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ENABLING EFFICIENT, ORDERLY, AND RESPONSIBLE DEPLOYMENT OF CO₂ PIPELINES IN THE UNITED STATES

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Accelerating the deployment of CCS for a net-zero emissions future.

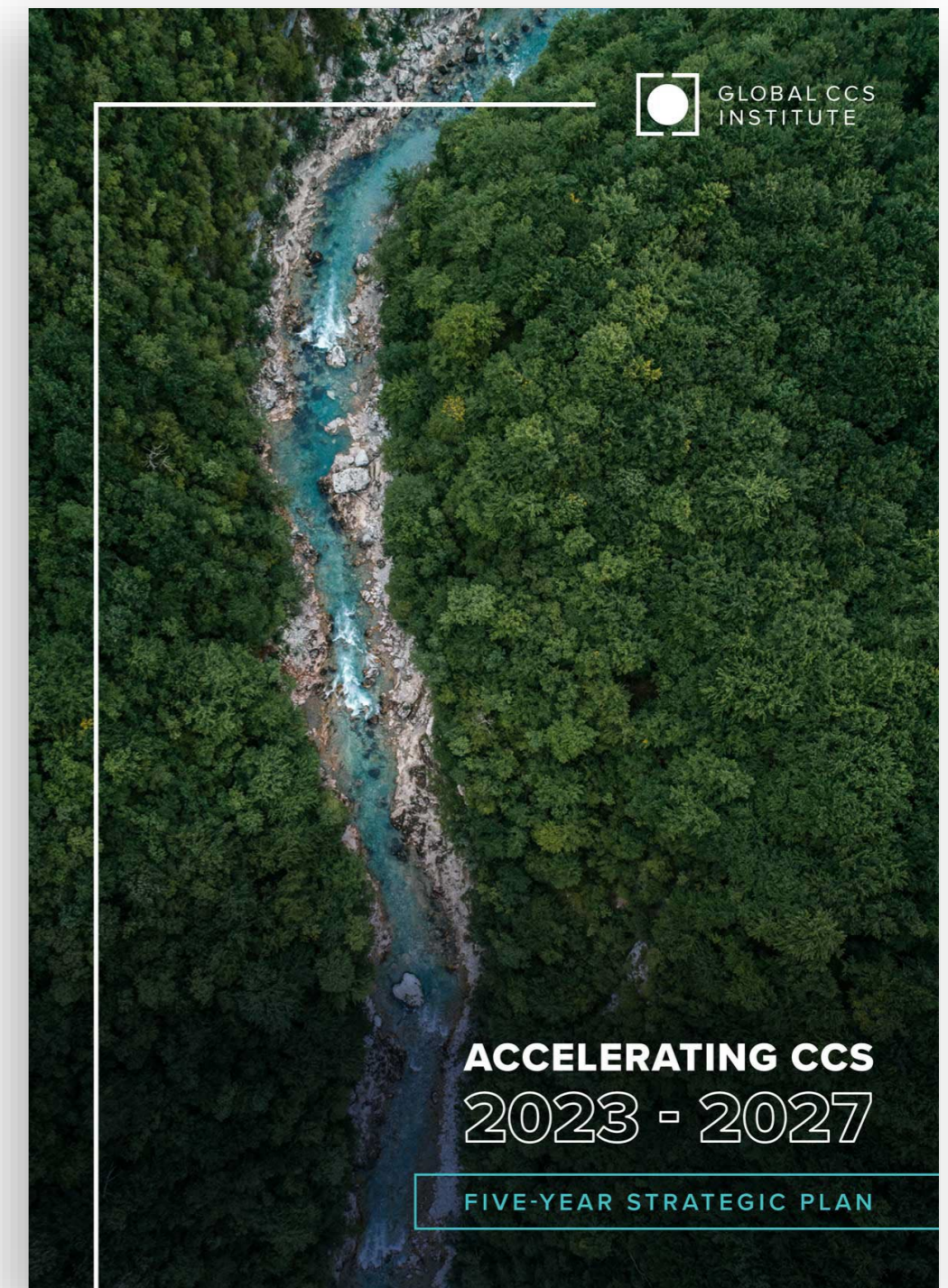
WHO WE ARE

International CCS think tank with offices around the world.

