

Industry Partner or Industry Puppet?

How MIT's influential study of fracking was authored,
funded, and released by oil and gas industry insiders

March 2013



public
accountability
initiative

Acknowledgements

The Public Accountability Initiative (PAI) is a non-profit, non-partisan research and educational organization focused on corporate and government accountability. In addition to publishing research on critical public accountability issues, PAI maintains LittleSis.org, an involuntary facebook of powerful people and tool for power research that was used to compile data for this report. PAI's work is funded by a variety of non-profit sources (all funding sources are listed at <http://public-accountability.org/about/funding>). PAI's research on the oil and gas industry and fracking is funded by the 11th Hour Project of the Schmidt Family Foundation, the Park Foundation, and the HKH Foundation.

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Executive Summary

The process of natural gas extraction known as “fracking” is a subject ripe for sound academic study, given open questions about the risks and benefits of shale gas. Unfortunately, there is growing evidence that the oil and gas industry has made a concerted effort to corrupt this process of academic inquiry.

Several universities have released high-profile studies on the subject of fracking that dismissed environmental concerns, but were later found to be tainted by poor scholarship, pro-industry bias, and significant conflicts of interest stemming from ties to industry. Rather than inform the public, the reports appear to have been designed to manipulate public opinion about fracking. The fallout has been significant, prompting resignations and retractions at the University of Texas, the University at Buffalo, and Penn State.¹ The Public Accountability Initiative (PAI) has been at the forefront of efforts to expose this trend, which has come to be known as “frackademia.”²

This PAI report examines yet another high profile study of fracking: MIT’s “The Future of Natural Gas” report, released in June 2011. The nomination of MIT professor Ernest J. Moniz as the next energy secretary has put a new spotlight on the report, which endorsed “natural gas as a bridge to a low-carbon future.”³ Moniz served as chair of the study group that authored the report and directs the MIT Energy Initiative, which released the report.

The MIT report is marred by undisclosed conflicts of interest, pro-industry advocacy, and poor scholarship similar to that which resulted in retractions and resignations at other universities, yet it has not received the same level of critical attention.⁴

Authored by industry. Key authors of the study, including Moniz himself, failed to disclose personal financial conflicts of interest in report materials or at events where the report was presented:

- Study chair Ernest Moniz took a lucrative position on the board of ICF International, a consulting firm with significant oil and gas ties, just prior to the release of the report. ICF cited shale gas analysis as a key profit driver for its energy business weeks before Moniz joined its board; it sells a proprietary gas market analysis tool and works for oil and gas clients such as America’s Natural Gas Alliance. Moniz’s ICF compensation since 2011 is valued at \$305,648.⁵ He has also served on the advisory board of NGP Energy Technology Partners, which invests in oil and gas companies, since 2006, but it is

¹ For more context, see “Frackademia 101,” below.

² The Public Accountability Initiative released reports that criticized flawed research and exposed conflicts of interest in the University at Buffalo report and in the University of Texas report. The original report on UT, released in July 2012, can be found here: <http://public-accountability.org/2012/07/contaminated-inquiry/> The original report on UB, released in May 2012, can be found here: <http://public-accountability.org/2012/05/ub-shale-play/>

³ This quote and variations of it can be found in the MIT report – http://mitei.mit.edu/system/files/NaturalGas_Report.pdf – and in the press release that announced the report: <http://web.mit.edu/press/2010/natural-gas>.

⁴ See: Peter Mantius, “‘Frackademia’ – MIT’s Ernest Moniz, Obama’s Top Candidate for Energy Secretary, Oversees Pro-Industry-Funded Research”, DC Bureau (February 21, 2013) and Lisa Wright, “Can Universities Credibly Probe Gas Impacts When Industry Foots the Bill?”, *New York Times* “Dot Earth” blog (July 29, 2012). Accessed at: <http://dotearth.blogs.nytimes.com/2012/07/28/can-universities-credibly-probe-frackin-impacts-while-industry-foots-the-bill/>

⁵ See table in Section II below.

unclear if he receives compensation in this position.

