Air Quality and Climate Impacts of Shale Gas Operations

Prepared for December 12 2013

Presented by Matt Walker, Clean Air Council

Clean Air Council

Protecting everyone's right to breathe clean air

Clean Air Council
Marcellus Shale Program

- Track current rules and regulations and issue legal comments
- Educate the public about air quality and health impacts
- Train residents in participating in regulatory process for shale gas equipment
- Work with residents to pressure polluters or agencies on proposed equipment
- Sue polluters or agencies when needed

Why be concerned about air quality impacts?

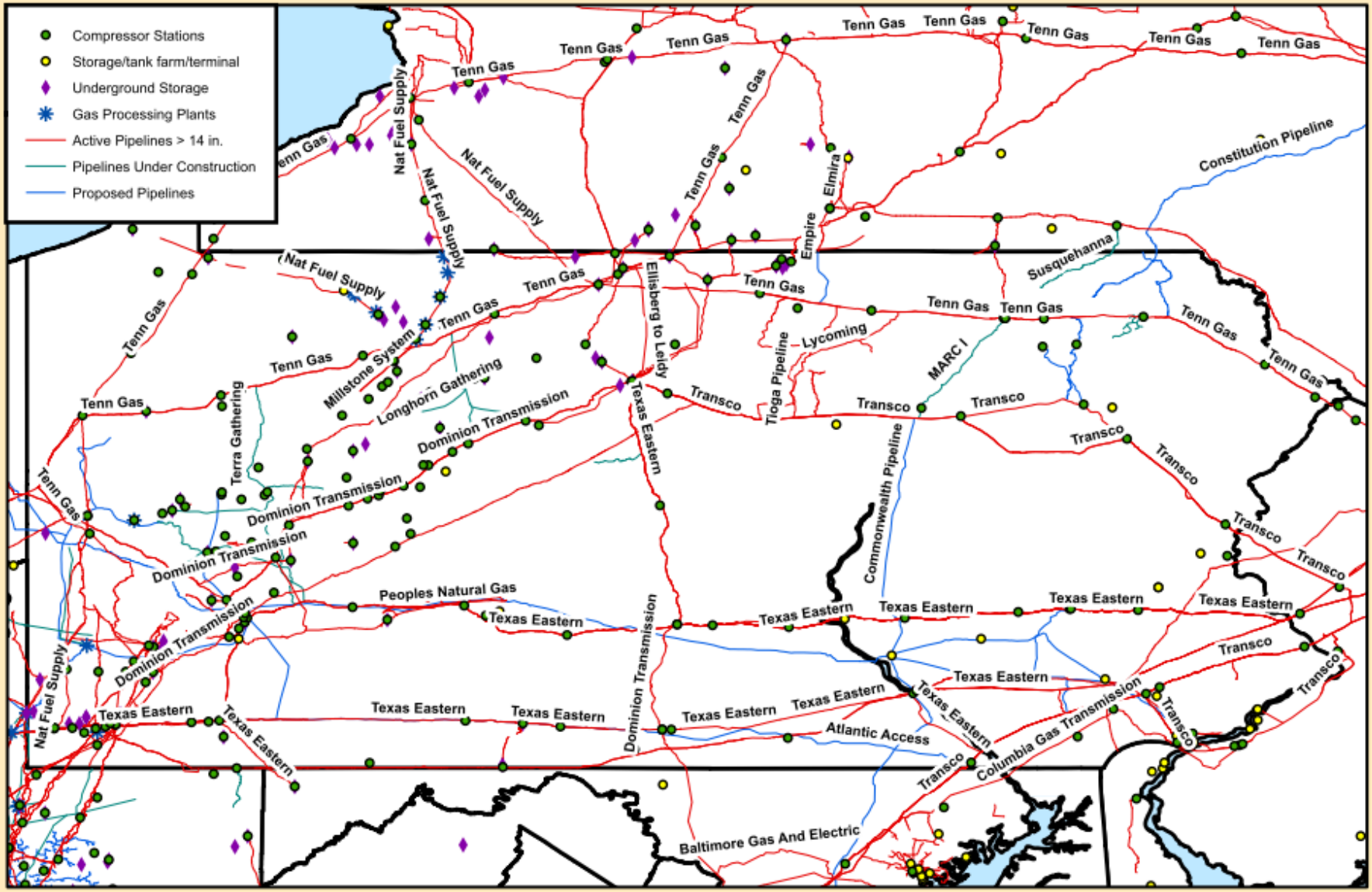
Wyoming Air Pollution…

Worse Than Los Angeles

During 2011 Due To Natural Gas Drilling

http://www.huffingtonpost.com/2011/03/08/wyoming-ait-pollution-gas-drilling_n_833027.html

State of the Air in PA



Data compiled by PennWell MAPSearch.
Data updated August 16, 2013.

