Methane
The Basics & Challenges

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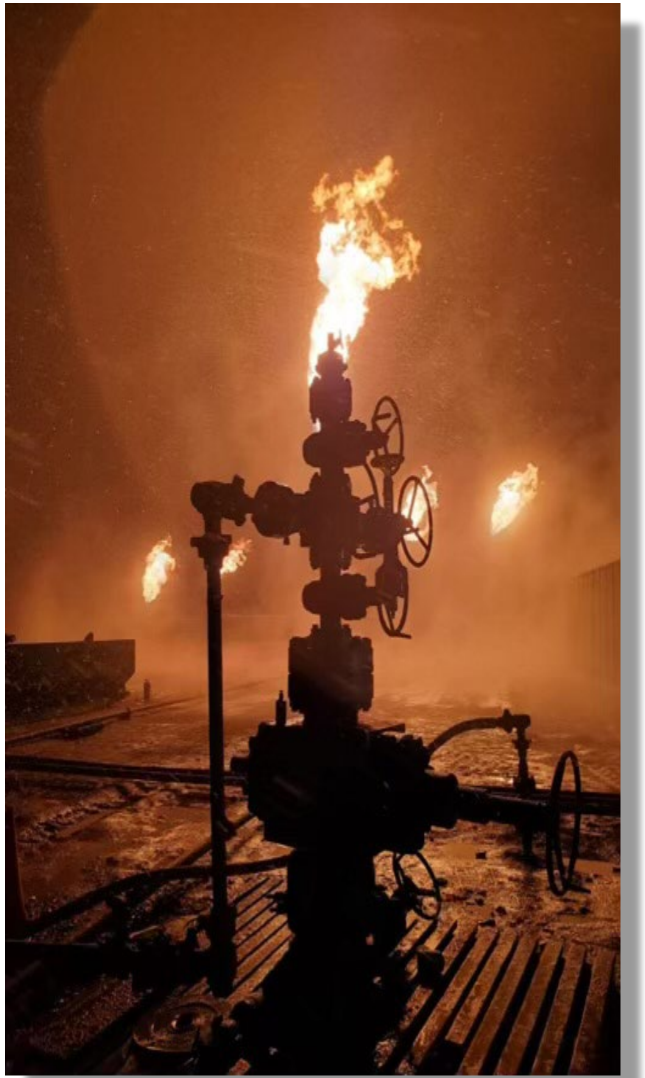
Climate Week 2025

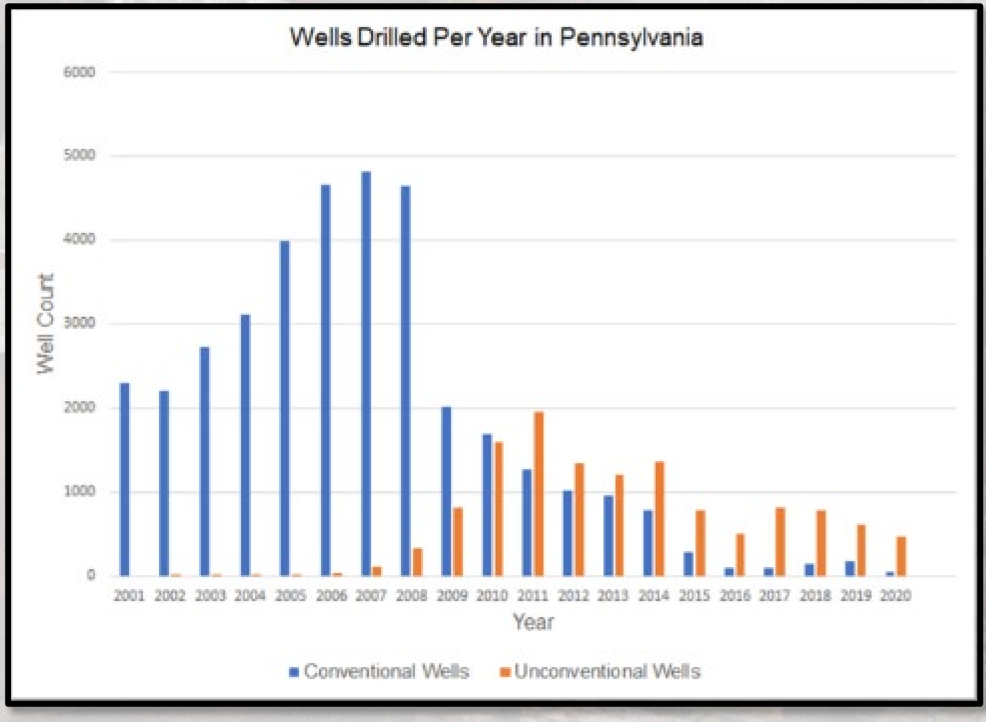
- COP30 CEO **Ana Toni** emphasized that focusing on reducing methane emissions in the fossil fuel sector is essential to lowering the pace of global warming. She noted that “Methane has been responsible for about 30% of the greenhouse gas effect.
- **Michael Bloomberg** emphasized that reducing methane emissions is the best opportunity to move quickly against climate change effects. He noted that “Methane emissions are a primary driver of climate change, and reducing them are one of our best opportunities we have to make fast progress. We can do this simply by fixing leaking gas wells.”
- According to the **UNEP**, methane currently accounts for about 1/3 of the global warming caused by humanity. Therefore, reducing methane is one of the fastest and most cost-effective ways to limit peak warming in the short-term.