- Study group co-chair Anthony Meggs, who presented the MIT report’s finding that the environmental impacts of fracking are “challenging but manageable” at the 2011 press conference for the report, joined gas exploration and production company Talisman Energy as a senior adviser one month prior to the release of the report, in May 2011. He later became executive vice president at Talisman, where he led studies of gas monetization options such as gas-to-liquids and LNG. Meggs was BP’s head of technology before joining MIT as a visiting engineer in 2008.
- Study group member and MIT professor John Deutch sits on the board of liquefied natural gas (LNG) company Cheniere Energy, which is the only company approved by the US to export LNG from the lower 48 states. He currently owns approximately \$1.4 million worth of Cheniere stock.⁶ He also serves on the advisory board of oil and gas investor NGP Energy Technology Partners with Moniz (NGP is run by his son, Philip Deutch). Deutch sat on the board of oilfield services company Schlumberger from 1997 until he stepped down in 2007 (current MIT president L. Rafael Reif joined the Schlumberger board in 2007, and owns approximately \$1 million in stock).

Funded and advised by industry. The MIT study was also funded by oil and gas industry sources and advised by a committee dominated by industry representatives.

- Report funding. The report was funded by oil and gas industry sources, including the American Clean Skies Foundation, which is closely linked to Chesapeake Energy. These funders were acknowledged in the report.
- Report advisory committee. Though the study’s advisory committee was billed as a group of “leaders from industry, government and environmental groups,” it was dominated by individuals with strong oil and gas industry ties.
- MIT Energy Initiative funding. The MIT Energy Initiative (MITEI), directed by Moniz, receives extraordinary amounts of funding – over \$145 million over its seven-year history – from oil and gas giants like BP and Chevron.

Though the MIT report named its funders, its failure to disclose its authors’ industry ties suggests that MIT did not have proper systems in place for disclosing and managing conflicts of interest.⁷ The MIT Energy Initiative’s response to PAI’s findings is telling in this regard. The response, which is included in the appendix, begins: “The notion that these findings are developed based on anything other than the unbiased research of MIT researchers is false.” The response notes that authors filed disclosure forms with the university, but does not address PAI’s queries about

⁶ Shares of LNG were worth \$23.58 at the market’s close on March 11, 2013. “Ownership Information: John M Deutch”, United States Securities and Exchange Commission. Accessed at: <http://www.sec.gov/cgi-bin/own-disp?action=getowner&CIK=0001179111>

⁷ The American Association of University Professors published a draft report, “Recommended Principles & Practices to Guide Academy-Industry Relationships,” detailing the issue of poorly-managed conflicts of interest and laying out best practices to ensure that academic-industry relations do not violate principles academic freedom, academic professionalism, research integrity, and the public trust. The report is available at: <http://www.aaup.org/report/recommended-principles-practices-guide-academy-industry-relationships>

whether MIT and the Energy Initiative viewed the study authors' industry ties as conflicts of interest and managed them as such. The response raises red flags about how the Energy Initiative understands and handles conflicts of interest.⁸

On the question of bias, there are signs that the study authors were not relying on sound research in authoring a study that was so bullish on the future of natural gas. Though a full review of the study is outside the scope of this report, the third section takes a closer look at the thin evidence underlying two of the MIT study's most significant and widely amplified pro-industry claims:

- **Environmental impacts.** There is no substantive research backing the study's claim that fracking-related environmental risks are "challenging but manageable."
- **Gas exports.** The report offers little evidence backing its argument for the development of a global gas market complete with LNG exports. For instance, it cites the economic benefits associated with a global gas market without including any discussion of price impacts.

University-industry partnerships support a great deal of academic research in the United States, but it is important to safeguard this research against improper industry influence. The significant conflicts of interest, gas industry advocacy, and poor scholarship in the MIT study suggest that the university did nothing to ensure that it was not acting as an industry mouthpiece in endorsing natural gas.

⁸ Conflict of interest questions are distinct from the determination of bias. See AAUP report, page 87: 'It is worth emphasizing that the COI definitions describe circumstantial situations; they do not imply confirmed wrongdoing. As the Institute of Medicine wrote in 2009: "A conflict of interest is not an actual occurrence of bias or a corrupt decision but, rather, a set of circumstances that past experience and other evidence have shown poses a risk that primary interests may be compromised by secondary interests. The existence of a conflict of interest does not imply that any individual is improperly motivated." Because financial conflicts are a function of a situation, rather than a function of whether someone is actually biased, they are either present, or they are not.'

I. The Study

The MIT Energy Initiative's "The Future of Natural Gas" study endorsed natural gas as a clean, abundant energy source that could provide a "bridge to a low-carbon future." The report put an environmental spin on the natural gas extraction process known as "fracking" at a time when it was coming under fire from environmentalists, academics, and journalists. The MIT banner gave the report special credibility and its findings were widely reported. This section provides some background about the report, highlights some of the report's key findings, and reviews press coverage of the study.