EARTHJUSTICE
THE EARTH NEEDS A GOOD LAWYER

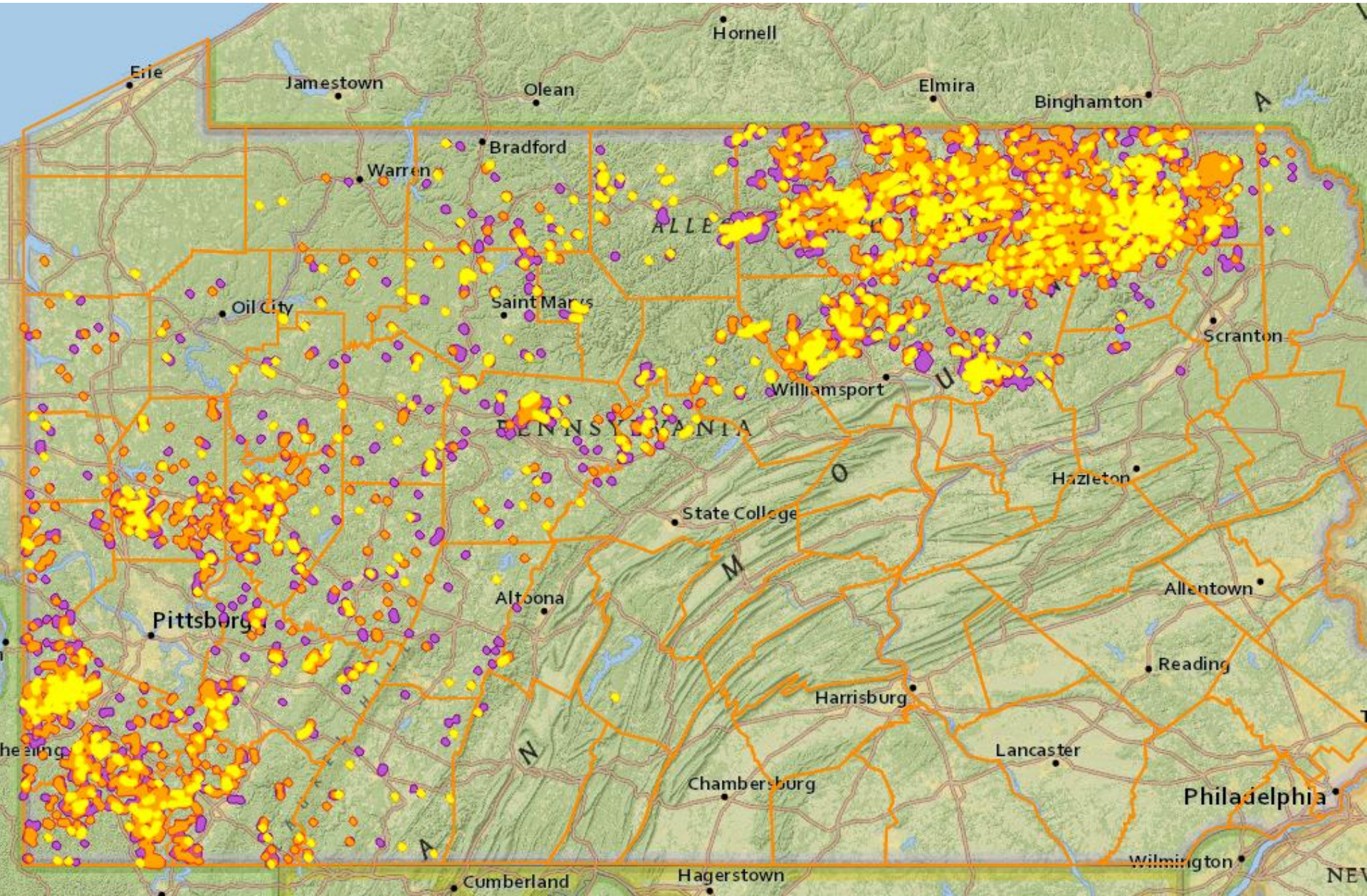
Pennsylvania Natural Gas Infrastructure

0 4.75 9.5 19 28.5 38 Miles

N

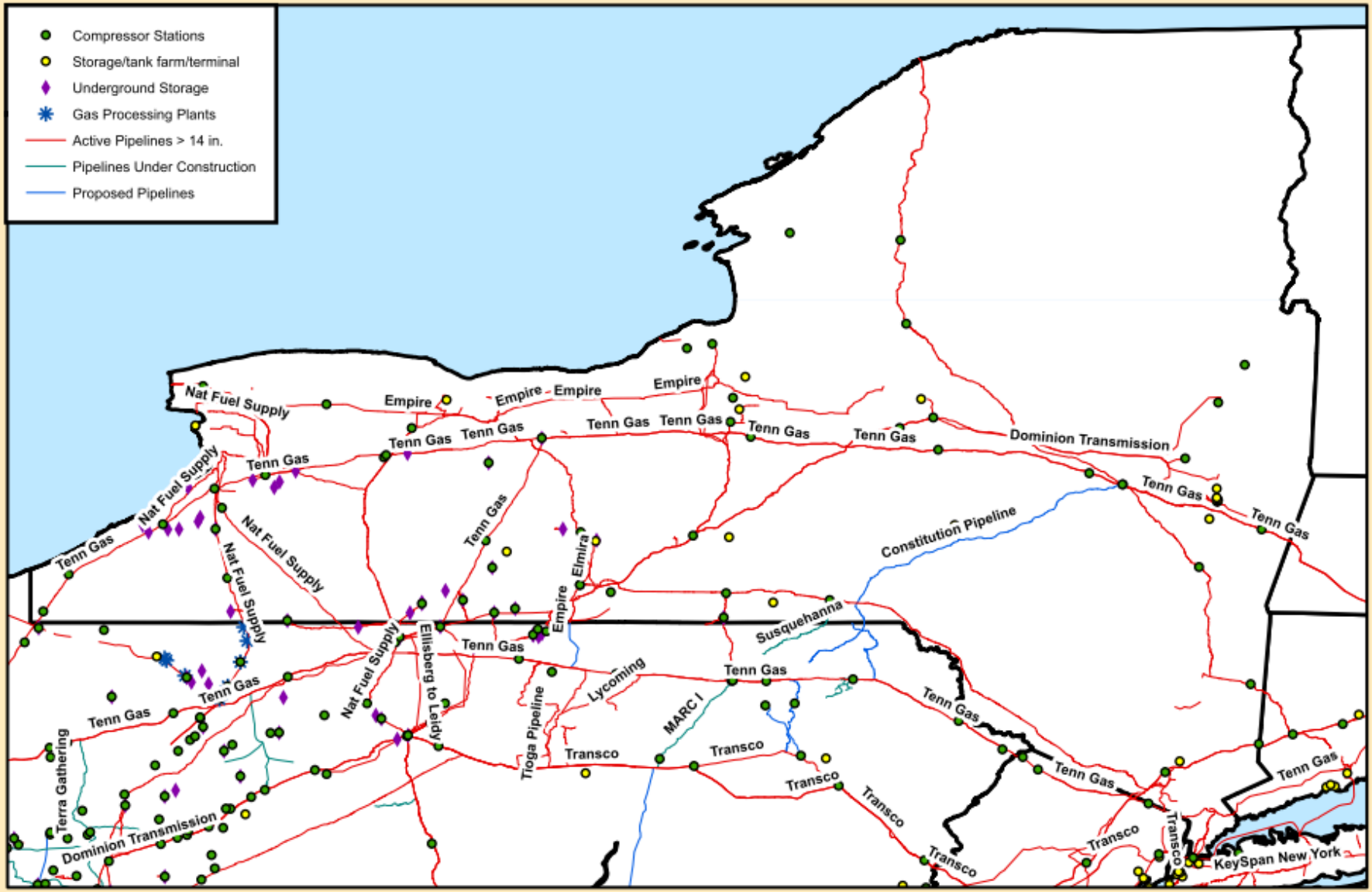
ESRI CONSERVATION

Drilled wells and Compressor Stations



Air Pollution Damages in PA

- RAND study estimated damages from shale gas air pollution in PA:
  - Damages were between $7.2 and $32 million.
  - Health impacts, hospitalization, and premature death and impacts to agriculture and infrastructure.
  - Compressor stations were 60–75% of total costs.



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New York Natural Gas Infrastructure

0 5 10 20 30 40
Miles

N

ESRI
CONSERVATION

Shale Gas Infrastructure

Oil and Natural Gas Operations

The oil and natural gas industry includes wells, gas gathering and processing facilities, storage and transmission and distribution pipelines.