Over 200 members across governments, global corporations, private companies, research bodies, and NGOs, all committed to a net-zero future.

WHAT WE DO

Fact-based influential advocacy, catalytic thought leadership, authoritative knowledge sharing.



WHERE ARE PIPELINES NEEDED?

Over 5,000 miles of CO₂ pipelines in the US¹

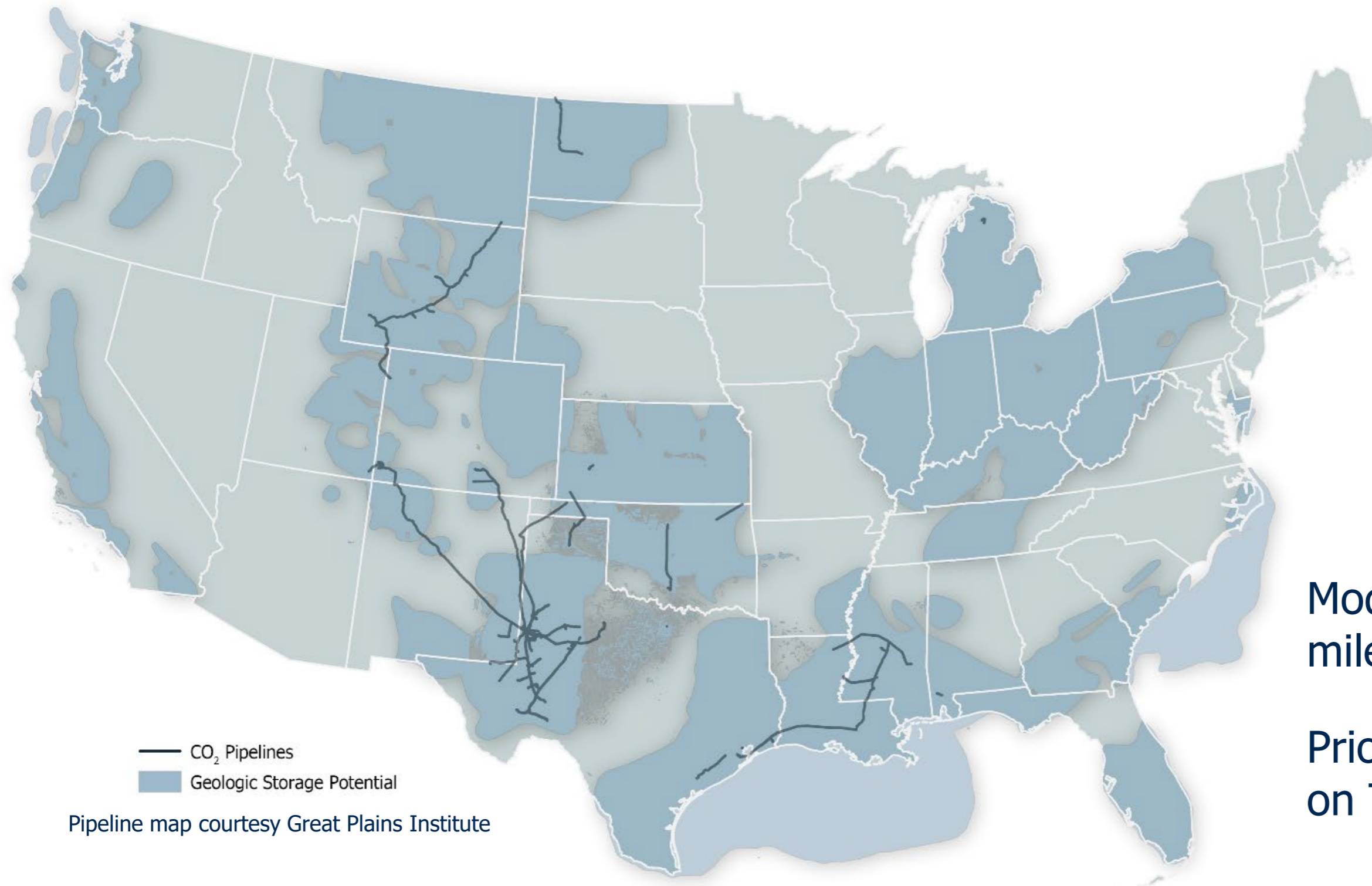
Four regions:

- Michigan
- Mountain West/ND
- Southwest
- Gulf Coast

More than 66 MtCO₂ transported annually²

Models suggest 30,000-96,000 miles needed by 2050³

Priority pipelines will be discussed on Task Force day two



Pipeline map courtesy Great Plains Institute

¹[PHMSA \(2022\) Annual Report Mileage for Hazardous Liquid or Carbon Dioxide Systems](#)

²[NPC \(2019\) Meeting the Dual Challenge. A Roadmap to At-Scale Deployment of Carbon Capture, Use, and Storage. Volume III, Chapter Six - CO₂ Transport](#)

³[DOE \(April 2023\) Pathways to Commercial Liftoff: Carbon Management](#)



LEGAL AND REG. STATE-OF-PLAY











Permitting can include multiple steps, levels of government: obtaining rights of way, conducting environmental assessments, providing public notice, undertaking community engagement

Federal

- PHMSA¹ regulates pipeline safety through [49 CFR Part 195](#)
- Siting authority held by federal agencies for pipelines only on federal lands (DOI agencies: BLM², Forest Service, etc.)
- Offshore pipelines regulated by PHMSA or BSEE³

State

- In most states, PHMSA Office of Pipeline Safety certifies state-level agencies to inspect and enforce pipeline safety regulations for intrastate gas pipeline operators.
- State agencies often adapt regulations in [49 CFR Part 195](#)

Portion of the CCUS efforts*	Authorization	Authorities that may require permits/permissions	Type of Agency
	Land use	Local government, Federal Government (public lands)	City Council, Federal Land Manager (USFS, BLM, etc.)
	Discharges to surface water	State and/or Federal Government	State Department of Environmental Quality, U.S. Environment Protection Agency
	Discharge of dredge or fill materials to waters of the U.S.	State and/or Federal Government	U.S. Army Corps of Engineers and or relevant State office (Florida, Michigan and New Jersey)
	Endangered species	State and/or Federal Government	State Environmental or Natural Resources Department, U.S. Fish and Wildlife Service, NOAA Fisheries
	Greenhouse gas reporting	State and/or Federal Government	State Environmental Department, U.S. Environment Protection Agency
	Air permits	State and/or Federal Government	State Environmental Department, U.S. Environment Protection Agency
	CO ₂ pipeline safety	State and/or Federal Government	State and Federal Departments of Transportation
	Siting CO ₂ pipelines	Local, State, and Federal Government	State Transportation Department or Utility Commission; Federal Land management agencies
	Pore space ownership and mineral rights	Local, State, and Federal Government (if Federal lands)	Determined by State-specific law, Federal agency managing Federal Lands to be used
	CO ₂ injection (and sequestration) permitting	State and/or Federal Government (some states have primary for Class VI permitting)	State Environmental Department, U.S. Environment Protection Agency

 Denotes Utilization,
  Denotes capture,
  Denotes transportation, and
  Denotes geologic sequestration

**Federal responsibility is listed together with exemplary state and local governments (which vary depending on local context). For Tribal lands/sovereign nations, the Tribal government will have oversight.

¹ Pipeline and Hazardous Materials Safety Administration, DOT

² Bureau of Land Management, DOI

³ Bureau of Safety and Environmental Enforcement, DOI

CO₂ PIPELINES IN STATE STATUTES

- Pipeline siting decisions are largely governed by states, except when pipelines cross federal land or rely on federal funds.
 - Some states include CO₂ pipelines in their statutes, others do not.
- In addition to meeting siting requirements, pipeline developers must obtain rights of way.
 - Operators must negotiate accessing rights of way through permits on public land or the purchase of easements to cross private land.
- Some states provide a legal route for developers to explore and utilize eminent domain, while others have unclear requirements regarding the use of eminent domain.
- Once built, operators must conduct maintenance and safety inspections consistent with state-level and PHMSA regulations and manage their compliance with permits and agreements governing public and private rights of way access.



