




TAMEST Shale Task Force

Read the Report: tamest.org/shaletaskforce

About TAMEST

- TAMEST is Texas' premier scientific organization, bringing together the state's best and brightest scientists and researchers.
- TAMEST membership includes all Texas-based members of the National Academies of Sciences, Engineering and Medicine and the state's Nobel Laureates.
- 18 research universities are affiliates of TAMEST.

About TAMEST

- TAMEST works to promote Texas as a destination for outstanding research, supports rising star researchers in the state and serves Texas as an intellectual resource.
- The TAMEST Board of Directors commissioned this National Academies-style study to help inform state policymakers and the public.
- The task force includes expert representation by academia, industry, an NGO and government.

Shale Task Force

Sponsored and Conducted by

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Statement of Task

- Evaluate the scientific basis of available body of information
- Communicate current state of knowledge

- Key steps:
  - Review methodologies and approaches
  - Identify gaps
  - Suggest improvements
  - Make recommendations

Task Force Membership

Christine Ehlig-Economides – Chair

Air

David Allen – Lead

Ramón Alvarez

Matthew Harrison

Land

Melinda Taylor – Lead

Joseph Fitzsimons

Tracy Hester

Water

Danny Reible – Lead

Denny Bullard

Michael Young

Seismicity

Brian Stump – Lead

Kris J. Nygaard

Craig Pearson

Transportation

John Barton – Lead

Cesar Quiroga

General

Amelie G. Ramirez