Production & Processing

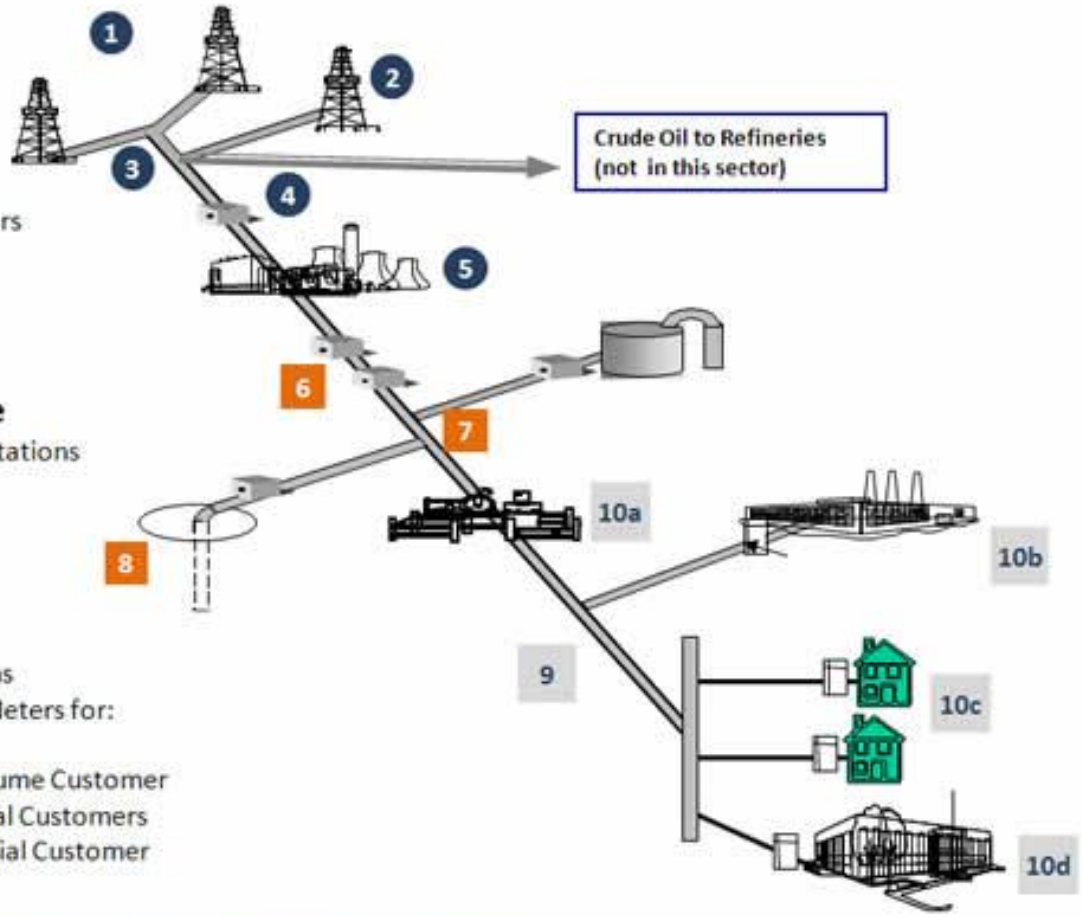
1. Drilling and Well Completion
2. Producing Wells
3. Gathering lines
4. Gathering and Boosting Compressors
5. Gas Processing Plant

Transmission & Storage

6. Transmission Compressor Stations
7. Transmission Pipeline
8. Underground Storage

Distribution

9. Distribution Mains
10. Regulators and Meters for:
    a. City Gate
    b. Large Volume Customer
    c. Residential Customers
    d. Commercial Customer



Source: Adapted from American Gas Association and EPA Natural Gas STAR Program

Compressor Stations

NOx, PM, CO2, VOCs, HAPs, CH4

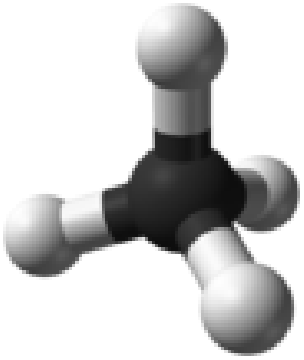
Pipeline Projects

VOCs, HAPs, CH4

What are the Pollutants?

Sources of Natural Gas Pollutants

Source	CH4	NOx	PM	VOCs	PAHs	CO2
Truck Engines		X	X	X	X	X
Compressor Engines	X	X	X	X	X	X
Flaring/Venting	X	X	X	X	X	X
Open-Air Impoundments				X	X	
Unplanned Events	X	X	X	X	X	X
Dehydration Units	X			X		
Pneumatic Instruments	X			X		
Condensate Tanks				X		