Methane Emissions



OIAM Well Plugging

- There are millions of OIAM oil & gas wells throughout the United States and a significant percentage of these wells are venting and have the potential to emit considerable volumes of methane. Methane gas is ~84 times more hazardous than carbon dioxide and have the potential to harm human health & the environment.
- Often, these wells are contributing to ground and surface water contamination.
- Unlike nature-based credits, plugging these wells has an immediate impact by reducing environmental threats, reducing emissions, enhancing biodiversity, and more.



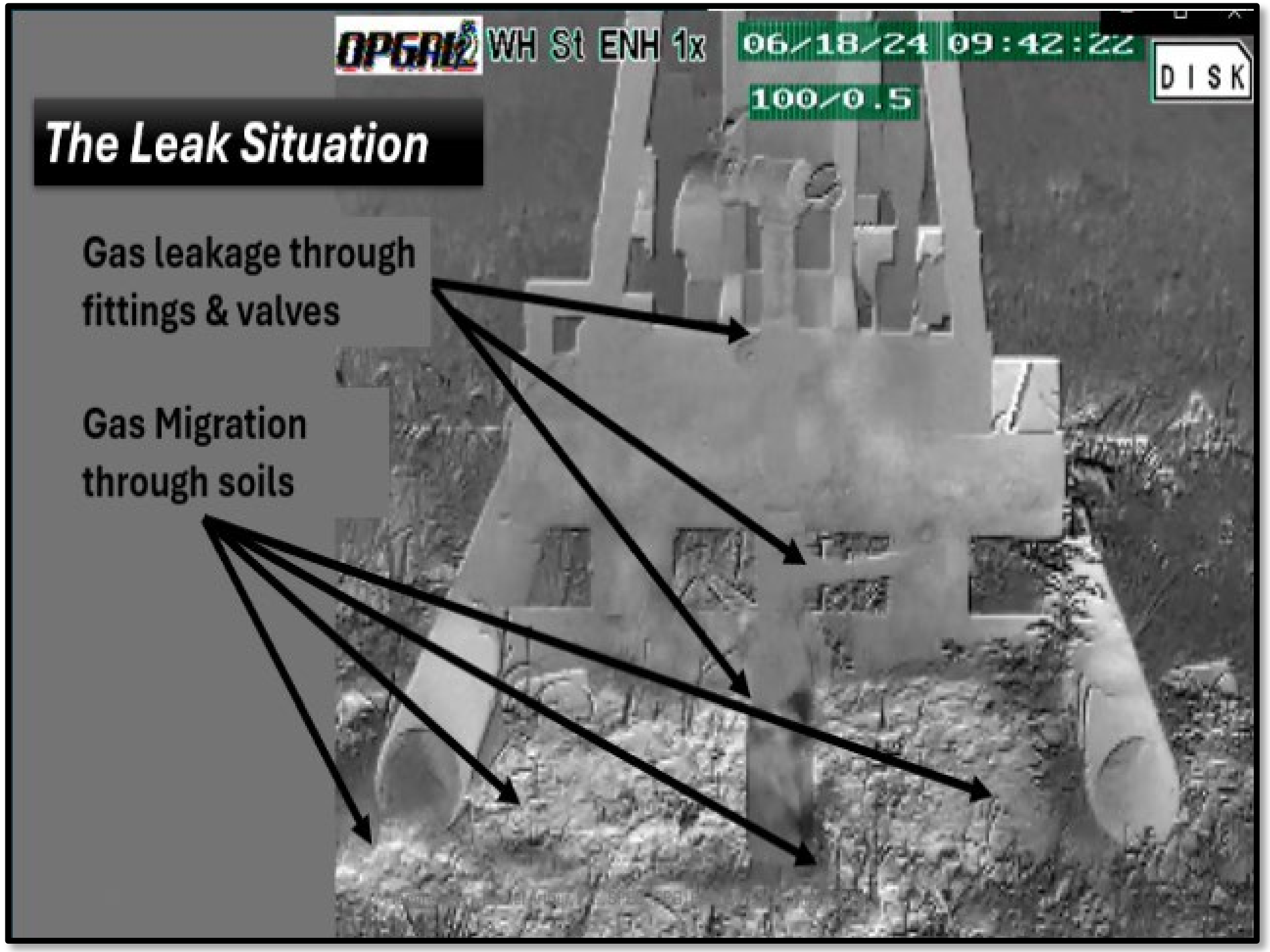
Available Options To Plug OIAM Wells…

- State Plugging Programs
- Federally Funded Plugging & Reclamation Programs
- Industry Groups
- Well Operator for Marginal/Idle Wells
- Landowners
- Private Sector Incentives
  - Carbon Credits/Carbon Market
  - Bio-Diversity Credits
  - Environmental Improvements (Wetlands, Wildlife Habitat, Proximity, etc.)
  - Plugging in advance of new development projects
- Charitable actions
- Other?

Oil City Legacy Registry

Robust & Conservative Quantification of Eliminated & Avoided Emissions

- **Direct Measurement Solution**: Uses pre- and post-plugging emission measurements for dynamic, data-driven crediting.
- **Calculated Approach**: Uses publicly available historical production data and industry standard decline curve analysis with a probabilistic failure model to project future emissions.
- Other (e.g., Volumetrics, etc.)

