Partnering with the National Energy Technology Laboratory

SUSTAINABLE WATER USE — FOR FOSSIL ENERGY —

RESEARCH & DEVELOPMENT PROGRAM

Water is a critical component of the extraction, production, and use of coal, oil, and natural gas — from hydraulic fracturing to power generation to carbon sequestration.

IMPORTANT FACTS About Water & Fossil Energy

In 2015, U.S. fossil fueled thermoelectric power accounted for:

26% OF THE TOTAL OR **281** BILLION GALLONS

OF FRESH WATER WITHDRAWN DAILY

Thermoelectric power plants withdraw large volumes of fresh water, but less than three percent is actually consumed. Most of the water is returned to its source.

Between 2012 and 2014:

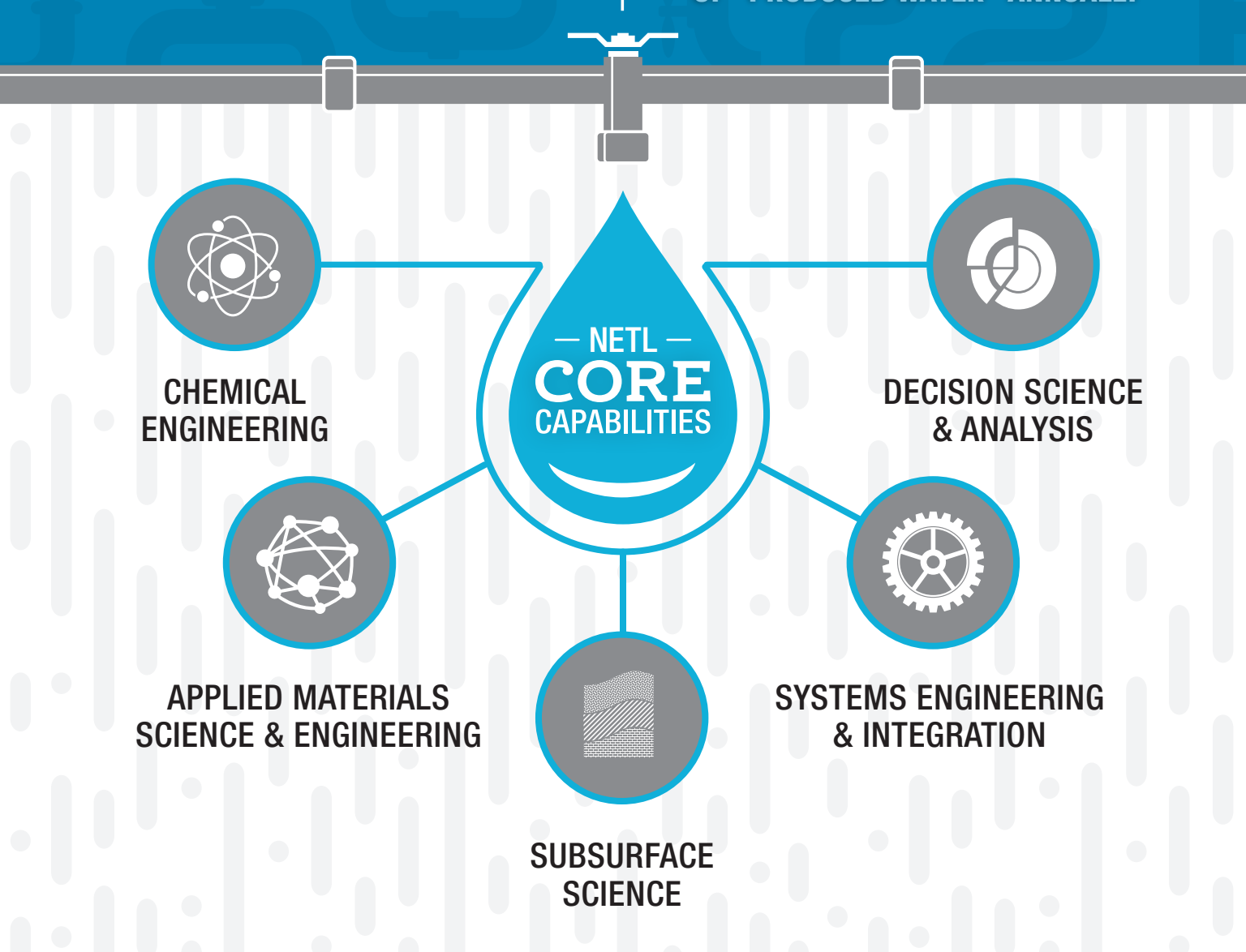
4.54 BILLION GALLONS

OF WATER WAS USED ANNUALLY IN U.S. OIL AND GAS PRODUCTION

U.S. oil and gas operations also generated an estimated

890 BILLION GALLONS

OF "PRODUCED WATER" ANNUALLY



NETL applies its research and program management capabilities to solve water problems associated with coal-based power generation, oil and gas development, carbon capture and storage, and other issues related to fossil energy extraction and use.

NETL's Water-Energy R&D Thrusts

Advanced Cooling Technology

Focused on technology innovations that reduce evaporative loss and enhance performance associated with wet, dry, and hybrid cooling systems for thermoelectric power production.

Non-Traditional Water Use

Directed at characterization and treatment of non-traditional sources of water, like mine water, for power generation and oil and gas recovery.

Water Treatment and Detection Technology

Focused on advanced sensors, wireless networks, novel sorbents, and innovative technologies for detecting, removing, and/or recovering contaminants from oil and gas production, coal mining discharge, and effluents from fossil-based power generation.

Decision Science and Modeling

Engaged in development and deployment of a range of modeling, analysis, and decision-making tools to evaluate the impact of fossil energy development on surface and sub-surface water resources.

Since 2000, NETL has funded more than **150 water-energy** projects, many of which resulted in commercial technologies like cooling tower recovery processes and new ways to treat and reuse produced water.

30 PROJECTS are currently active in water-energy areas that are worth more than **$100 million.**

PROJECT EXAMPLES

SPX ClearSky® Plume Abatement System: Recovers a significant fraction of water lost though evaporation in cooling towers.

Recovering Rare Earth Elements From Acid Mine Drainage: West Virginia University led development of a cost-effective and environmentally benign process to recover rare earth elements (REEs) from sludge generated during acid mine drainage (AMD) treatment.

Handheld Environmental Monitoring System: NETL designed a new handheld laser induced breakdown spectroscopy system to measure water quality characteristics.

Water-Energy Modeling: NETL developed a prototype model for the National Energy Modeling System that estimates the impact of fossil energy technologies on water resources.

U.S. DEPARTMENT OF ENERGY | NETL NATIONAL ENERGY TECHNOLOGY LABORATORY