Methane:
A very potent greenhouse gas

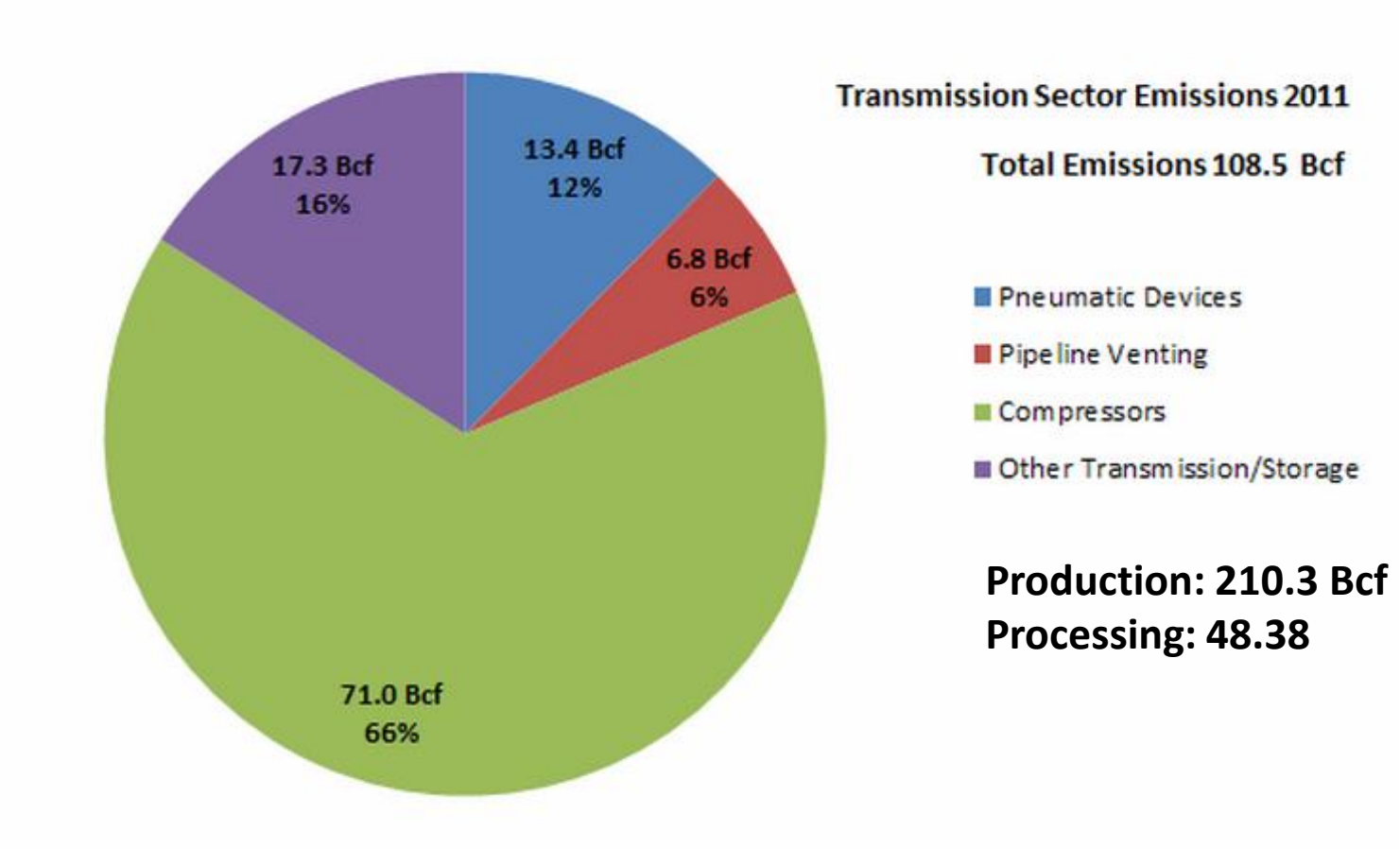
- Natural gas is mostly methane
- NASA Scientist Drew Shindell says methane is **105 x more potent** than CO2 over 20 years
- IPCC says methane is **72 x more potent** than CO2 over 20 years
- EPA says methane is only 21 times more potent
  - Shorter lifetime in the atmosphere than CO2
  - Now proposing revision

Methane Leakage Rates

- The gas industry leaks anywhere from 3 ½ to 9 percent of the gas it produces
- NOAA field study in Utah found 9% leakage rates
  - Atmospheric samples
    - More likely to reflect real-world emissions
- New industry/EDF study
  - Not representative (small subset of wells)
  - Well site locations selected by industry
  - Not a complete life-cycle study

Where is the methane coming from?

- Venting, leaking (fugitive emissions), and burning

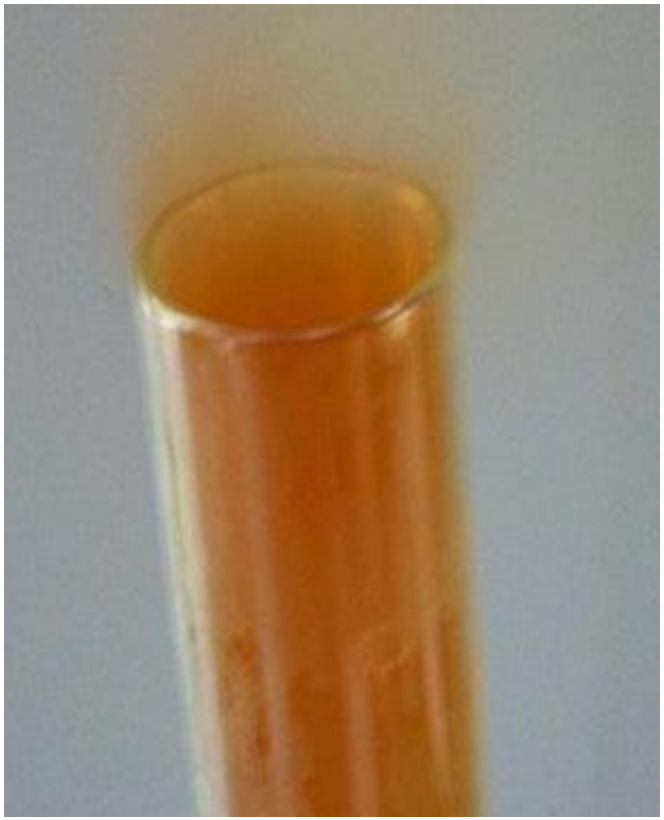


Production: 210.3 Bcf
Processing: 48.38

http://www.epa.gov/methane/gasstar/basic-information/index.html

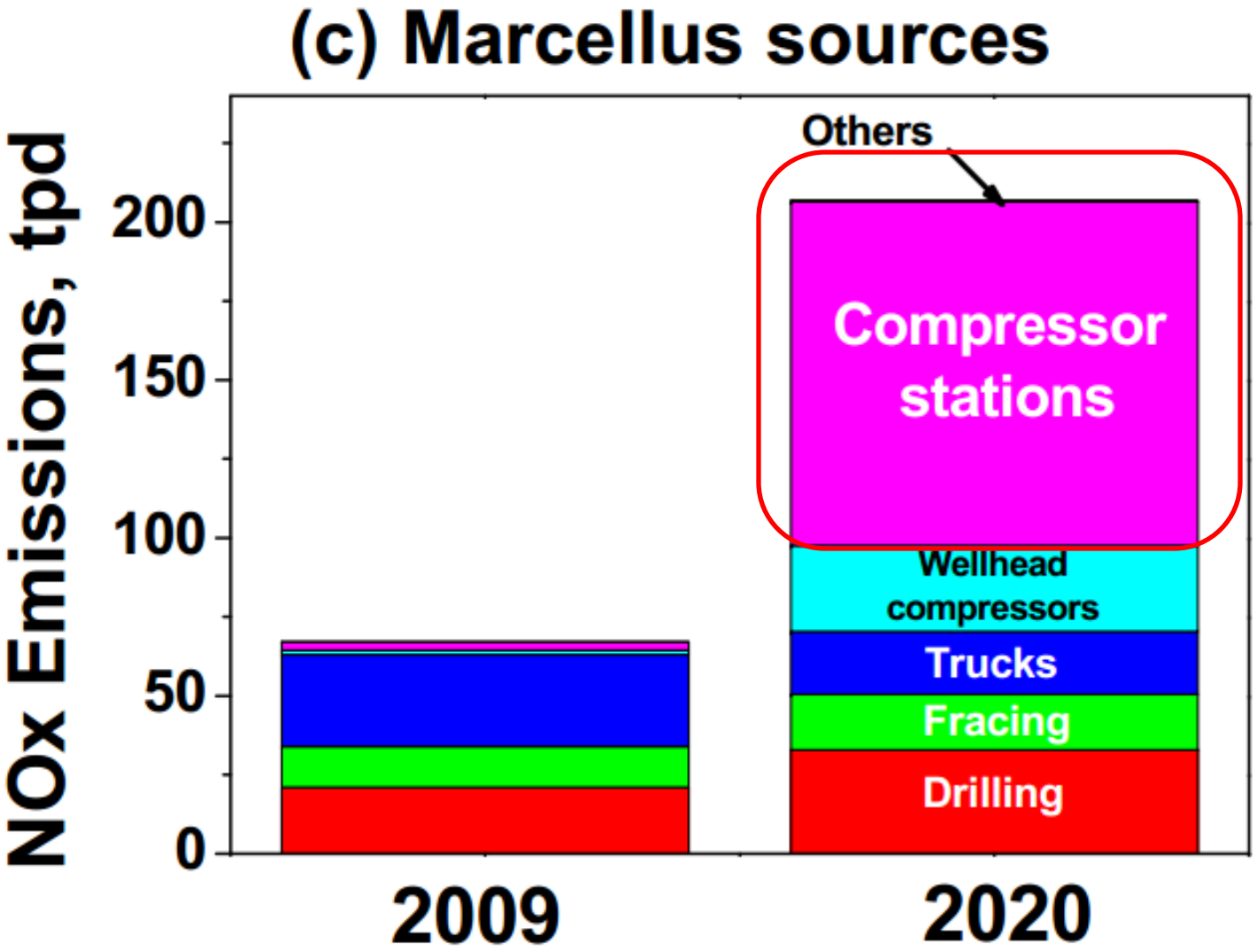
Mono-Nitrogen Oxides (NO2 or NOx)