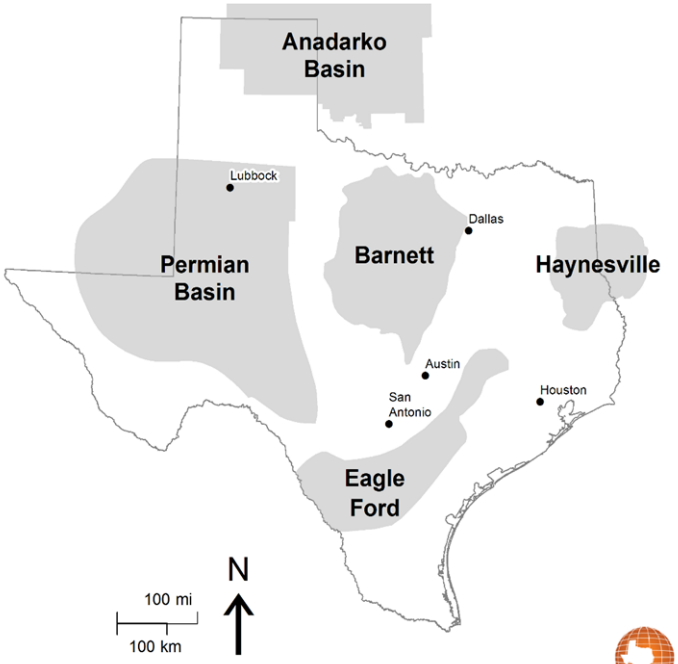
Economic/Social

Gene Theodori – Lead

Omar Garcia

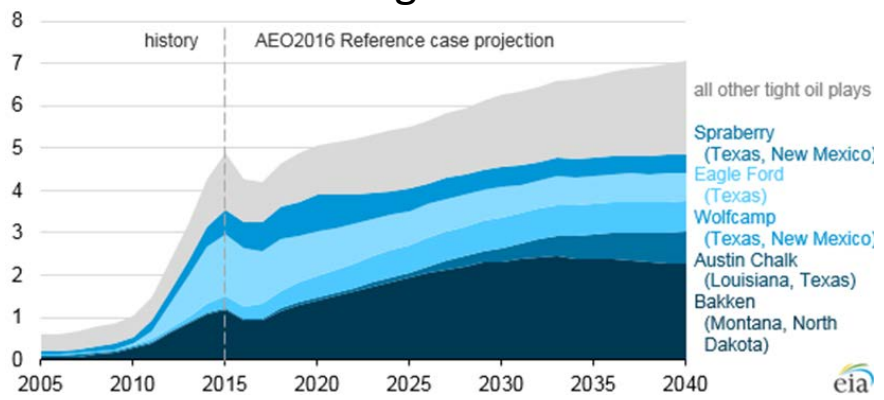
Urs Kreuter

The Texas Shale Experience

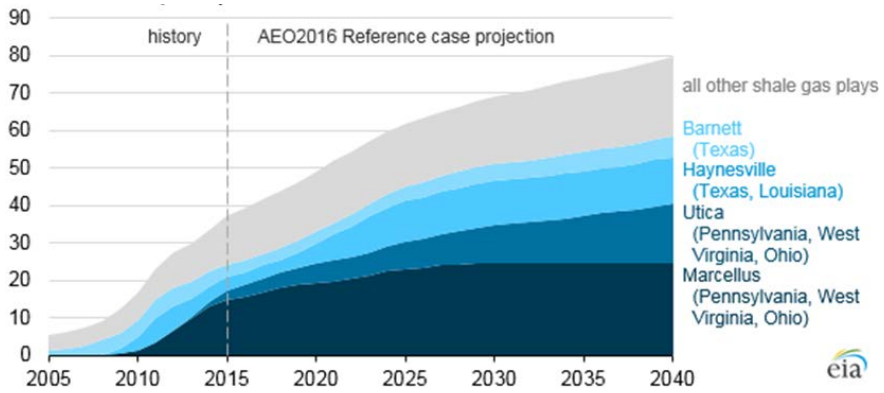


Bureau of Economic Geology

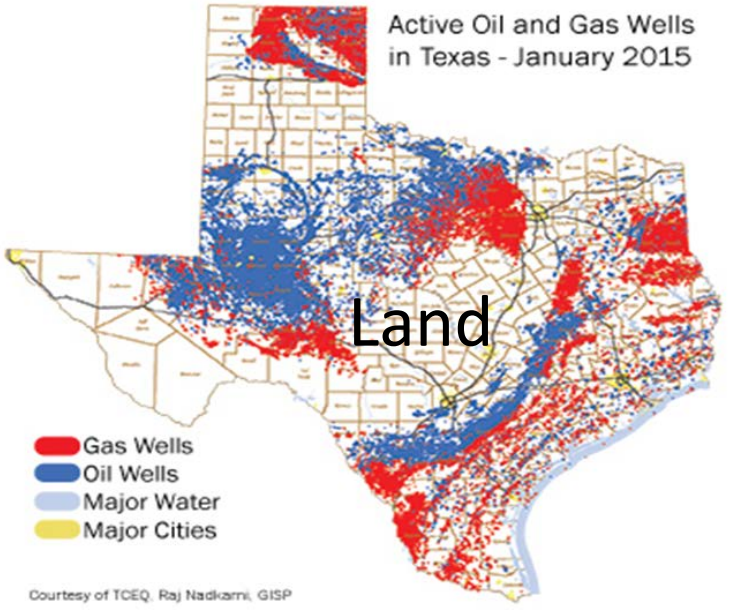
Tight Oil

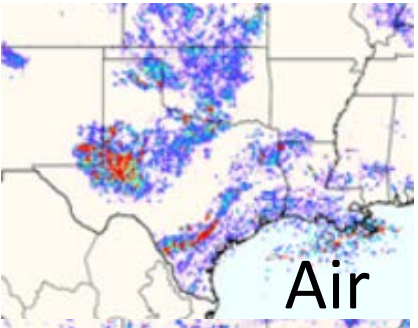


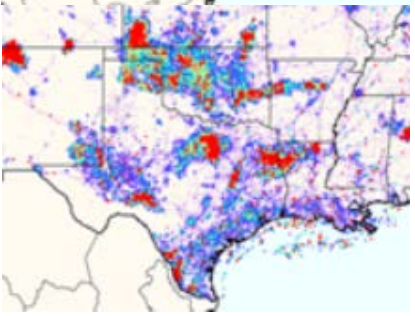
Natural Gas

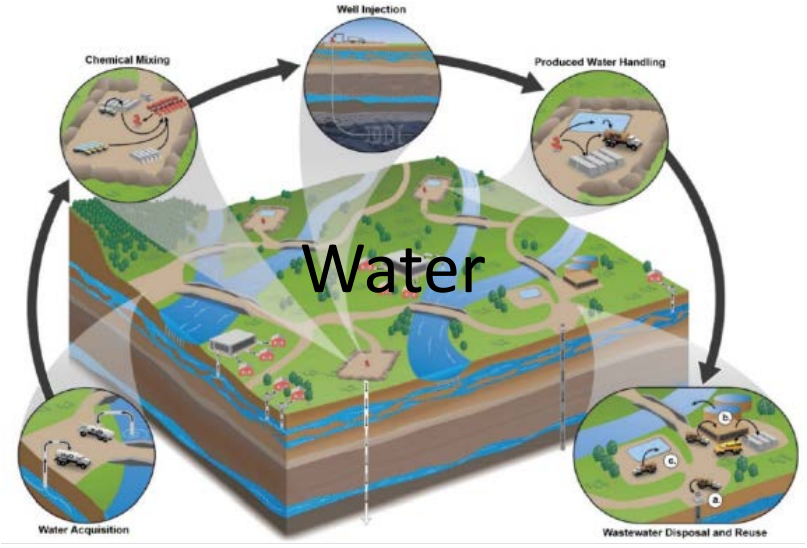


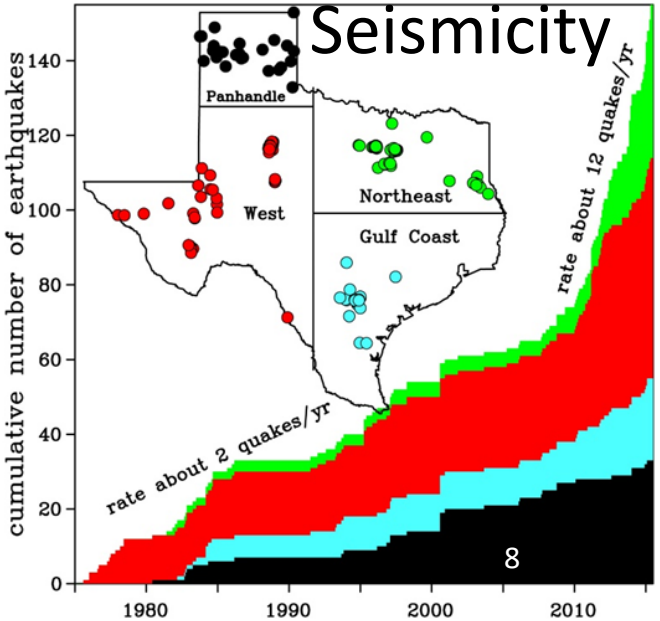
Environmental Impacts











Air Quality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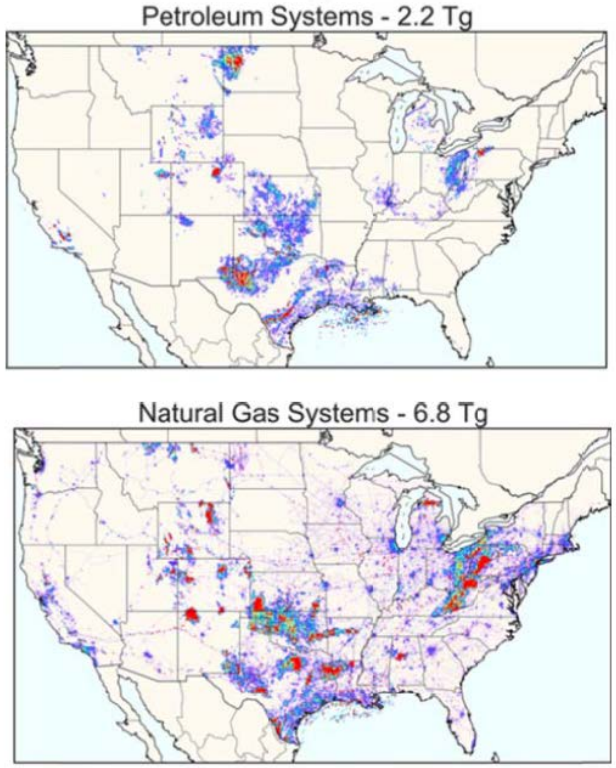
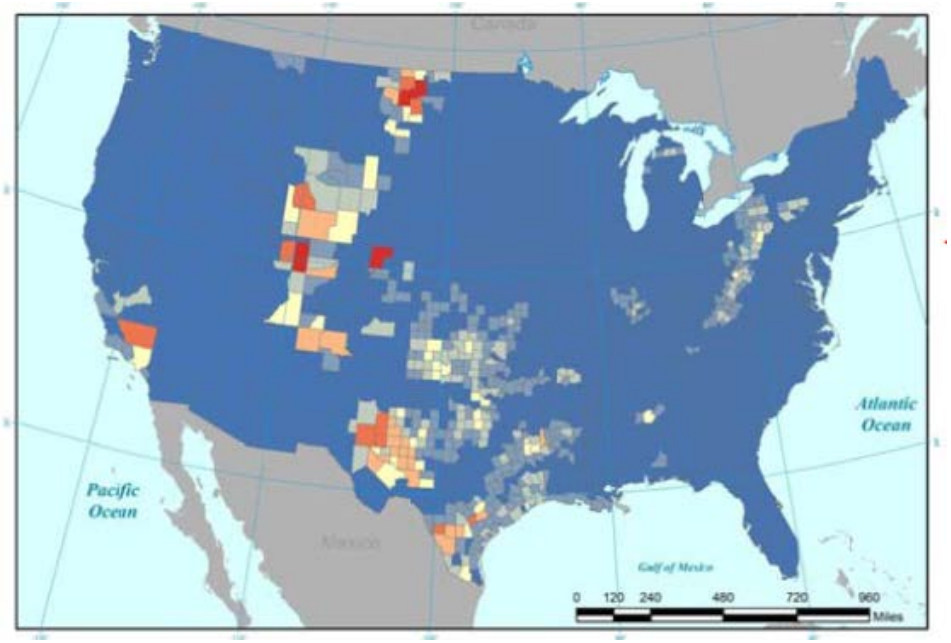
The production of shale resources results in emissions of greenhouse gases, photochemical air pollutants, and air toxics.

