

INTERIM JOINT COMMITTEE ON NATURAL RESOURCES AND ENERGY

Minutes of the 6th Meeting of the 2019 Interim

November 19, 2019

Call to Order and Roll Call

The 6th meeting of the Interim Joint Committee on Natural Resources and Energy was held on Tuesday, November 19, 2019, at 3:00 PM, in Room 154 of the Capitol Annex. Senator Brandon Smith, Chair, called the meeting to order, and the secretary called the roll.

Present were:

Members: Senator Brandon Smith, Co-Chair; Representative Jim Gooch Jr., Co-Chair; Senators Matt Castlen, C.B. Embry Jr., Paul Hornback, Robby Mills, John Schickel, Reginald Thomas, Johnny Ray Turner, Robin L. Webb, Whitney Westerfield, and Phillip Wheeler; Representatives John Blanton, Charles Booker, Adam Bowling, Terri Branham Clark, R. Travis Brenda, Randy Bridges, Jim DuPlessis, Daniel Elliott, Chris Fugate, Angie Hatton, Derek Lewis, Suzanne Miles, Melinda Gibbons Prunty, Josie Raymond, and Cherlynn Stevenson.

Guests: Dr. Jack Groppo, Professor of Mining Engineering, Center for Applied Energy Research, University of Kentucky.

LRC Staff: Stefan Kasacavage, Janine Coy-Geeslin, Tanya Monsanto, and Rachel Hartley.

Recovery of Rare Earth Elements from Byproduct Sources

Jack Groppo stated that rare earth elements (REE) are actually very common; however, they are rarely found in high concentrations. REE are utilized in magnetics, phosphors, metal alloys, catalysts, ceramics, glass, and defense. One important downstream market for REEs is magnets used in larger wind turbines that can be used for electricity generation.

There are no wind turbines in Kentucky that are utility scale because there is no reliable wind potential; however, wind turbines are the fastest growing application for renewable electric generation in the United States. There are now 12 megawatt wind turbines commercially available, which is more than double the size of wind turbines a year ago. The increase in size is due to using magnets manufactured with REE.

The United States does not have mineable sources of REEs so research has been focused on developing technologies to separate REEs from alternative resource streams. Resource streams for REEs include: coal preparation refuse and middlings, coal combustion fly ash, acid mine drainage, and electronic scrap and electronic waste or e-waste. Of those, e-waste is the richest source for REEs. Coal seams contain about 140 parts per million (ppm) of REE whereas e-waste has about 300 to 500 ppm of REE.

In response to a question about the source of REEs in China, Dr. Groppo said that the REEs there are mined from mineral sands. In response to another question about whether REEs are considered a national security issue, Dr. Groppo said that securing a domestic source for REEs is important to national security. The United States Department of Energy has lead the charge for REEs, because it is needed for building certain kinds of weaponry.

Continuing, Dr. Groppo stated that e-waste can be used as a resource for REEs, and items of interest in that resource stream include hard drives, printed circuit boards, and electric vehicle batteries. The REEs derived from these resources are needed to build the wind turbines and can also be used in other applications such as weapons.

The University of Kentucky is developing a research program to use byproducts from e-waste. The research program is a joint project between the UK College of Engineering and the Center for Applied Energy Research. The advantages of using the REEs from e-waste is that (1) the REEs are of a high grade, (2) other metals can be recovered, and (3) there is already an existing infrastructure for the collection and separation of those wastes in the recycling stream.

Currently there is no technology for the separation of REEs from e-waste, so that waste tends to be exported or stored in a warehouse in the United States. Dr. Groppo believes there is a significant economic opportunity in developing this technology.

In response to a question from Senator Wheeler, Dr. Groppo stated China only wants to sell finished products, not REE. The Department of Defense is concerned because of national security.

In response to a question from Representative Blanton, Dr. Groppo stated companies in the United States that claim to have this technology have not been able to adequately demonstrate it yet.

Representative DuPlessis commented that the United States should do smelting and fabrication rather than send those jobs to China.

Dr. Groppo responded that there are three operating smelters in the United States, but they need a sulfuric acid plant nearby during the process.

There being no further business, the meeting was adjourned.