- **Formed by combustion**
- **Contributes to ozone (smog)**



Source: http://www.atsdr.cdc.gov/toxfaqs/TF.asp?id=396&tid=69,http://www.earthworksaction.org/publications.cfm?pubID=143
http://www.atsdr.cdc.gov/toxfaqs/TF.asp?id=396&tid=69

Biggest NOx Contributors



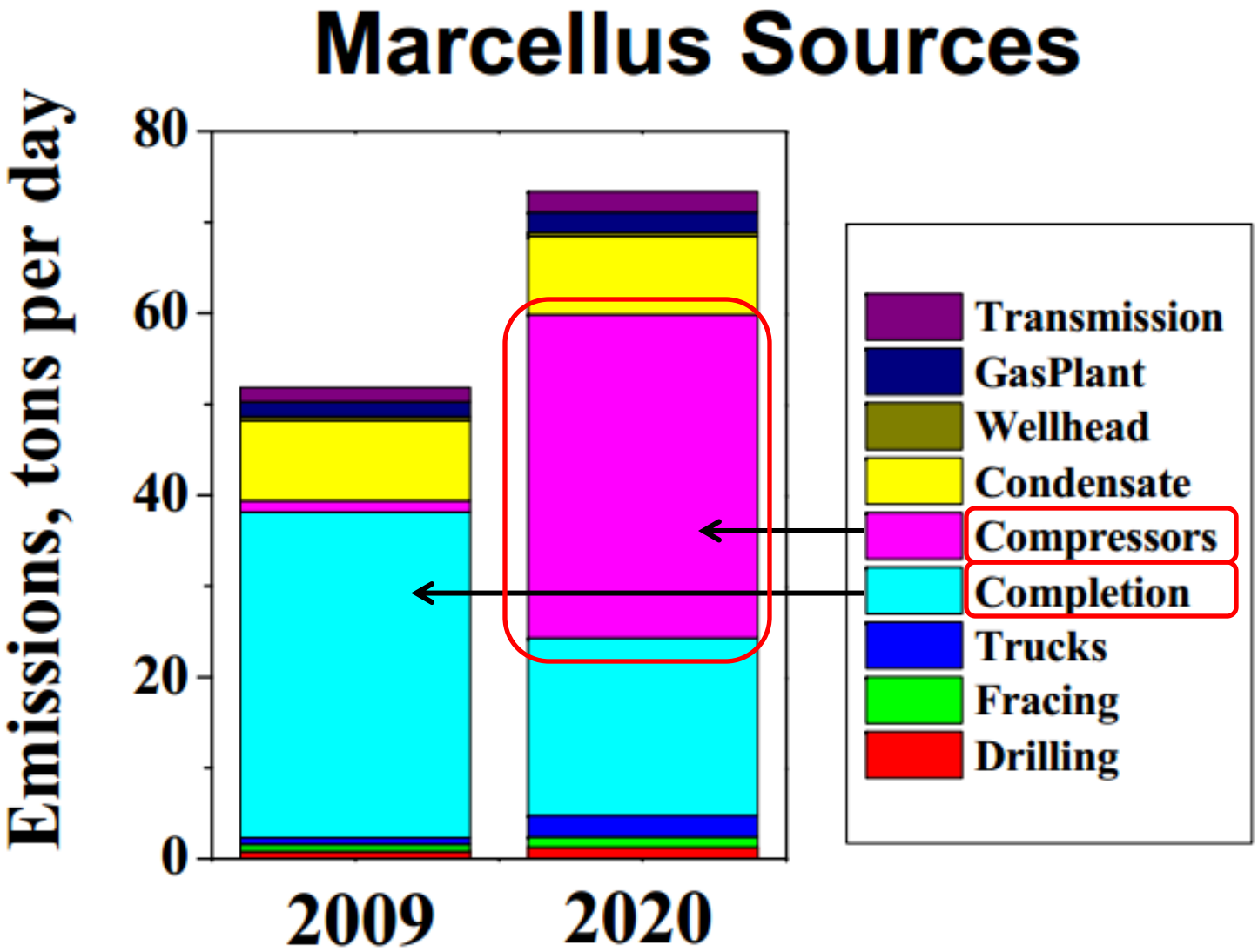
Adapted from Allen Robinson, http://iom.edu/~/media/Files/Activity%20Files/Environment/EnvironmentalHealthRT/2012-Apr-30/Robinson.pdf

Volatile Organic Compounds

- Volatile Organic Compounds (VOCs)
  - **Known and suspected carcinogens**
  - **Contributes to ozone (smog)**

http://www.epa.gov/iaq/voc.html

Biggest VOC Contributors



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Air Pollution, Weather and Topography

- Inversion
  - Warm air above cool air = No mixing = No wind
  - Air pollution trapped
  - Temp. inversion + low wind = severe smog
  - Areas w/ valleys/mts experience inversion more often