CO₂ PIPELINES IN STATE STATUTES

States exercise common carrier and eminent domain requirements in different ways¹

CO ₂ pipelines included	General pipeline permitting requirements		Common carrier/eminent domain requirements		Unclear or nuanced common carrier/eminent domain requirements	CO ₂ pipeline companies can exercise eminent domain	Unclear or nuanced whether CO ₂ pipeline companies can exercise eminent domain	
Illinois Indiana Iowa Kentucky Louisiana Maryland Michigan Montana New Mexico South Dakota Texas Washington	Alaska Arkansas California Connecticut Florida Georgia Hawaii Illinois Indiana Iowa Kentucky Louisiana Michigan Minnesota Mississippi Montana	Nevada New Hampshire New Jersey New Mexico New York North Carolina North Dakota Oklahoma Oregon Rhode Island South Dakota Texas Vermont Virginia Washington Wyoming	Alabama Arkansas California Colorado Florida Kansas Maryland Michigan Montana North Carolina North Dakota	Ohio Oklahoma Oregon Pennsylvania Rhode Island South Carolina South Dakota Tennessee Texas Vermont Washington	Alaska Connecticut Idaho Illinois Kentucky Massachusetts Minnesota Nevada New Jersey	Arizona Illinois Indiana Iowa Kentucky Louisiana Michigan Mississippi Missouri Montana New Mexico North Carolina North Dakota Pennsylvania South Dakota Texas Wyoming	Alabama Alaska Arkansas Colorado Connecticut Florida Georgia Idaho Kansas Maine Maryland Massachusetts Nebraska Nevada	New Jersey New York Ohio Oklahoma Oregon Rhode Island Tennessee Utah Vermont Virginia Washington West Virginia Wisconsin

¹NARUC (2023) *Onshore U.S. Carbon Pipeline Deployment: Siting, Safety, and Regulation*



CHALLENGES FOR CO₂ PIPELINES

- Pipelines are costly and technically challenging – revenue model for the US CCS market is still emerging and uncertain
- Public opposition is strong in some parts of the country
- Definition of CO₂ (narrow federal definition of >90% CO₂ in supercritical state¹)
- Siting and permitting authorities vary state-by-state
- Varying state definitions of “common carrier”
- When authority falls to local government, operators may need to deal with dozens of counties along pipeline route
- No economic oversight through the Federal Energy Regulatory Commission (FERC) and Surface Transportation Board (STB)
 - FERC/STB regulate the rates of interstate oil/natural gas and non-energy pipelines, respectively—both have declined jurisdiction over interstate CO₂ pipelines¹
 - Economic regulation falls to states – many have no such laws/rules in place¹

¹[*NARUC \(2023\) Onshore U.S. Carbon Pipeline Deployment: Siting, Safety, and Regulation*](#)