The MIT Energy Initiative released "The Future of Natural Gas" in June 2011 after issuing a "preliminary overview" of report findings in June 2010. The report was one in a series of Energy Initiative studies on the energy situation in the US, and the culmination of several years of research by a 19-member study group, two contributing authors, and ten research assistants.

The study group was chaired by Ernest Moniz (also the director of the Energy Initiative) and co-chaired by MIT professor Henry Jacoby and MIT visiting engineer Anthony Meggs.⁹ An 18-member committee advised the study group. The study was funded primarily by industry sources, which were disclosed in an acknowledgements section (study funders are discussed at greater length in section II of this report).

The report ran 170 pages in length, with numerous appendices. Topics covered included conventional and unconventional natural gas reserves, the substitution of gas for coal in electricity generation, and the global market for natural gas. Among its major findings:

- "There are abundant supplies of natural gas in the world, and many of these supplies can be developed and produced at relatively low cost."
- "The environmental impacts of shale development are challenging but manageable."
- The substitution of natural gas for power generation provides an opportunity to "reduce U.S. power sector CO₂ emissions by up to 20%, while also reducing emissions of criteria pollutants and mercury."
- "Additional gas-fired capacity will be needed as backup if variable and intermittent renewables, especially wind, are introduced on a large scale."
- "A global 'liquid' natural gas market is beneficial to U.S. and global economic interests and, at the same time, advances security interests through diversity of supply and resilience to disruption."¹⁰

These findings put a positive, environmental spin on natural gas. There were some caveats – for instance, the report endorsed research and regulation to help minimize environmental impacts – but the report's pro-industry findings received much more emphasis. The press release amplified pro-gas claims, highlighting the study team's conclusion that increased reliance on natural gas

⁹ A full list of study group members and advisory committee members is available here:

<http://mitei.mit.edu/publications/reports-studies/future-natural-gas>

¹⁰ "The Future of Natural Gas", Massachusetts Institute of Technology (June 2011). Accessed at: http://mitei.mit.edu/system/files/NaturalGas_Report.pdf

would lead to lower greenhouse gas emissions. Its headline read: “Report: Natural gas can play a major role in greenhouse gas reduction.”

The press release also included a quote from MITEI director Ernest J. Moniz praising natural gas. “The analysis in this study provides the confirmation,” Moniz said. “Natural gas truly is a bridge to a low-carbon future.”¹¹ Some variation on this phrase appears nine times in the report itself.

The ensuing media coverage picked up on the tone of the press release, amplifying claims that natural gas was a bridge away from carbon-intensive energy and that environmental impacts were “challenging but manageable.” Headlines included:

- **An M.I.T. Plan for Natural Gas with Planet in Mind** (Andy Revkin, *New York Times* “Dot Earth” blog, June 9, 2011)
- **Bright future for natural gas, study says** (*United Press International*, June 10, 2011)
- **MIT Researchers See Natural Gas as the Choice for Lower Carbon Emissions** (Joel Kirkland, *Climate Wire*, June 25, 2011)

The full study was initially released at a press conference at MIT on June 9, 2011, and also enjoyed a Washington release at the Brookings Institution several weeks later. Ernest Moniz testified on the report’s findings before the Senate Committee on Energy and Natural Resources in July 2011, echoing several key findings in the report, including the assertion that environmental risks associated with fracking are “challenging but manageable.”

The MIT report came at a critical time for the industry, which was fending off a tide of negative press. A study by Cornell ecologist Robert Howarth released in April 2011 suggested that fracking may actually be dirtier than coal, due to methane leaks associated with the practice.¹² The *New York Times* had been running a series on natural gas titled “Drilling Down,” authored primarily by Ian Urbina, which had been raising questions about fracking.

The MIT study group countered these criticisms. Following industry and Wall Street blowback from one Urbina article that questioned the long-term financial viability of shale gas companies, then-public editor Arthur Brisbane cited the MIT natural gas study group as “taking issue” with Urbina’s analysis and highlighted their characterization of the growth of shale gas as a “paradigm shift” in a column that blasted Urbina’s reporting.¹³ MIT also took on Howarth’s study – MIT study group co-chair Henry Jacoby called Howarth’s study “very weak” and a section answering Howarth’s claims was appended to the MIT report.¹⁴

The MIT report helped lend academic credibility to industry talking points at a time when the industry needed this support. The next section details how the report was, in fact, authored and released by a group of industry insiders with a financial stake in the “future of natural gas.”