Regulatory Framework for Shale Gas

Air Quality Permitting

- EPA sets NAAQS based on Public Health
- State facility permits for minor sources
- DEC issues Title V Permits for major sources
  - Must obtain if it has POTENTIAL to emit certain thresholds
  - Extra requirements
- Environmental Impact Assessment
  - State Environmental Quality Review is required of most projects
    - Requires gov't agency issuing permit to identify and mitigate any significant environmental impacts

Greenhouse Gas Tailoring Rule

- Methane and GHGs can trip Title V "major source" permit
  - 100,000 tpy CO2e limit for new or modified site

Compressor Station Permitting Requirements

- 2 compressor stations in NY are in nonattainment areas
- Stony Point Station (Rockland County)
  - Severe nonattainment area
  - Is major source for NOx, VOCs and GHGs
  - Is expected to trigger BACT for GHGs
  - Not expected to trigger PSD and NNSR
- Southeast Compressor Station (Putnum County)
  - Existing major source of NOx and GHGs
  - Expected to exceed GHG limits and trigger PSD
  - Not expected to trigger PSD and NNSR

Air Quality Permitting

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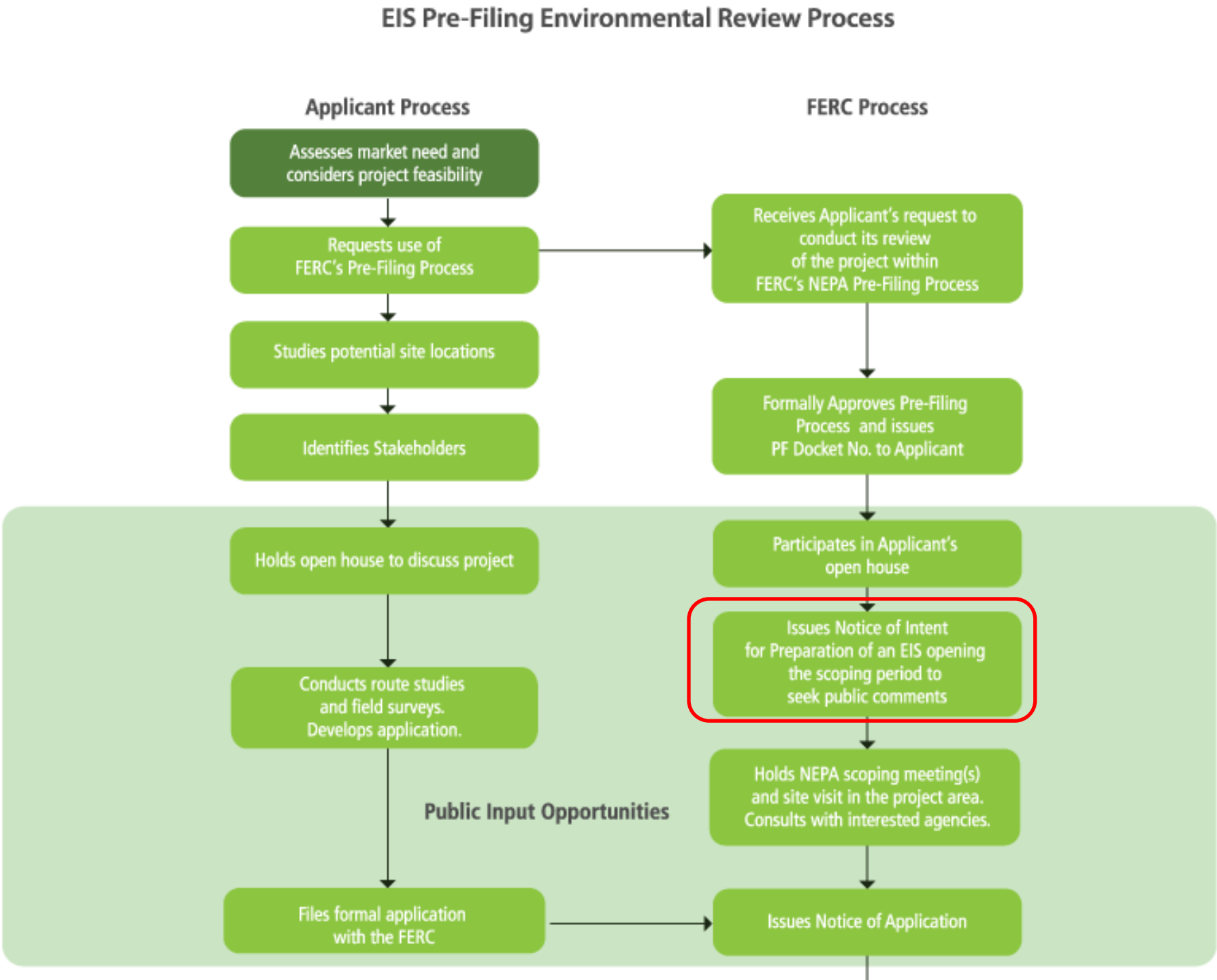
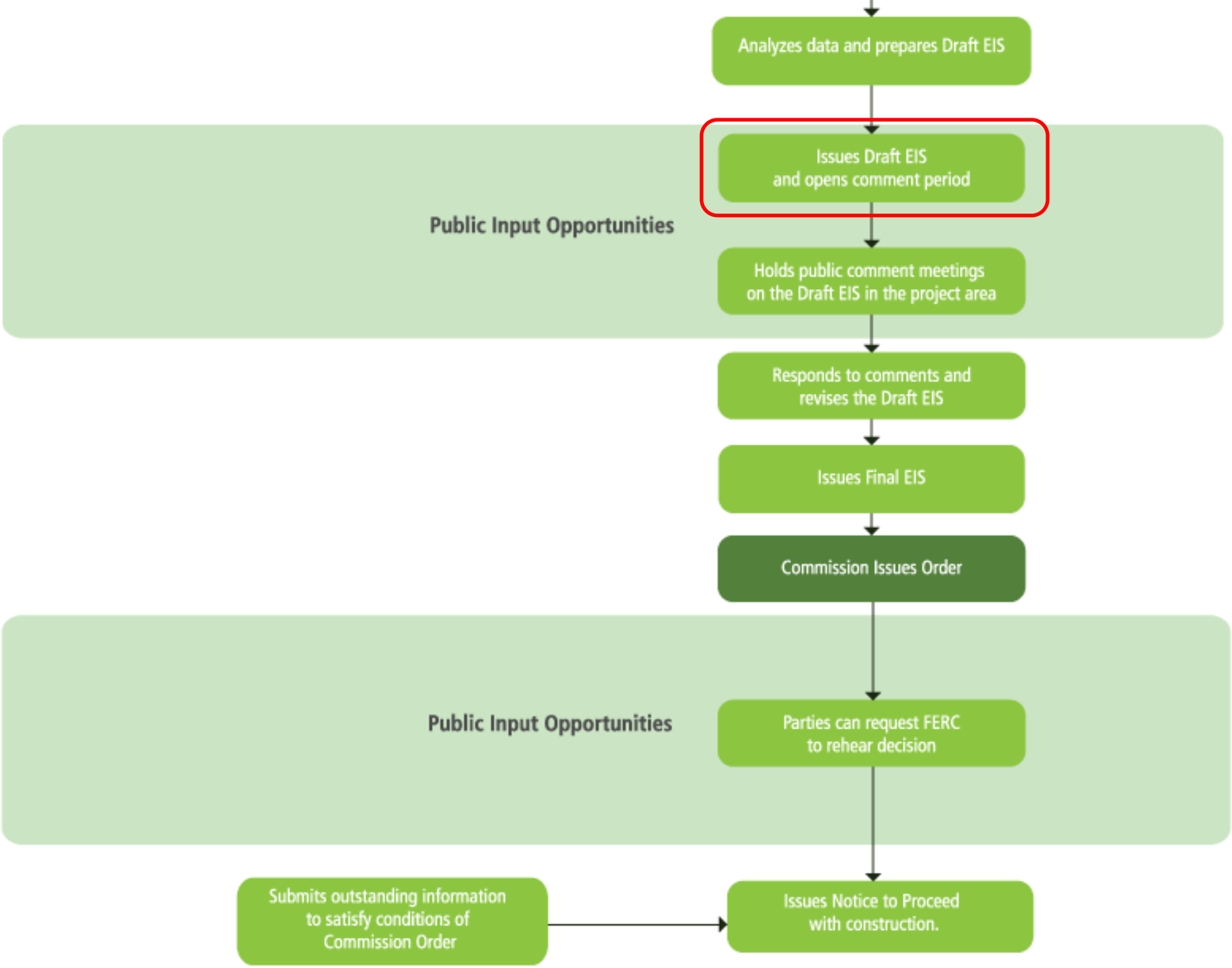
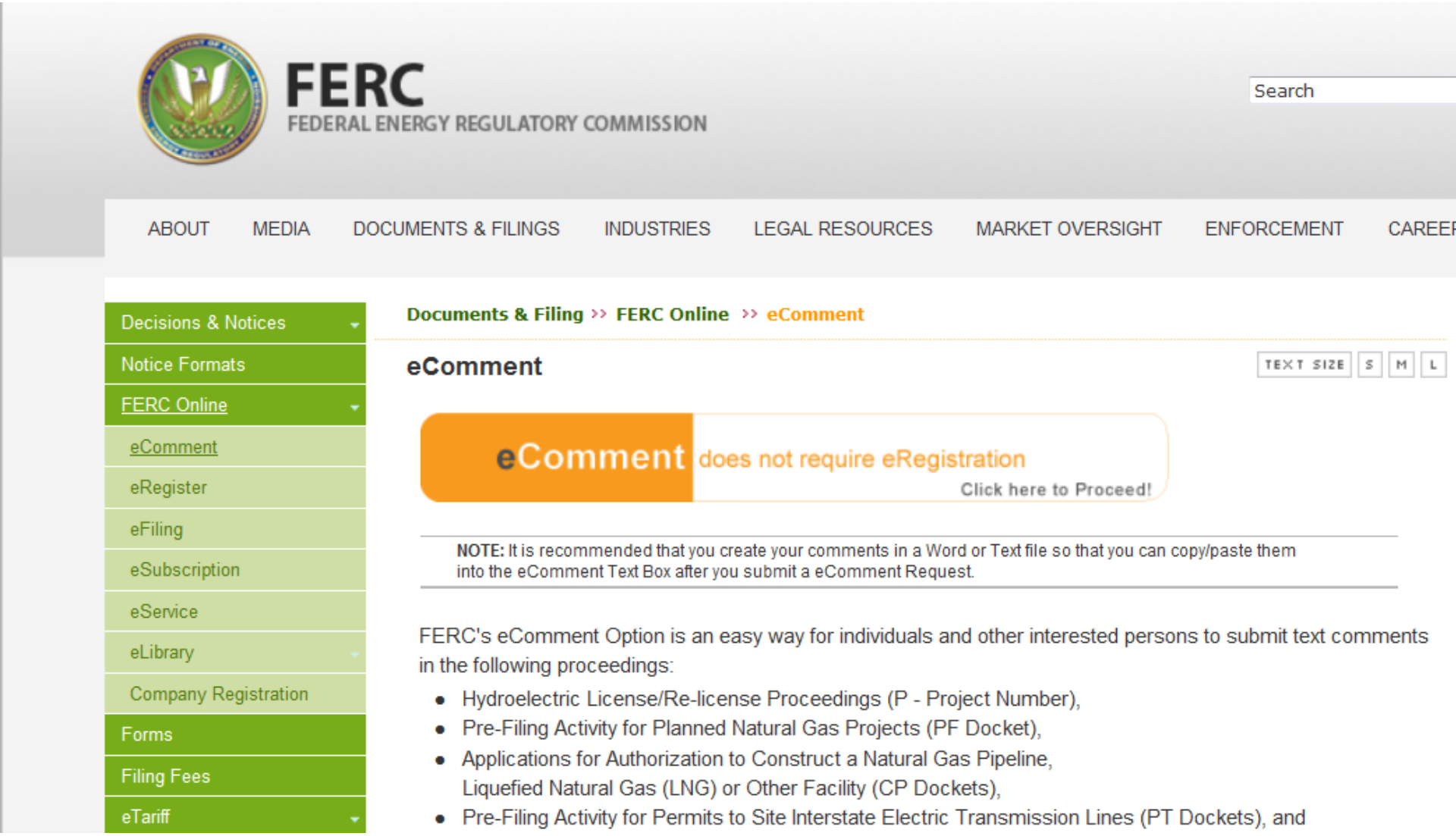
FERC Process


EIS Pre-Filing Environmental Review Process
Applicant Process
FERC Process
Assesses market need and considers project feasibility
