Minimizing Air and Climate Impacts Across the Natural Gas Value Chain

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Finding the ways that work

The Gas Boom Has Clear Advantages in the United States…

- Economic development;
- Increased energy security;
- Less air pollution; and
- Fewer greenhouse gases from combustion than coal.

…If done the “right way”.

…and Potential Risks

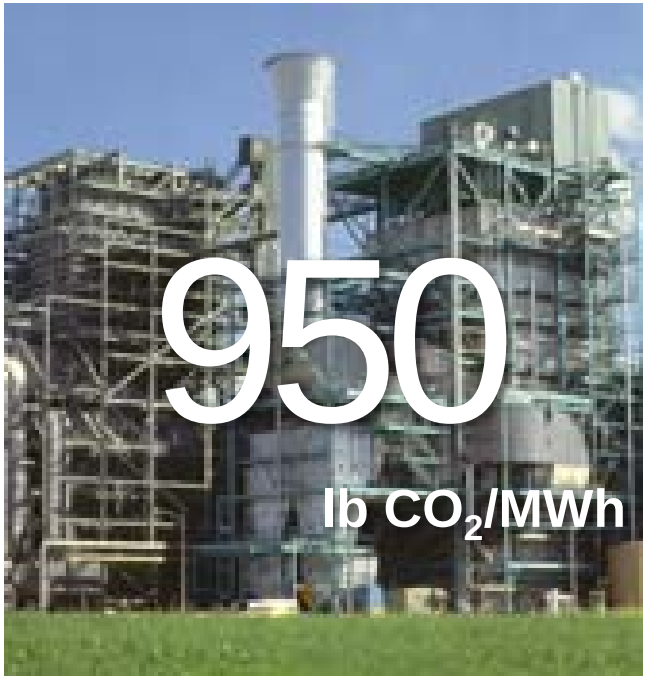
1. Ground and surface-water contamination and significant amount of water usage;
2. Air emissions can threaten public health;
3. Increased greenhouse gas emissions; and
4. Cumulative impacts from truck traffic, noise, lights, etc.

…If not done correctly.

Lack of public trust due to risks could erode economic and social benefits of the gas boom. It is in everybody's interest to get it right.