¹¹ “Report: Natural gas can play a major role in greenhouse gas reduction”, Massachusetts Institute of Technology (June 9, 2011). Accessed at: <http://web.mit.edu/press/2011/natural-gas-full-report.html>

¹² The Howarth study was funded in part with a grant from the Park Foundation; Park Foundation supports PAI’s fracking research, along with the other donors listed in the “Acknowledgements” section at the beginning of the report.

¹³ Brisbane did not note the MIT study’s close ties to the oil and gas industry, which were noted in a response from Urbina and his editors (one of a handful of media reports that actually noted the study’s industry ties).

¹⁴ Peter Mantius, “‘Frackademia’ – MIT’s Ernest Moniz, Obama’s Top Candidate for Energy Secretary, Oversees Pro-Industry-Funded Research”, DC Bureau (February 21, 2013).

Frackademia 101

Amid the controversy surrounding fracking, energy companies have turned to the academy for research validating the practice. In a page seemingly borrowed from the tobacco industry playbook, industry-friendly academics are producing research trumpeting fracking's benefits and downplaying its drawbacks. The claims made in these reports often do not stand up to scrutiny and the researchers often have ties to the energy industry, either by current or past employment or through industry funding for their work.

In 2012 three universities – Penn State, the University of Texas at Austin (UT), and the University at Buffalo (UB) – made headlines when studies released under their banners came under fire for undisclosed conflicts of interest, poor scholarship, and pro-industry bias. PAI played a significant role in exposing these problems, particularly in the cases of UB and UT. Though MIT's report follows a similar pattern to the reports outlined below, it has not yet received the critical attention that led to retractions, closings, and resignations at other universities.

Penn State cancels yearly report. From 2009 to 2011, Penn State released a yearly report that made inflated (and widely criticized) claims about the economic benefits of fracking in the Marcellus Shale. The reports initially failed to disclose that they were funded by an industry group, the Marcellus Shale Coalition. In 2010, after activists criticized the report's pro-gas advocacy and failure to disclose its funding, Penn State mineral sciences dean William Easterling retracted the original version of the report. An updated version of the report was released in 2011, but in 2012, *Bloomberg* reported that no Penn State faculty stepped forward to sign on to that year's edition of the report – meaning that it could not be released and had effectively been canceled. Easterling cited the study's reputation as a reason for the faculty snub.

University at Buffalo shuts research institute. In April 2012, the University at Buffalo (UB) announced the formation of a new institute devoted to researching fracking – the Shale Resources and Society Institute (SRSI). One month after its founding, SRSI released a report, authored by University of Wyoming economist Timothy Considine (Considine also authored the Penn State study discussed above), that claimed that fracking was becoming safer in Pennsylvania. A PAI review of the report identified undisclosed conflicts of interest and serious problems with the report, including an apparent mathematical error that rendered its central finding false. After six months of criticism and public outcry from SUNY students, faculty, and trustees, UB chose to shutter SRSI in November 2012.

University of Texas retracts report, professors resign and retire. In February 2012, the University of Texas (UT) Energy Institute released a report that found that fracking does not contaminate groundwater. A subsequent PAI review of the report identified a significant conflict of interest that had not been disclosed in the report: its principal investigator, UT professor Charles Groat, was a director of a gas exploration company, PXP. PAI also found evidence of sloppy scholarship and pro-gas bias. The ensuing controversy led UT to form an external review panel, which eventually called for the retraction of the report. The director of the Energy Institute, Ray Orbach, resigned and Groat retired.

For more context, see: Jim Efstathiou Jr., "Frackers Fund University Research That Proves Their Case", *Bloomberg* (July 23, 2012). Accessed at: <http://www.bloomberg.com/news/2012-07-23/frackers-fund-university-research-that-proves-their-case.html>; Brian Montopoli, "A poisoned well? Fracking studies stir doubts", *CBS News* (February 5, 2013). Accessed at: http://www.cbsnews.com/8301-201_162-57567508/a-poisoned-well-fracking-studies-stir-doubts/; Richard Schiffman, "'Frackademia': how Big Gas bought research on hydraulic fracturing," *Guardian* (January 9, 2013). Accessed at: <http://www.guardian.co.uk/commentisfree/2013/jan/09/fracking-big-gas-university-research>

II. Industry Ties, from Authors to Funders

“The study is an independent study. We welcomed advice, but the responsibility is ours for the findings and recommendations.”