Requests use of FERC's Pre-Filing Process
Studies potential site locations
Identifies Stakeholders
Holds open house to discuss project
Conducts route studies and field surveys. Develops application.
Files formal application with the FERC
Receives Applicant's request to conduct its review of the project within FERC's NEPA Pre-Filing Process
Formally Approves Pre-Filing Process and issues PF Docket No. to Applicant
Participates in Applicant's open house
Issues Notice of Intent for Preparation of an EIS opening the scoping period to seek public comments
Holds NEPA scoping meeting(s) and site visit in the project area. Consults with interested agencies.
Issues Notice of Application
Public Input Opportunities


Analyzes data and prepares Draft EIS
Issues Draft EIS and opens comment period
Public Input Opportunities
Holds public comment meetings on the Draft EIS in the project area
Responds to comments and revises the Draft EIS
Issues Final EIS
Commission Issues Order
Public Input Opportunities
Parties can request FERC to rehear decision
Submits outstanding information to satisfy conditions of Commission Order
Issues Notice to Proceed with construction.



http://www.ferc.gov/docs-filing/ecomment.asp

- **DOCKET No. PF12-10**

Name: Matt Walker

E-mail Address: mwalker@cleanair.org

Phone:

Docket: Hydro Project Search

You can search for dockets or click the Quick Entry tab if you already know the docket numbers you want to insert.