Power plant CO_2 emissions…

Coal



Natural Gas

Power plant emissions…aren't whole story

COAL MINING
& PROCESSING

TRANSPORTATION

COAL
COMBUSTION

NATURAL GAS
PRODUCTION

PROCESSING

TRANSMISSION
& STORAGE

NATURAL GAS
COMBUSTION

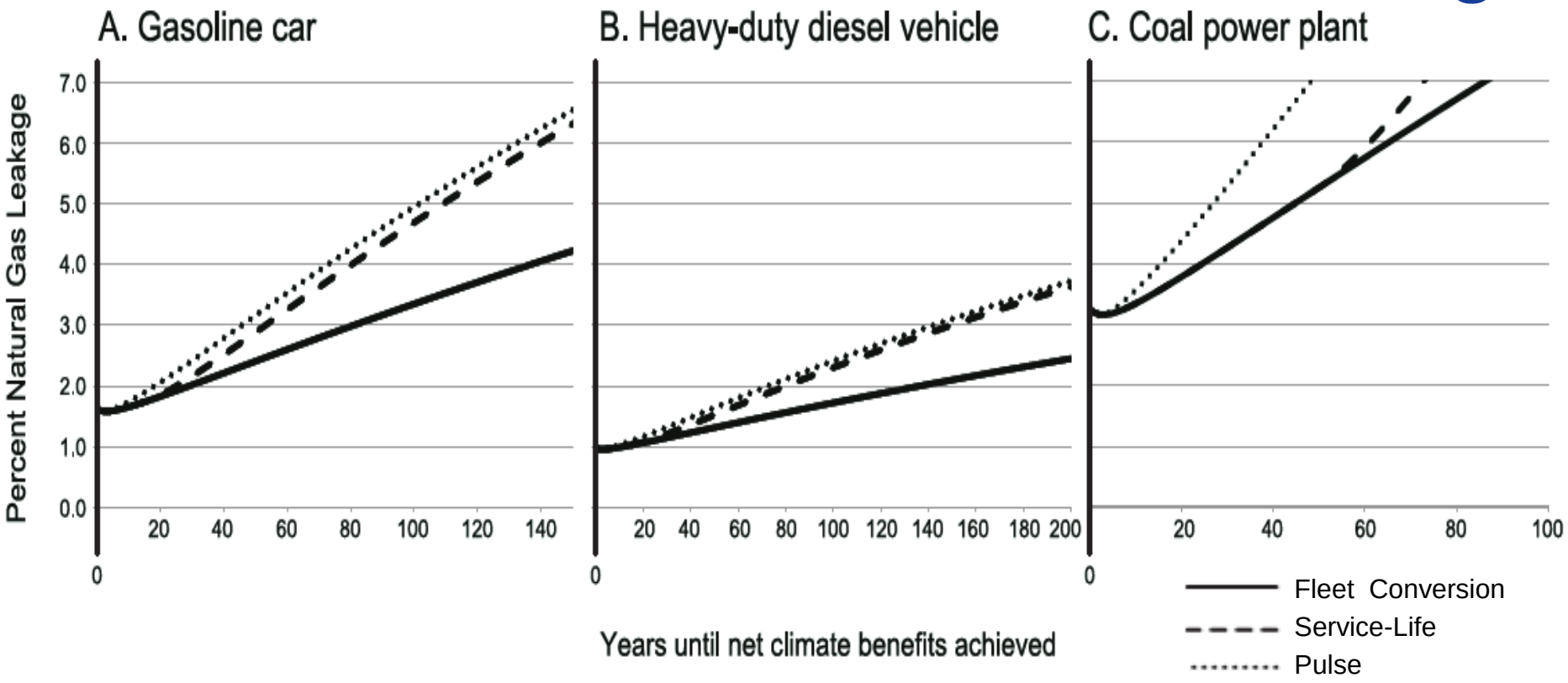
LOCAL DISTRIBUTION
TO OTHER END USERS

Source: Adapted from Jaramillo et al., (2007) EST 41, 6290, Truck photo by Stephen Petit, SiefkesPetit Communications. Posted at: flickr.com/photos/truckpr/6771598239/. Used under Creative Commons license

Methane Leak Rates Affects Climate Benefits of Natural Gas

- Overall leak estimates range between 1% - 7.9%, but much of it based on assumptions.
- 2010 EPA estimates leaks are about 2.5%.
- Better data needed urgently to identify current U.S. leak rate. Sub-part W will help.
- If leaks are in fact 2.5%, a recent paper illustrates switching from gasoline and diesel to natural gas may make things worse for the climate over some time periods.