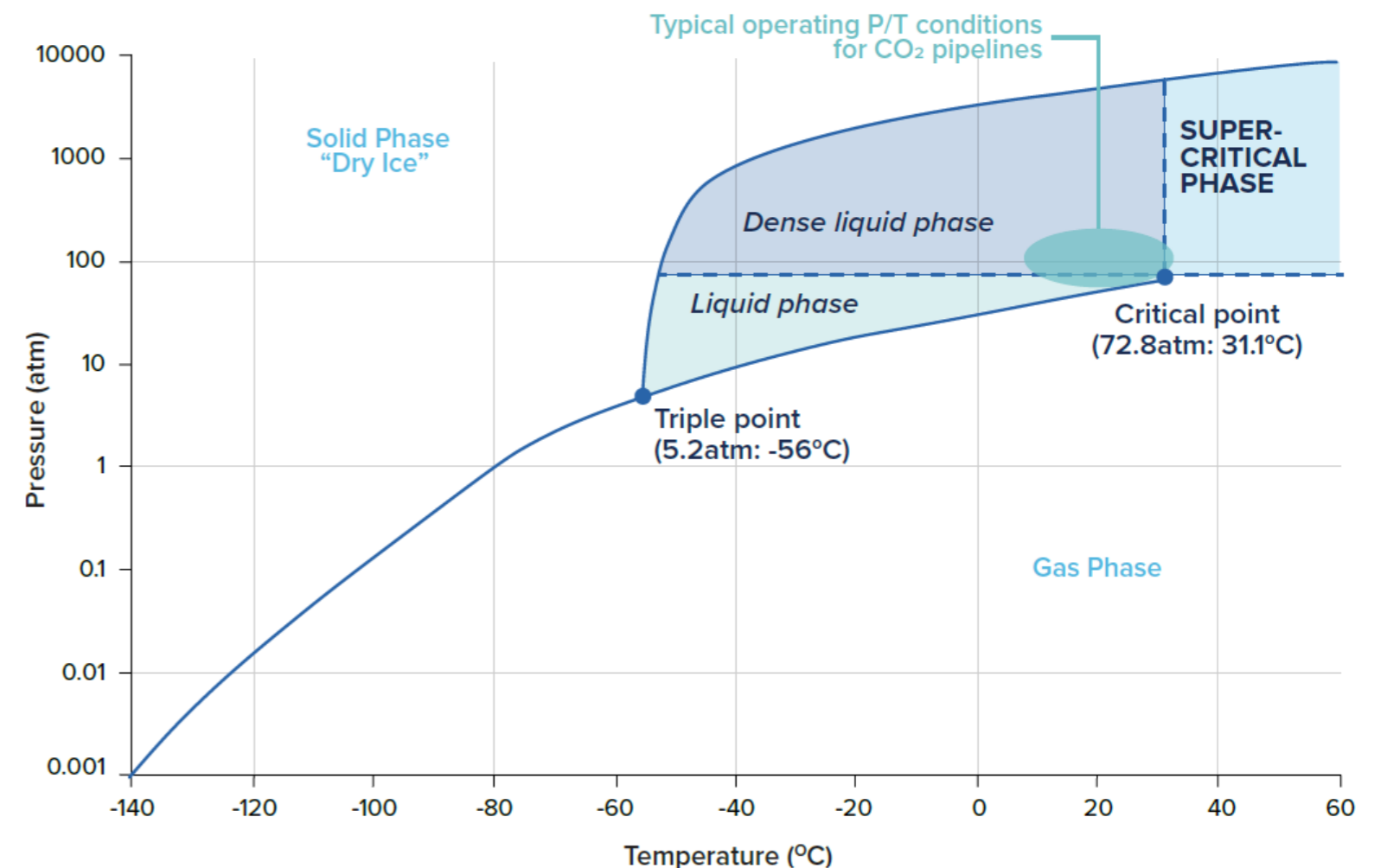
PIPELINE SAFETY, RISKS, BEST PRACTICES

CO₂ Hazards

- Properties and phase behavior of CO₂
- Exposure limits
- Streams and impurities

Pipeline Safety

- History (including Satartia), design, materials, fracture control, dispersion modeling, emergency response, route selection
- Requalification/conversion to service
- Research (including Spadeadam test facility)



Carbon dioxide phase diagram (after Mazzoldi et al., 2008).



THE NEED FOR COMMUNITY ENGAGEMENT

Community Engagement

- Community Concerns
- Environmental Justice
- Guidelines (API RP 1185, US DOE FECM Framework)

Benefits of CCS

- Community Benefits Plans, Justice40
- Possible Reduction of co-pollutants
- Economic benefits



TASK FORCE CONSIDERATIONS

Barriers to CO₂ pipeline permitting must be addressed to enable efficient, orderly, and responsible deployment of carbon management technologies

- **Regulatory clarity:**

- Clarity of siting/permitting authority at each govt. level and jurisdiction (Federal, State, Local)
- Step-by-step procedures within permit processes
- Existing models for streamlining where possible

- **Safety:**

- Clear and consistent standards
- Appropriate risk analysis, impact assessments, and emergency response protocols

- **Community Engagement:**

- Best practices and guidelines for robust community engagement



NEW REPORT

Building Our Way to Net Zero: Carbon Dioxide Pipelines in the United States

A resource for the communities, government officials, NGOs, to learn the facts about:

- Why the world needs to mitigate CO₂ emissions
- Why CO₂ pipelines are vital infrastructure required to address climate change
- The legal and regulatory state of play of CO₂ pipelines in the US
- CO₂ and pipeline safety, risks, and best practices
- The need for community engagement

We must responsibly build the carbon management infrastructure needed to mitigate CO₂ emissions and achieve net-zero emissions by 2050.



THANK YOU