

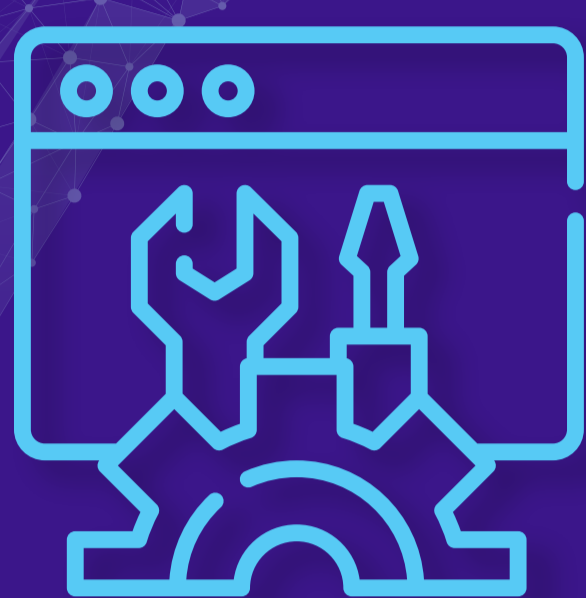
# 5 USES FOR ARTIFICIAL INTELLIGENCE YOU'VE NEVER HEARD OF

We have all heard that artificial intelligence (AI) is used to create voice-activated assistants like Alexa or Google Home, self-driving cars, and drone delivery programs. But, we bet you didn't know that AI is also used to make fossil energy technologies more efficient.

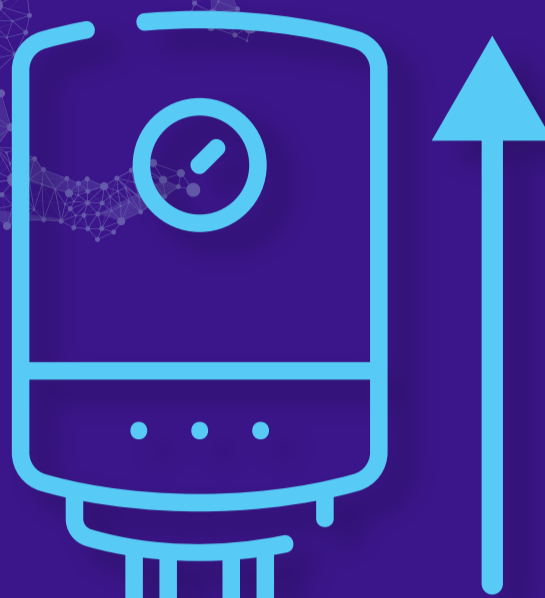
At the Office of Fossil Energy, AI is transforming our ability to analyze massive datasets and solve complex problems. We have over 60 AI-enabled projects underway. Check out these 5 examples:

## SMART ROBOTS INSPECT AND REPAIR POWER PLANT BOILERS

AI-enabled robots can perform real-time, non-destructive inspection of boiler furnace walls in a power plant. If they find a crack, they can make an immediate repair, using AI for smart data analysis.



Reduce risks to humans performing maintenance



Increase boiler reliability, usability, and efficiency

## DRONE-MOUNTED, SMART METHANE EMISSIONS DETECTION SYSTEMS

New smart methane emissions detection systems mounted on autonomous drones will detect and pinpoint methane leaks. The use of AI algorithms will enable these systems to perform with precision.



Increase accurate leak detection readings



Limit environmental impacts of natural gas production, processing, and transmission

## COMPUTATIONAL TOOLS PREDICT OIL AND GAS WELL PRODUCTIVITY

Energy producers can use AI computational tools to obtain accurate predictions of well productivity before drilling underground. The data helps drive the business decisions of operators who need to optimize oil and gas production by drilling fewer wells.



Synthesize multiple data sets rapidly



Reduce surface footprint

## COMPUTERS DEDICATED TO FOSSIL ENERGY RESEARCH

The Joule 2.0 supercomputer and the WATT computer help accelerate the development of innovative, cost-effective technologies. **Joule 2.0** runs AI software and is among the fastest, largest, and most energy-efficient supercomputers in the world. A talented mathematician working 40 hours a week for 50 weeks per year would take about 55.9 billion years to do what Joule 2.0 can do in one second. And, the **WATT computer** is optimized to rapidly ingest the enormous amount of data required for 'deep learning' AI. If 532 miles of shelves at the Library of Congress were stacked end-to-end, the WATT computer would be able to read the shelves at 15,700 miles per hour, absorbing all of the information in about 2 minutes.



Model energy technologies and accelerate technology development



Quickly ingest data and synthesize multiple data sets

## SMART-CS INITIATIVE WILL TRANSFORM CARBON STORAGE

Using AI and machine learning, a SMART-CS initiative is being developed to ensure that carbon dioxide can be securely stored underground once it is captured from power plants or industrial sources. This initiative will develop real-time visualization, rapid forecasting capabilities, and virtual learning environments.



Improve efficiency and effectiveness of carbon storage



Save time and enable rapid operational decisions

These are just a few ways we're using AI research and development to utilize and protect our Nation's vast fossil energy resources. To learn more about the Office of Fossil Energy, our projects, and our partnerships, visit [fossil.energy.gov](https://www.fossil.energy.gov).



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