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Economic, Social. and Environmental Cost/Benefit Modeling of Fit-for-Purpose Treatment and Reuse of Produced Water

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In passing the New Mexico Produced Water Act, the New Mexico Legislature in 2019 established a regulatory and policy framework for the ownership, management, and reuse of oil and gas produced water outside of the oil and gas sector, giving statutory control and authority to the New Mexico Environment Department (NMED). To establish science-based regulations and policies for the use of treated produced water outside the oil and gas sector, NMED entered into a Memorandum of Understanding with New Mexico State University to create the **New Mexico Produced Water Research Consortium** (Consortium).

The goal of the Consortium is to establish and coordinate a focused science and technology research and development program in collaboration with state and federal environmental and natural resource agencies, academia, industry, and non-governmental organizations and associations. The research program is focused on addressing the public and environmental health, safety, and economic issues associated with the treatment and reuse of produced water.

One of the primary Consortium technical efforts undertaken in 2021 was to work with Sandia National Laboratories and several of their partners in a Department of Energy-funded project to develop an integrated model for assessing the economic, societal and environmental tradeoffs associated with alternative produced water management and fit-for-purpose treatment and reuse strategies related to oil and gas development and production. The tool is easy to use, publicly available, quantitative, and tailored to the unique characteristics of an oil/gas project and locale. Considerations include both source water selection and produced water treatment, application, and disposition. The model user interface was designed for ease of utilization by producers, technology developers, economic development agencies, and regulatory agencies to help guide in the development of sound science-based decisions on the reuse of treated produced water for maximum societal and economic benefits while protecting public, environmental, and ecological health and safety. While the tool was created to support oil and gas produced water treatment and reuse management decisions in Southeastern New Mexico (Delaware Basin), the model serves as a proof-of-concept platform that will inform future extensions to other oil and gas regions of the U.S.

This presentation will discuss the modeling approach, process, and examples of quantitative information outputs for various applications and their associated trends that can be used to support emerging ESG needs and requirements of oil and gas producers and midstream operators.

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