– Ernest Moniz, introducing the “Future of Natural Gas” study at MIT in June 2011¹⁵

When he presented the final “Future of Natural Gas” study at MIT in June 2011, Ernest Moniz described the study as “independent” and noted that its advisory committee and funders, which had strong ties to industry, did not endorse or shape the report’s findings. Though the report had an extremely industry-friendly message, both Moniz and the report’s introduction suggested that the study group operated independently of its industry backers.

In fact, the study was far from being independent of industry; key authors of the study, including Moniz himself, had significant personal financial ties to the oil and gas industry. The fact that these conflicts of interest were not properly disclosed suggests that MIT, the Energy Initiative, and the “Future of Natural Gas” study group had poor systems in place for monitoring and managing conflicts of interest. This makes the study’s other extensive industry ties – from its funders to its advisory committee to MITEI’s funders – all the more troubling. The following section catalogues these industry ties.

A. Study Authors’ Undisclosed Conflicts of Interest

Key authors of the MIT study had strong oil and gas industry ties. None of these connections were disclosed in the study, in study materials, or in presentations of the study. Current, compensated positions are highlighted below, but past and uncompensated industry positions, which may or may not warrant public disclosure, are also listed for the purpose of context.¹⁶

Ernest Moniz

Ernest Moniz served as chair of the “Future of Natural Gas” study group, and has served as director of the MIT Energy Initiative since its founding in 2006. Moniz had significant personal ties to the oil and gas industry that were not disclosed in the final study or at the various release events for the report, including Moniz’s congressional testimony. President Obama nominated Moniz as the next energy secretary on March 4, 2013.

- **ICF International**

Moniz took a paid position on the board of ICF International, a consulting firm with oil and gas industry contracts, just prior to the release of the Future of Natural Gas study.

¹⁵ Video here: <http://mitei.mit.edu/publications/reports-studies/future-natural-gas>

¹⁶ See AAUP report, “Recommended Principles & Practices to Guide Academy-Industry Relationships,” for a discussion of what warrants public disclosure. The report is available at: <http://www.aaup.org/report/recommended-principles-practices-guide-academy-industry-relationships>

ICF International is a publicly traded consulting firm with a large energy practice and significant oil and gas industry contracts. According to recent Congressional testimony by ICF executive Harry Vidas, ICF produces studies for oil and gas industry clients including America's Natural Gas Alliance, the INGAA Foundation (a natural gas pipeline industry group), the National Petroleum Council, and the American Petroleum Institute.¹⁷ ICF has produced analyses of US oil and gas resources and midstream infrastructure for these clients.¹⁸ ICF also maintains a proprietary analytical tool called the "Gas Market Model," which "provides clients with analysis and forecasts of regional gas markets throughout North America."¹⁹

In May 2011, several weeks before Moniz joined ICF's board, ICF CEO Sudhakar Kesavan told investors that one of three key growth drivers in its burgeoning energy business was "analysis focused on assessing the mix of fossil fuels, including shale gas, in the overall portfolio of our future energy supply."²⁰ ICF's energy, environment, and infrastructure business segment accounted for approximately 41% of its business in 2012;²¹ it is not clear what percentage of this can be attributed to its natural gas analysis business.²²

Moniz was named to a paid position on the board of ICF International on June 3, 2011, three days prior to the release of the "Future of Natural Gas" study.²³ The final study, which was released on June 6, 2011 and presented to the public on June 9, 2011, did not acknowledge this connection, nor was it acknowledged in public presentations of the report.

ICF tapped Moniz specifically because of his energy expertise. According to ICF International's 2012 proxy statement, Moniz was selected for the following reasons: "Substantial expertise in the energy field," "Extensive experience within the government, particularly with regard to energy policy," and "Service on boards of other public companies."²⁴

Moniz's directorship at ICF has been lucrative for him. Since joining the ICF board, he has received total compensation valued at \$305,648 as of the close of business on March 11, 2013. For a partial year of service in 2011, he received \$36,603 in fees and 4,952 shares of stock, which vested in 2012. ICF International has not yet published its 2013 proxy statement, so 2012

¹⁷ Harry Vidas, "Testimony Before the Subcommittee of Energy & Power of the U.S. House of Representatives Committee on Energy and Commerce" (February 5, 2013). Accessed at: <http://democrats.energycommerce.house.gov/sites/default/files/documents/Testimony-Vidas-EP-American-Energy-Security-2013-2-5.pdf>