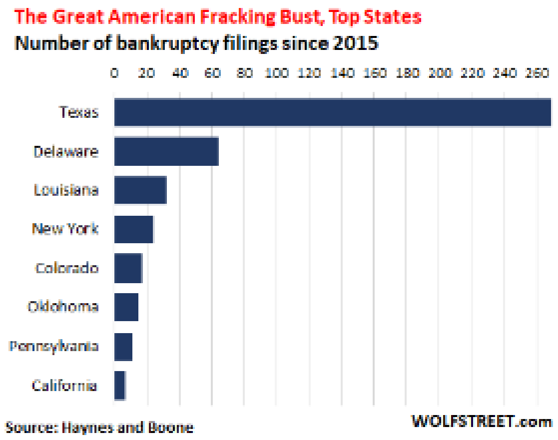


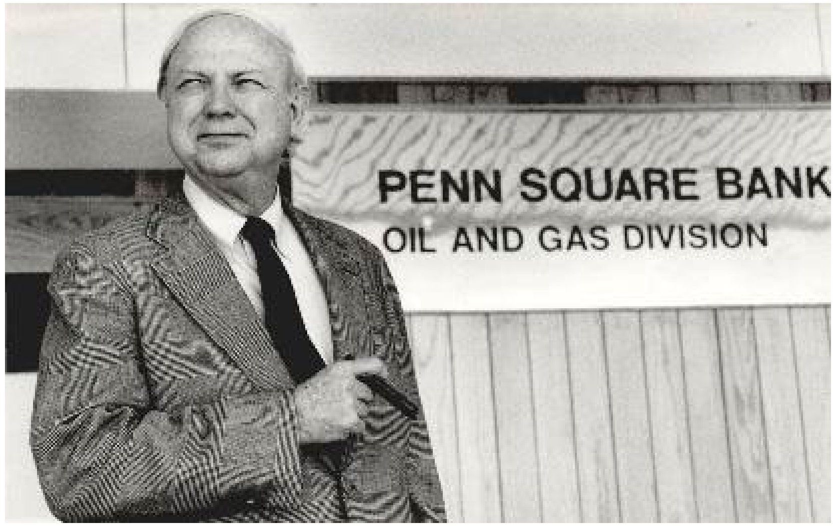
Well Plugging Registries/Platforms

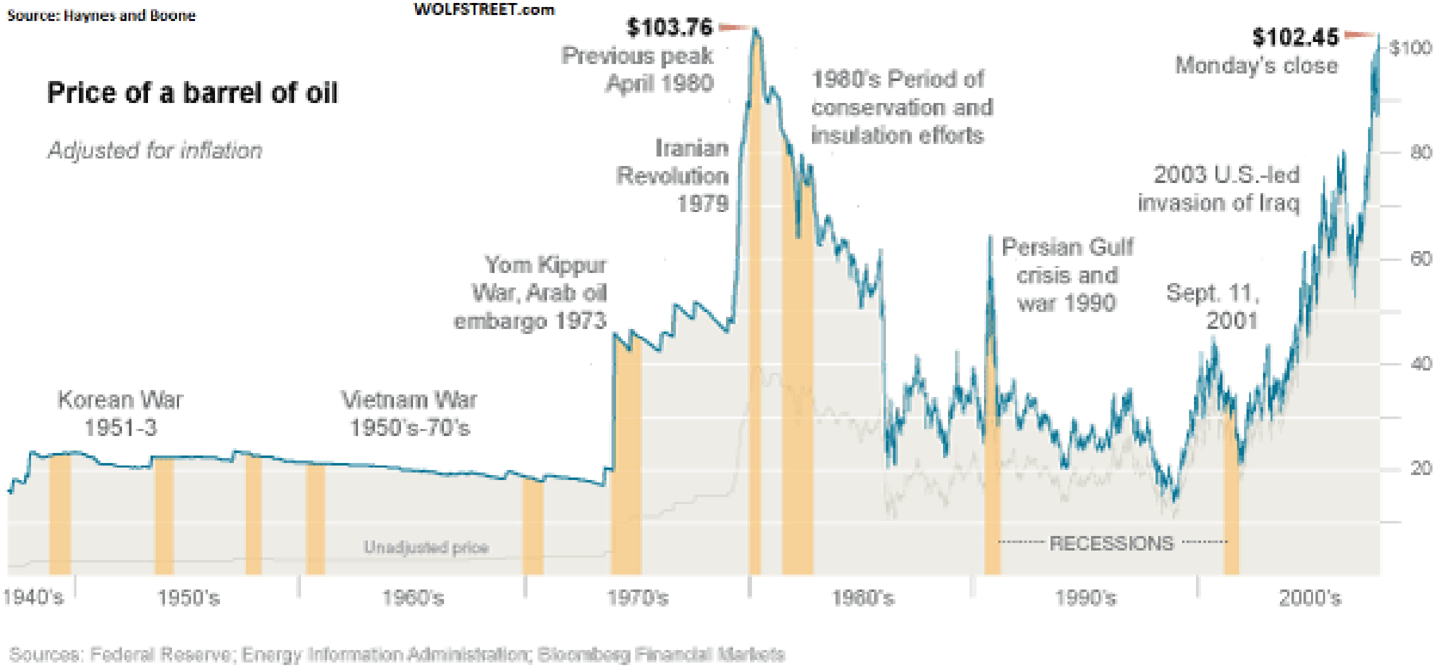
Registry/Protocol	Eligible Wells	Focus	Method	Multiple Options
ACR (Orphan Wells)	Orphans Only	High Volume Gas Wells	Two 2-hour flow measurements	No
CarbonPath (Orphan Wells)	Orphans Only	High Volume Gas Wells	One representative flow measurement	No
CarbonPath (Early Retirement)	Marginal Wells	Oil or Gas Wells	DCA/Reserve Analysis	No
BCarbon (MEETWP)	Idle or Orphan	Gas Wells or Wells with Associated Gas	DCA and Leak Modeling	No
ICR (Early Retirement)	Marginal	Oil or Gas Wells	DCA/Reserve Analysis	No
Oil City Leg. (OIAM Wells)	OIAM Wells	Oil or Gas Wells	Multiple Options	Multiple Available
Verra	TBD	TBD	TBD	TBD
Gold Standard	TBD	TBD	TBD	TBD
Others	Several other protocols are under various stages of development. Some include registries and others manage governance without a registry's involvement.			

Additionality for AIM Wells?

- Oil & Gas are ultra-critical commodities and are often used by the U.S. and other countries for a variety of manipulative purposes.
- In 1982, because of the bankruptcy of Penn Square Bank, it's estimated that over 1,000 oil & gas companies were bankrupted.
- Commodity prices, governmental practices, & price manipulations are far beyond the control of any oil & gas company, especially smaller independent operators of MCWs, which make up over 85% of all the Abandoned, Idle, & Marginal (AIM) Conventional Wells in the U.S.







