

# CO<sub>2</sub> Pipelines

## Part of our Lower-Carbon Energy Future

Many things we need emit carbon dioxide. Keeping American manufacturing jobs in a future cleaner fuel economy will involve capturing carbon emissions before they reach the atmosphere. Pipelines are an ideal way to move large volumes of CO<sub>2</sub> emissions long distances to permanent underground storage sites.

### Examples of carbon-emitting processes:

- Steel & Cement Manufacturing
- Power Generation
- Renewable Fuels Production

### Track Record of Safety

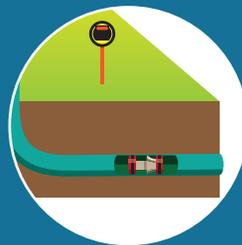
- CO<sub>2</sub> pipelines have been operating safely in the United States for decades. Today, there are over 5,000 miles of pipelines delivering CO<sub>2</sub> pipelines.
- Congress expanded federal pipeline safety law in 1988 to require regulation of CO<sub>2</sub> pipelines. PHMSA extended federal regulatory requirements to CO<sub>2</sub> pipelines in 1989.
- Federal pipeline safety regulations require CO<sub>2</sub> pipeline operators to proactively inspect and perform preventive maintenance on their systems. Pipeline personnel monitor their systems 24/7 to ensure everything is running safely.
- Government pipeline safety data collected by PHMSA and publicly available shows CO<sub>2</sub> pipeline incidents are rare and declining. CO<sub>2</sub> pipelines have a lower incident rate than both crude oil and refined products pipelines.



Hi-Grade Steel & Protective Coatings



Preventative Maintenance



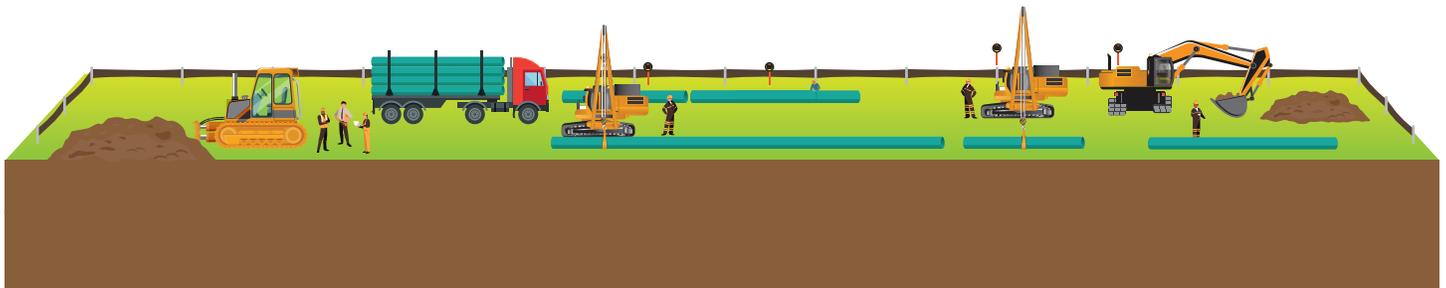
Hi-Tech Inspection Tools



24/7 Monitoring

### Clean Energy Jobs

CO<sub>2</sub> pipelines offer a great opportunity for creating new clean energy jobs. Building pipelines provides jobs for thousands for welders, equipment operators, engineers and more. Pipeline construction jobs can support a family with wages topping \$30 an hour.



# CO<sub>2</sub> Pipeline Safety

## Track Record of Safe Operations

CO<sub>2</sub> pipelines have been operating safely in the United States for decades. Pipeline safety laws and government safety regulations administered by the U.S. Pipeline and Hazardous Materials Safety Administration (PHMSA) and state agencies mandate safe operations of CO<sub>2</sub> pipelines.