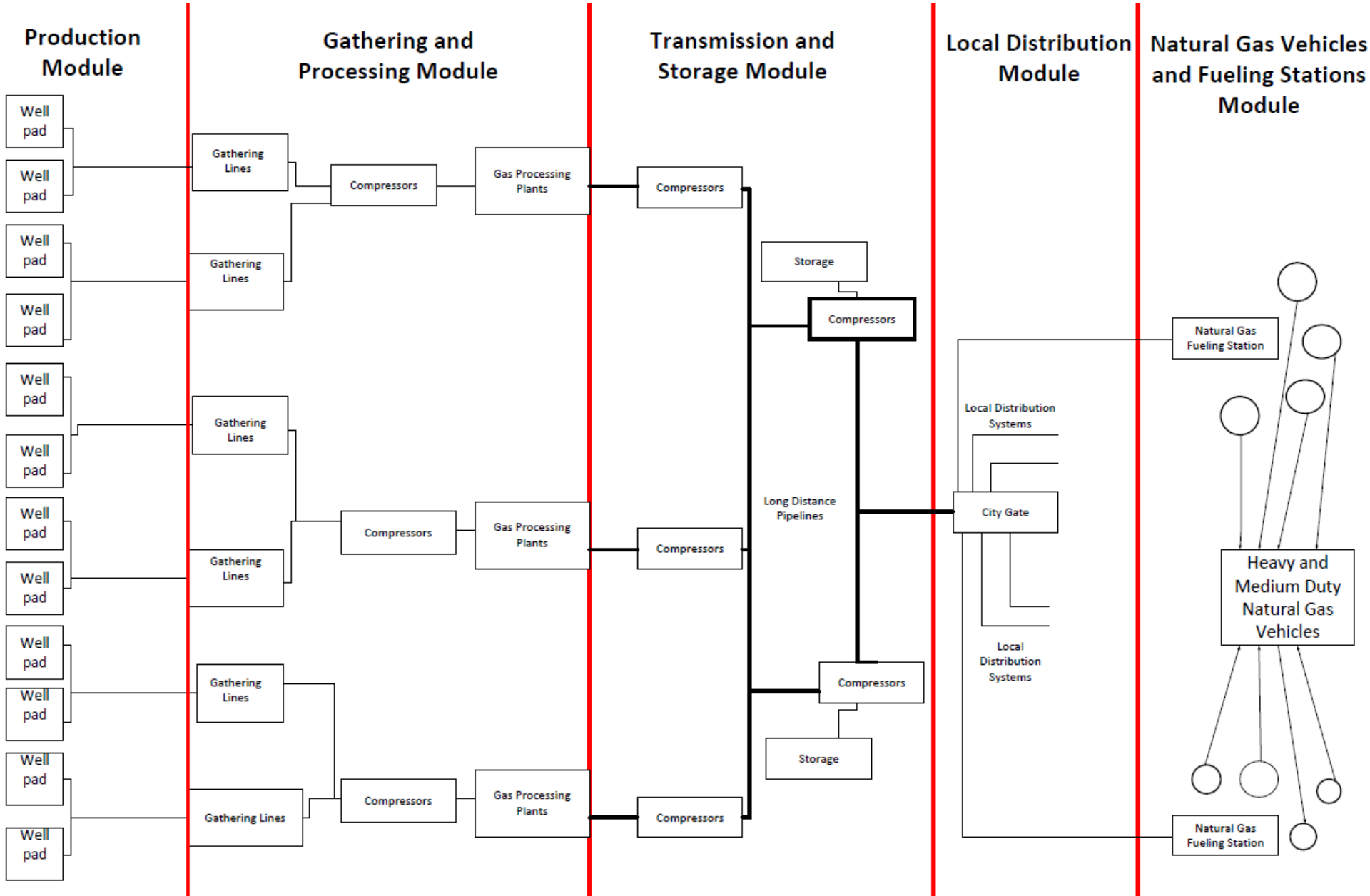
What it Takes to Avoid Climate Damages



A recent paper in PNAS shows the point, given current data, for these three fuels at which it is better for the climate in all time frames to switch to natural gas:

- Coal power plant = 3.2% (or less) leakage
- Gasoline = 1.6% (or less) leakage
- Heavy Duty Diesel = 1.0% (or less)

EDF's CH_4 Emissions Field Studies



Air Emissions Threaten Public Health

- Oil and gas production emissions from the Barnett shale in DFW area comparable to NOX and VOC vehicle emissions in DFW.
- On 8/22/12 San Antonio surpassed EPA Ozone standard which press reports largely attribute to increased Eagle Ford drilling.
- Wintertime ozone exceedances have been recorded in remote parts of WY & UT where main activity is gas and oil production.
- NOX emissions from unconventional gas in one NE state are equivalent to NOX emissions from 3rd highest emitting coal power plant in that state (16,542 tons).
- VOC emissions from unconventional gas in that same state are equivalent to the top 4 point sources combined. (2,820 tons)

What Can be Done?

- Better leak rate data needed. Sub-part W, EDF CH4 studies will help better characterize leak rates.
- If leak rates are high, reductions are needed to maximize the climate benefits of natural gas.
- Federal and State regulations for oil and gas can be improved (e.g. covering existing wells and oil wells as well as regulating methane).
- States seeking to reduce GHGs and meet Ozone NAAQS may find low-cost opportunities in oil and gas fields.