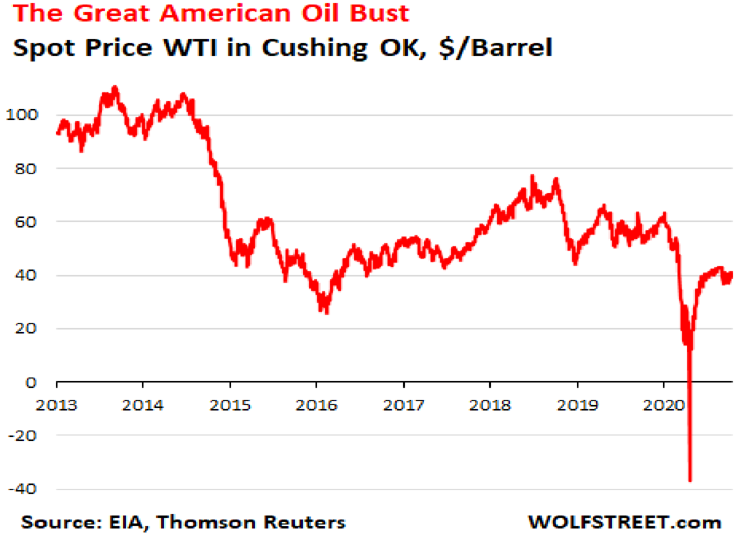
O&G Companies Don’t Control the Price of Oil

Like other commodity-based industries, prices can very massively without warning. In energy, this has happened since the 1880s and can occur without warning, often leading to significant bankruptcies and operating wells turning into orphans unexpectedly.

Largest Oil & Gas Bankruptcy Filings, Q1-Q3 2020

	Filing date		Sector	Debts in Billion $
1	Apr-26	Diamond Offshore	OFS	11.8
2	Jan-21	McDermott	OFS	9.9
3	Jun-28	Chesapeake	E&P	9.2
4	15-Jul	California Resources	E&P	6.3
5	May-14	Ultra Petroleum	E&P	5.6
6	May-22	Unit Corporation	E&P	4.8
7	31-Jul	Nobel Corporation	OFS	3.9
8	12-Jul	Hi-Crush	OFS	3.8
9	Apr-01	Whiting Petroleum	E&P	3.6
10	16-Aug	Chaparral Energy	E&P	3.5
11	30-Jul	Denbury Resources	E&P	2.5
12	30-Sep	Oasis Petroleum	E&P	2.3
Total Debts				67.1

