

Identification:

Name: Evelina Marques

Country: Portugal

Dear Sirs,

Good afternoon, I want to answer to one question about LNG sustainability issues, namely **Question number 12**.

Question 12. Do you think there are any sustainability issues specific to LNG that should be explored as part of this strategy? What would be the environmental costs and benefits of alternative solutions to LNG? Please provide evidence in support your views.

Answer to question 12 from Evelina Marques:

I find useful that the European Commission make an independent study on the environmental impact of methane leakage into the atmosphere for the LNG and NG processes, including upstream, midstream and downstream, and the production shares of conventional/non-conventional production.

In concrete, the study I propose should identify (in disaggregated way) the quantification of methane release to the atmosphere in the following activities:

- Unconventional gas production in the US;
- Conventional gas production (in world);
- International LNG transport;
- High pressure pipeline transport and downstream distribution activities.

In my view, the public opinion is not sufficiently clarified with credible information about methane leakage to atmosphere, so the EC should bring clarity to this matter. For example, according to the info available in website 'Wikipedia.org' (shale gas/climate), several studies identify a large range of methane leakage (from 1% to 8%) in shale gas production in US:

"Barack Obama's administration has sometimes promoted shale gas, in part because of their belief that it releases fewer [greenhouse gas](#) (GHG) emissions than other fossil fuels. In a 2010 letter to President Obama, [Martin Apple](#) of the [Council of Scientific Society Presidents](#) cautioned against a national policy of developing shale gas without a more certain scientific basis for the policy. This umbrella organization that represents 1.4 million scientists noted that shale gas development "may have greater GHG emissions and environmental costs than previously appreciated."^[43]

In late 2010, the U.S. Environmental Protection Agency^[40] issued a new report, the first update on emission factors for greenhouse gas emissions by the oil and gas industry by the EPA since 1996. In this new report, the EPA concluded that shale gas emits larger amounts of [methane](#), a potent [greenhouse gas](#), than does conventional gas, but still far less than coal. Methane is a powerful greenhouse gas, although it stays in the atmosphere for only one tenth as long a period as carbon dioxide. Recent evidence suggests that methane has a global warming potential (GWP) that is 105-fold greater than carbon dioxide when viewed over a 20-year period and 33-fold greater when viewed over a 100-year period, compared mass-to-mass.^[41]

Several studies which have estimated lifecycle methane leakage from shale gas development and production have found a wide range of leakage rates, from less than 1% of total production to nearly 8%.^[42] Using data from the Environmental Protection Agency's most recent Greenhouse Gas Inventory^[43] yields a methane leakage rate of about 1.4%, down from 2.3% from the EPA's previous Inventory.^[44] The most comprehensive study of methane leakage from shale gas to date, initiated by the Environmental Defense Fund (EDF) and released in the Proceedings of the National Academy of Sciences on 16 September 2013,^[45] finds that fugitive emissions in key stages of the natural gas production process are significantly lower than estimates in the EPA's national emissions inventory (which are already quite low). The study reports direct measurements from 190 onshore natural gas sites across the country and estimates a leakage rate of 0.42% for gas production. Although the EDF study did not cover all stages of natural gas supply chain, subsequent studies are planned to estimate leakage rates in others parts of the system.

A 2011 study published in [Climatic Change Letters](#) controversially claimed that the production of electricity using shale gas may lead to as much or more [life-cycle](#) GWP than electricity generated with oil or coal.^[46] In that peer-reviewed paper, [Cornell University](#) professor Robert W. Howarth, a marine ecologist, and colleagues claimed that once methane leak and venting impacts are included, the life-cycle greenhouse gas footprint of shale gas is far worse than those of coal and fuel oil when viewed for the integrated 20-year period after emission. On the 100-year integrated time frame, this analysis claims shale gas is comparable to coal and worse than fuel oil. However, numerous studies have pointed out critical flaws with that paper and/or come to completely different conclusions, including assessments by experts at the U.S. Department of Energy,^[47] peer-reviewed studies by Carnegie Mellon University^[48] and the University of Maryland,^[49] and even the [Natural](#)

[Resources Defense Council](#), which concluded that the Howarth et al. paper's use of a 20-year time horizon for global warming potential of methane is "too short a period to be appropriate for policy analysis."¹⁵⁰

In January 2012, Howarth's own colleagues at [Cornell University](#), Lawrence Cathles et al., responded with their own peer-reviewed assessment, noting that the Howarth paper was "seriously flawed" because it "significantly overestimate[s] the fugitive emissions associated with unconventional gas extraction, undervalue[s] the contribution of 'green technologies' to reducing those emissions to a level approaching that of conventional gas, base[s] their comparison between gas and coal on heat rather than electricity generation (almost the sole use of coal), and assume[s] a time interval over which to compute the relative climate impact of gas compared to coal that does not capture the contrast between the long residence time of CO₂ and the short residence time of methane in the atmosphere." The author of that response, Lawrence Cathles, concludes that "shale gas has a GHG footprint that is half and perhaps a third that of coal," based upon "more reasonable leakage rates and bases of comparison."¹⁵¹

In April 2013 the U.S. Environmental Protection Agency dramatically lowered its estimate of how much methane leaks from wells, pipelines and other facilities during production and delivery of natural gas by 20 percent. According to the Associated Press, the EPA report on greenhouse emissions credited tighter pollution controls instituted by the industry for cutting an average of 41.6 million metric tons of methane emissions annually from 1990 through 2010, a reduction of more than 850 million metric tons overall. The AP noted, "The EPA revisions came even though natural gas production has grown by nearly 40 percent since 1990."

Kind regards,

Evelina Marques