a transportation network and a skilled workforce, a significant investment is warranted. The research already shows that the collateral benefit of cleaning up waste coal is a key aspect of a return on any investment extracting critical minerals from it. Besides satisfying the need to clean up waste coal, otherwise known as “gob”, Southwestern Virginia’s location in central Appalachia is

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perfect for domestic sourcing and shipment by rail and road to ports on the U.S. eastern seaboard.

“We have an opportunity to take an environmental liability and turn it into an environmental asset,” said **Dr. Michael Karmis, who initiated and led this project and has recently retired from Virginia Tech as the Stonie Barker Professor of Mining and Minerals Engineering and Director of the Virginia Center for Coal and Energy Research (VCCER)**. “We also must realize – the general public as well as scientists, industrialists and regulators – that, at this moment, our use of critical minerals in all types of products and processes makes it imperative that the U.S. enter the supply chain sooner rather than later.”

“Our projected outcomes fall into three areas,” said **Richard Bishop, Virginia Tech Professor of Practice and Principal Investigator, Evolve CAPP**. “Jobs, environmental remediation and national self-sufficiency. As a team which will grow with the work, we must keep our priorities in front of us, integrating our specialties in ways that serve the scale of the project and prevent siloes. The only way to close the gaps in our infrastructure is for the various disciplines to unite around this opportunity. This is complicated. There are five different facets: harvesting, processing, protecting the environment, commercializing and regulating. This is why we’ve assembled a broad spectrum of professional backgrounds and emphasized integration. It’s a necessity, not a choice.”

“Everyday products from appliances to cell phones require critical minerals to manufacture,” said **John Warren, Virginia Energy Director**. “We need to reverse course on our reliance on global suppliers and Evolve CAPP represents an important step in proving Southwestern Virginia can do it and do it right.”

“This is a long play for Virginia's Southwest and entirely within our wheelhouse,” said **Will Clear, Virginia Energy Deputy Director**. “The Commonwealth is working hard to clean up gob coal, and this team's research is offering up a solution that could accelerate that cleanup and stabilize our regional economy through a new industry relevant to domestic and global manufacturers.”

“A mineral is critical when it is necessary for continuing our way of life – and when its scarcity is such that supply can be jeopardized,” said **Will Payne, Managing Partner of Coalfield Strategies, LLC, and InvestSWVA Project Lead**. “If Southwestern Virginia can offer itself to the nation as a domestic sourcing center of critical minerals for manufacturing, it will help the U.S. avoid reliance upon nations that do not share our policy priorities or our legal structure. We believe that the work of this project will alleviate supply chain disruptions and, at the same time, make American companies the major players in the manufacture and distribution of critical mineral-based components.”

About Evolve Central Appalachia (Evolve CAPP)

Evolve CAPP addresses the harvesting and commercialization of rare earth elements (REE) and critical minerals (CM). The Virginia Center for Coal and Energy Research at Virginia Tech

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promotes regional economic growth and foster new job creation by accelerating the extraction and processing of REE and CM from coal, coal sediments, coal ash, coal refuse and impoundments, acid mine drainage and other basin-specific resources in the Central Appalachian region.

About Virginia Center for Coal & Energy Research (VCCER)

The mission of the Virginia Center for Coal & Energy Research (VCCER) is to coordinate and disseminate coal and energy research information and data to the Commonwealth of Virginia. The center examines the socio-economic implications related to energy and coal development and the associated environmental impacts. VCCER was created by an Act of the Virginia General Assembly on March 30, 1977, as an interdisciplinary study, research, information and resource facility for the Commonwealth of Virginia. Visit [VCCER](#).

About Virginia Department of Energy (Virginia Energy)

The Virginia Department of Energy (Virginia Energy) enhances development and conservation of energy and mineral resources in a safe and environmentally sound manner to support a more productive economy. Created as the Department of Mines, Minerals and Energy in January 1985, the agency makes worker safety its top priority. Virginia Energy has offices in Big Stone Gap, Charlottesville and Richmond. Visit [Virginia Energy](#).

About InvestSWVA

InvestSWVA is a public-private business research, attraction and marketing campaign for Southwest Virginia launched under the umbrella of the Virginia Tobacco Region Revitalization Commission and backed by private industry. Visit [InvestSWVA](#) to learn more.

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