### Federal Government Pipeline Safety Requirements

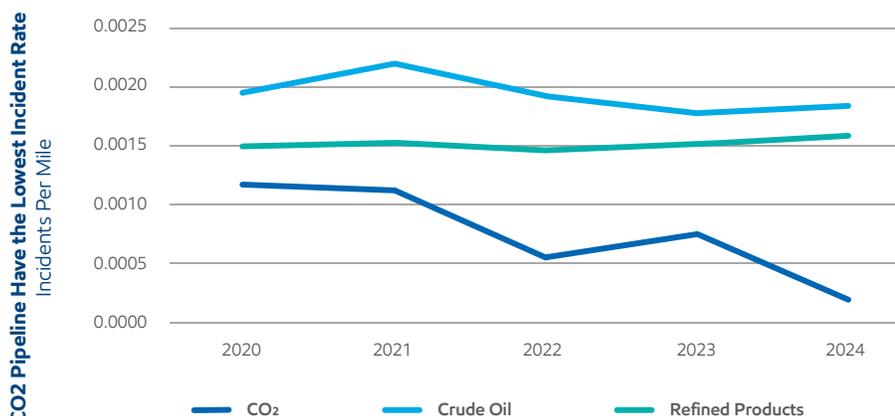
- Congress in the *Pipeline Safety Reauthorization Act of 1988* required the U.S. Department of Transportation to regulate CO<sub>2</sub> pipelines under federal pipeline safety regulations.
- The U.S. Pipeline and Hazardous Materials Safety Administration (PHMSA) in 1989 expanded its federal pipeline safety regulations to cover CO<sub>2</sub> pipelines.
- Current PHMSA regulations at 49 CFR Part 195 prescribe hundreds of requirements on the construction, inspection, maintenance, monitoring and incident response for CO<sub>2</sub> pipelines.
- PHMSA is charged with inspecting and enforcing compliance on pipeline operators violating federal CO<sub>2</sub> pipeline safety requirements.

### CO<sub>2</sub> Pipeline Operator Safety Programs

- CO<sub>2</sub> pipeline operators proactively inspect their pipelines on regular schedules to look for any issues and ensure the pipeline remains safe. Pipeline operators perform preventative maintenance on their pipes to address potential issues before they become a problem.
- Operators use diagnostic tools called “smart pigs” that travel inside pipelines scanning the walls with technology similar to an ultrasound or MRI found in a doctor’s office. Specially trained controllers keep a watchful eye 24/7 monitoring pipeline pressure and flow.

### CO<sub>2</sub> Pipeline Safety Record

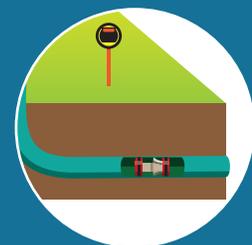
- Government pipeline safety data collected by PHMSA and publicly available shows CO<sub>2</sub> pipeline incidents are rare.
- CO<sub>2</sub> pipelines have a lower incident rate than both crude oil and refined products pipelines.



Source: Liquid Energy Pipeline Association (LEPA)



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# CO<sub>2</sub> Underground Storage Safety

Dozens of underground storage facilities across the United States have operated safely for decades storing natural gas, crude oil, propane and other important commodities. CO<sub>2</sub> storage sites will use the same layers of caprock deep underground to keep the CO<sub>2</sub> permanently locked in place.