Search | Quick Entry

Enter Docket Number: PF12-10 Search (e.g. CP08-10 or P-12485)

Docket	Description	Select
PF12-10-000	Request to Initiate Pre-Filing Review for the Hancock Compressor Station	

Selected Dockets:

Docket	Description	Remove
PF12-10-000	Request to Initiate Pre-Filing Review for the Hancock Compressor Station	✕

Comment:

Writing Tips

- **Focus your testimony on using your strengths – tell your own story in your own voice**
- **Always relate your points back to the specific piece of equipment you are commenting on**
- Use your experiences and local knowledge
- Don’t worry about having to include legal or technical arguments
- Nothing is too simple or short to write
- Don’t be intimidated

AIM Project Comments

Potential Asks to Agencies

- Cumulative climate change and air quality impacts
  - FERC should fully review the aggregate effects
  - DEC can also consider cumulative impacts on air quality, water quality, or climate change
- A “no-build” alternative is required by law
- Reasonable forecasting of the likely impacts of shale development
- An alternatives analysis of renewable energy projects or energy-efficiency programs that reduce demand
- An alternatives analysis of any viable alternative pipeline modifications that may exist to reduce environmental impact

Luzerne County, PA

Commonwealth Pipeline

LANCASTE

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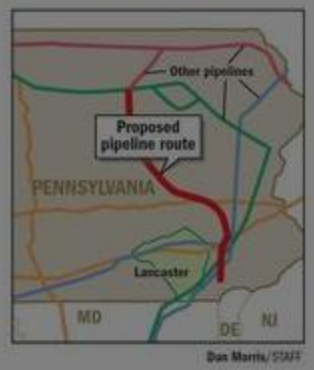
INTERIORS W

County no longer inclu natural gas pipeline

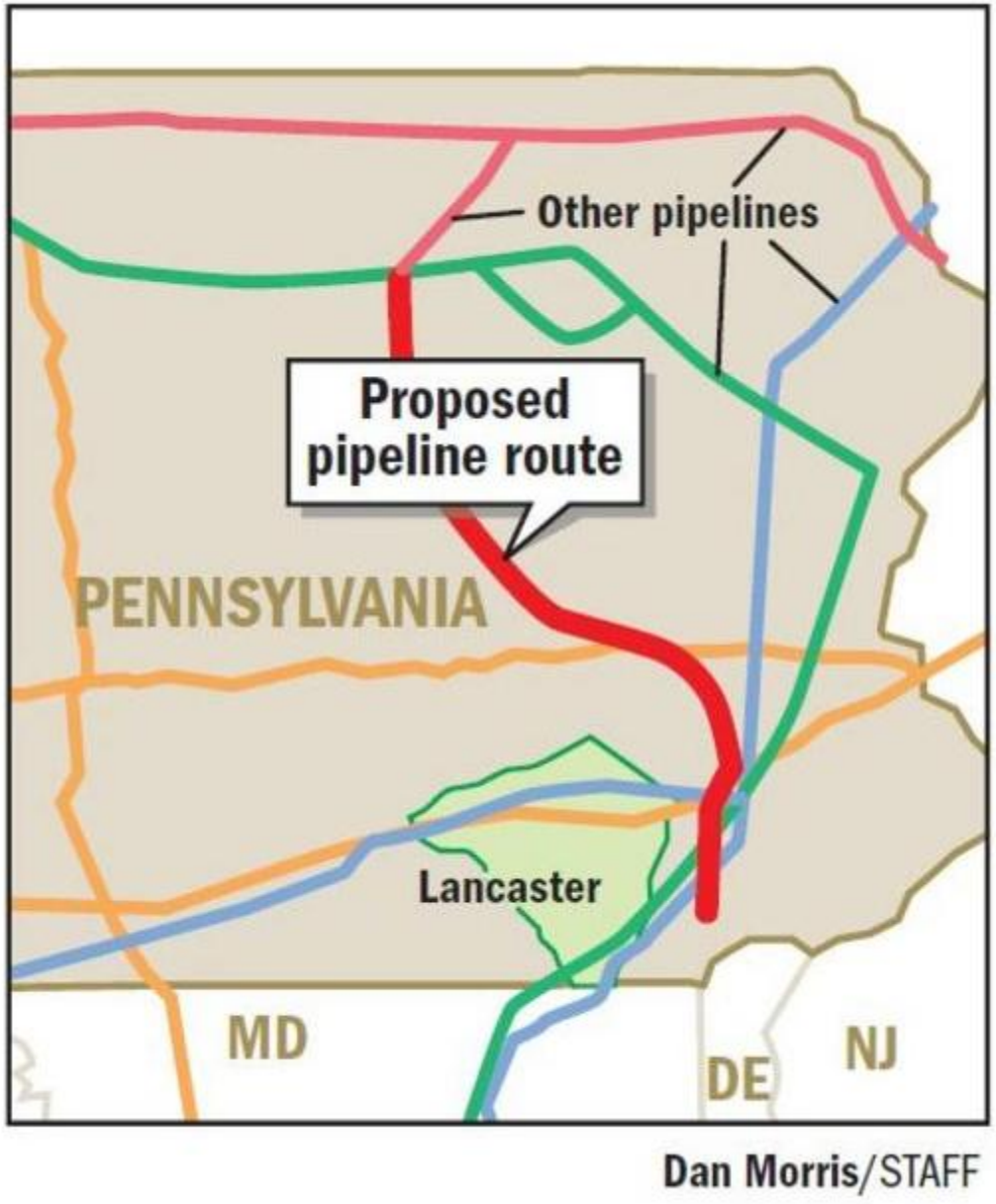


This map shows the latest proposed route for a new 120-

Susquehanna River, either in La
also showed the pipeline crossi
County.

"The market drives where you e
when asked Monday why the pi

"This path has markets as well



Take Action

- Comment on natural gas equipment through the FERC comment and hearing process and get stronger permits
- Comment on state permits and environmental impact assessments and request public hearings
- Organize a campaign to stop projects
- Switch to renewable energy today

Contact Info

Matt Walker, Community Outreach Director

Clean Air Council

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