Greenhouse gas (methane) upstream and processing emissions



Volatile organic compound upstream oil and gas emissions



Recent federal and state regulations have reduced emissions from multiple types of emission sources.

Examples: Federal

- New Source Performance Standards OOOO and OOOOa:
  - Requirements of reduced emission well completions for gas wells
  - Tanks with potential emissions of >6 tons/yr must have emission controls
  - Leak Detection and Repair Standards

Examples: State

- State permits can require emission controls beyond federal standards, particularly in regions that do not meet National Ambient Air Quality Standards

Emissions in many categories associated with shale resource production are dominated by a small sub-population of high-emitting sources.

Case study: two source categories for methane emissions

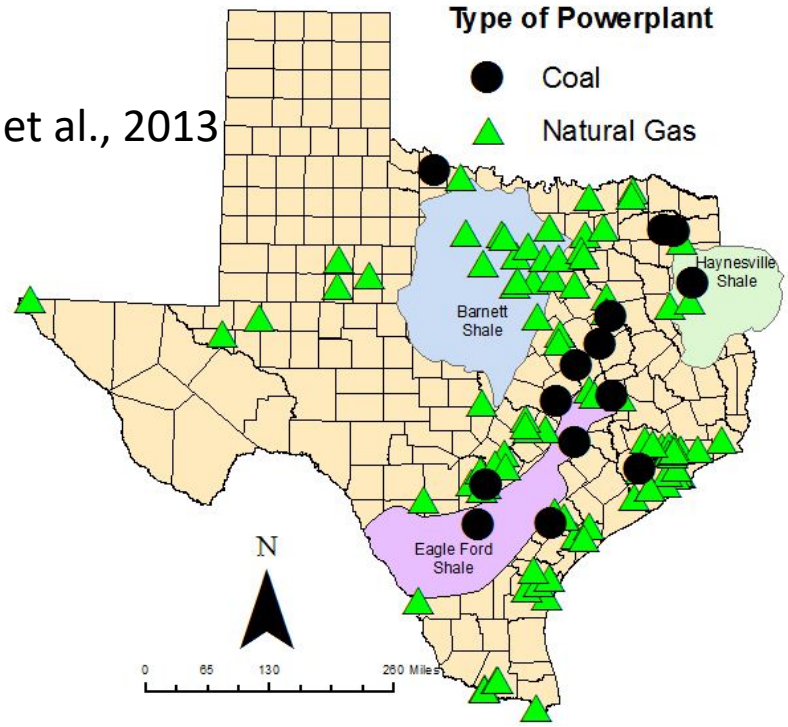
- ~50,000 wells (of the roughly 500,000 natural gas wells in the United States) vent during a process referred to as a liquid unloading, a small fraction (~3 to 5%) likely account for half of unloading emissions
- Pneumatic controllers use pressurized natural gas to control the opening and closing of control valves, and are estimated to be the largest source of methane emissions in the petroleum and natural gas supply chains; ~20 percent of pneumatic controllers at natural gas sites account for 95 percent of pneumatic controller emissions

Development of inexpensive, robust, reliable, and accurate methods of rapidly finding high-emitting sources has the potential to reduce emissions.

Optical Gas Imaging Camera being used to scan a wellhead for leaks (Source: University of Texas)

Shale resource development both directly and indirectly impacts air quality. Indirect impacts include reductions in emissions associated with the substitution of natural gas for coal in electricity generation. Comprehensive assessments of both direct and indirect impacts to air quality from the production of shale resources are complex.

Pacsi, et al., 2013



- Electricity generation and emissions from natural gas power plants increase
- Electricity generation and emissions from coal power plants decrease
- Production and emissions in natural gas production regions increase
- Net: Decreases in emissions state-wide

There is limited information concerning exposures to air toxics emissions and their corresponding health impacts. Targeted research in this area should be conducted

Source: TCEQ

Eagle Mountain Lake site, operated by the TCEQ in the Barnett Shale, makes hourly measurements of dozens of hydrocarbons

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