## Natural Geology Can Make Underground CO<sub>2</sub> Storage Safe

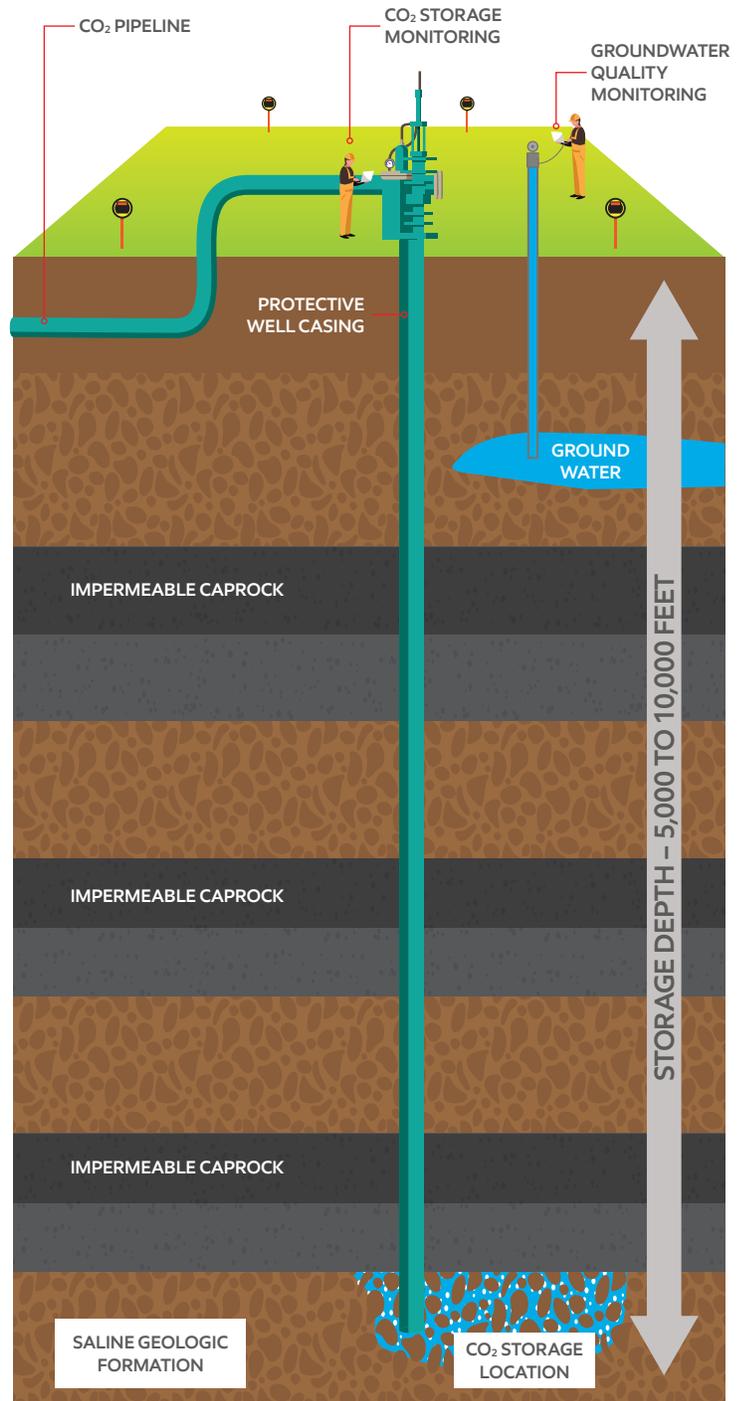
- Impermeable layers of rock deep underground act as a lid to keep stored CO<sub>2</sub> in place.
- The same impermeable layers of rock that have kept oil and gas locked for eons can safely store CO<sub>2</sub> underground.
- Naturally occurring underground deposits of CO<sub>2</sub> have stayed locked deep underground for millions of years.

## CO<sub>2</sub> Underground Storage Is Covered by Federal and State Regulations

- CO<sub>2</sub> underground storage sites are regulated by the U.S. Environmental Protection Agency and several states.
- Federal requirements for CO<sub>2</sub> underground storage, operation and monitoring are designed to protect drinking water sources and the environment.
- CO<sub>2</sub> underground storage sites must meet federal construction, operations and monitoring requirements before injection operations commence and continually thereafter.
- Federal government regulations require extensive study by experts of the underground geology before a site is deemed safe for CO<sub>2</sub> storage.

## Underground Storage Is Proven Safe

- The U.S. has a long history of safe underground storage operations, including four Strategic Petroleum Reserve sites in Texas and Louisiana.
- Underground storage sites storing natural gas, propane, crude oil and carbon dioxide have operated safely for over 30 years.
- Federal government regulations requiring continued monitoring and recordkeeping will demonstrate and document CO<sub>2</sub> underground storage sites are operating safely.



Source: Liquid Energy Pipeline Association (LEPA)