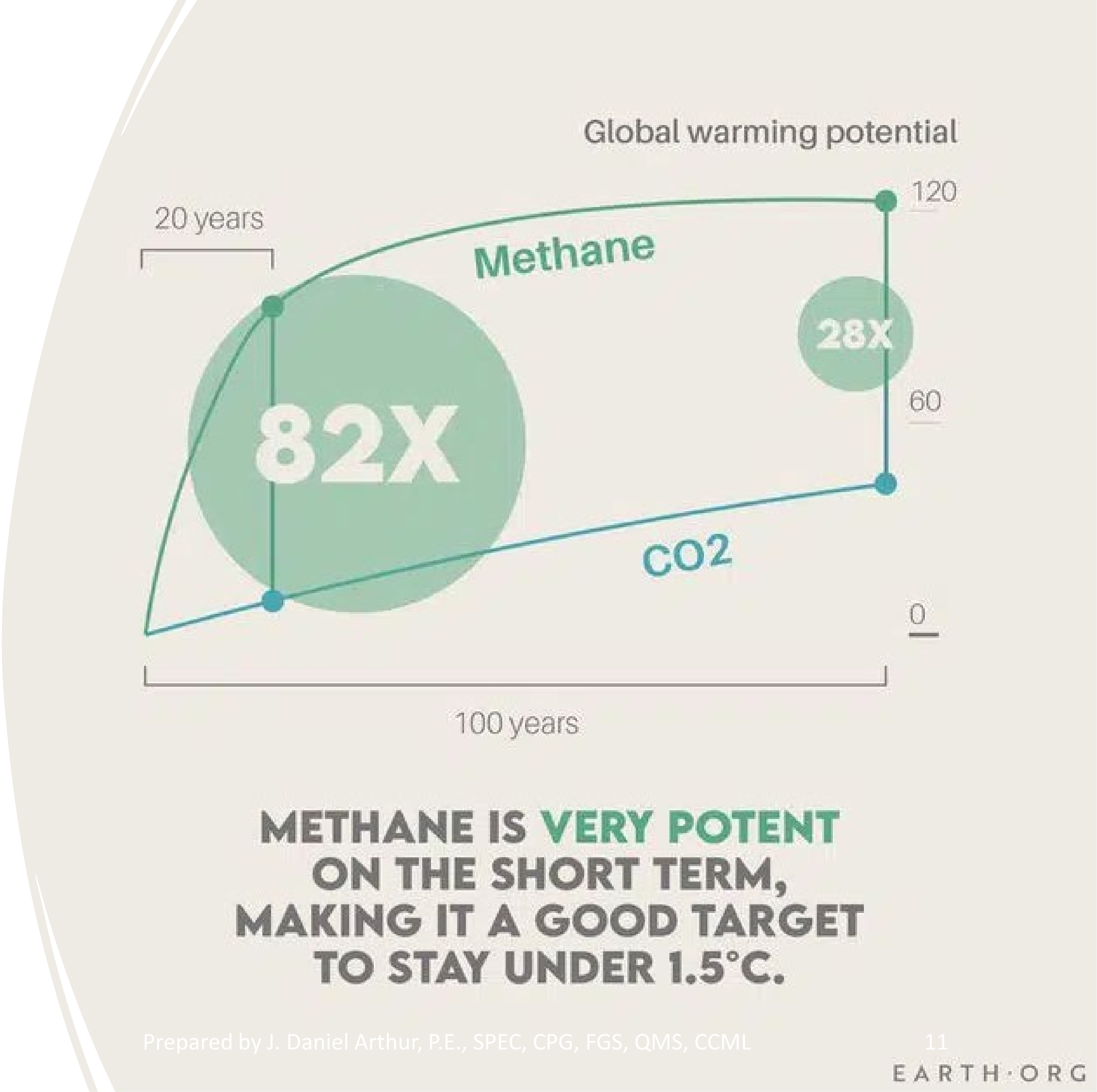
Source: Haynes and Boone WOLFSTREET.com



Is Bonding or Holding "Big Oil" Accountable the Solution?

- Local, state & federal governments deal with a variety of challenges.
- States are both responsible for protecting the environment (for example), but also for managing resources and generating income for use for a variety of public purposes.
- Increasing bonding could limit production due to increased costs or limit development until commodity prices increase. Increased operating costs (e.g., bonding) could lead to higher prices, higher costs for products like gasoline, home heating, and more.
- A major challenge for governments is trying to control things like inflation, so doing things that might intentionally increase inflation or push companies to do business in another state are real challenges.
- Regulatory solutions are rarely as simplistic as we would like them to be.

Other Considerations



Challenges of The Carbon Market

- **<u>Selling Carbon Credits</u>**
- Methodologies/Protocols & Challenges
- Who has the “Best” Methodology?
- Well Plugging vs Other Methodologies
- Measurement vs Projections
- Big Four Carbon Registries or???
- Validation & Verification Bodies
- Registry or No Registry (Is a Registry Needed?)
- Carbon Ratings and Optics
- Permanence, Leakage, and Other Questions
- Is Meeting Regulatory Requirements Sufficient?
- Educating the Market & Mud Slinging

- Voluntary vs Compliance Markets
- Project Developers & Expectations
- Costs vs Cost Expectations
- Costs to Plug a Well and Reclaim a Well Site
- Ownership of the Wellbore
- Ownership of Generated Credits
- Mineral Interests
- Contracts & Agreements
- Legal Aspects
- Insurance/Warranties/Risks?
- Long-Term Plugging Funds
- Is Progress Being Made?

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Certified Carbon Management Leader (CCML)
VVB to Multiple Carbon Registries and Developers
Served as Expert to the USDOE/DOI (MERP)
Served as Expert to the SEC
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Experience throughout the US & Internationally
Gas Migration Investigation (GMI) Expert
Certified Project Management Professional (PMP)

WCS WELL CONTROL SCHOOL
NATIONAL ACADEMY OF FORENSIC ENGINEERS
SPE International Society of Petroleum Engineers
NCEES advancing licensure for engineers and surveyors
ASCE AMERICAN SOCIETY OF CIVIL ENGINEERS
PETROLEUM HISTORY INSTITUTE
AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS AAPG 1917
The Geological Society serving science & profession
SSA Seismological Society of America
National Society of Professional Engineers
INTERNATIONAL ASSOCIATION OF WELL CONTROL INSTRUCTORS