¹⁸ Notably, considering Moniz's nomination as energy secretary, ICF is also a significant federal contractor, including with the Department of Energy. It was awarded a \$40 million, 5-year Department of Energy contract in June 2011, several weeks after Moniz joined its board. "ICF International Awarded More Than \$40 Million New Task Order Contract with Department of Energy", ICF International (June 29, 2011). Accessed at: <http://www.icfi.com/news/2011/icf-awarded-new-task-order-contract-doe>

¹⁹ "Gas Market Model", ICF International. Accessed at: <http://www.icfi.com/insights/products-and-tools/gmm>

²⁰ "ICF International (ICFI): Q1 2011 ICF International Inc Earnings Conference Call", EarningsCast. Accessed at: <http://earningscast.com/ICFI/20110505>

²¹ "Q3 2011 ICF International Inc Earnings Conference Call", CQ Transcriptions (November 2, 2011).

²² ICF positioned itself to profit from the increased natural gas production and use in 2007, when it purchased a gas-focused consulting firm named Energy & Environmental Analysis. At the time, Kesavan pointed to the combination of the firms' modeling frameworks as a "unique analytical platform" that would be important in light of "increased use of natural gas and LNG as fuels to generate electric power." ("ICF International Acquires Energy and Environmental Analysis, Inc.", ICF International (January 10, 2007). Accessed at: <http://www.icfi.com/eea>)

²³ "ICF International Appoints Ernest J. Moniz to Board of Directors", ICF International (June 3, 2011). Accessed at: <http://www.icfi.com/news/2011/icf-appoints-ernest-j-moniz-to-board-of-directors>

²⁴ "Form DEF 14A", ICF International (April 20, 2012). Accessed at: <http://www.sec.gov/Archives/edgar/data/1362004/000119312512171567/d335055ddef14a.htm>

total compensation figures are unavailable, but according to a June 2012 SEC filing, Moniz was awarded another 5,314 shares in 2012, which will vest in 2013.²⁵

Ernest Moniz's Compensation from ICF International (2011-present)			
	2011	2012	Total
Fees	\$37,603	*	\$37,603
Shares Awarded	4,952	5,314	10,266
Value of Shares as of			
March 11, 2013**	\$129,296.72	\$138,748.54	\$268,045.26
Total	\$166,899.72	\$138,748.54	\$305,648.26

* Moniz's fees for 2012 were not yet available upon this report's writing
** Shares of ICFI were worth \$26.11 at the market's close on March 11, 2013.

ICF is a significant financial contributor to the MIT Energy Initiative, as well. According to its 2012 proxy, ICF is donating \$125,000 per year to the Energy Initiative over the course of a five-year membership.²⁶ This membership was negotiated in April and May 2011, prior to Moniz joining ICF's board in June 2011.

The MIT study cites ICF several times and describes it as “a consulting firm whose services were used in preparation of supply curves for this study.”

- **NGP Energy Technology Partners**

Moniz is also an advisory board member of NGP Energy Technology Partners (NGP ETP), an energy-focused venture capital fund with significant investments in the oil and gas industry. Moniz has served on NGP ETP's advisory board since 2006.²⁷ It is unclear if this position is compensated.

According to its website, NGP ETP “invests equity capital for growth and buyout transactions in companies that provide products and services to the oil and gas, power, energy efficiency, and alternative energy sectors.”²⁸ NGP ETP is part of the investment platform of NGP Energy Capital Management, along with Natural Gas Partners, NGP Global Adaptation Partners, NGP Capital Resources Company, and NGP Midstream and Resources.²⁹

NGP ETP lists five oil and gas industry service providers in the portfolio of 15 energy companies posted on its website.³⁰ The company made many of these investments during Moniz's tenure as an advisory board member.

²⁵ “Ownership Information: Ernest J Moniz”, United States Securities and Exchange Commission. Accessed at: <http://www.sec.gov/cgi-bin/own-disp?action=getowner&CIK=0001265177>

²⁶ “Form DEF 14A”, ICF International (April 20, 2012) at 20.

²⁷ Interview with Phil Deutch on February 22, 2013.

²⁸ “Home”, NGP Energy Technology Partners. Accessed at: <http://www.ngpetp.com/>

²⁹ “NGP Energy Capital Management”, NGP Energy Technology Partners. Accessed at: http://www.ngpetp.com/ngp_ecm.php

³⁰ “Portfolio Companies”, NGP Energy Technology Partners. Accessed at: http://www.ngpetp.com/portfolio_companies.php

- Environmental Drilling Solutions (2009-present). Formerly known as Jackal Services LLC, NGP ETP purchased a stake in EDS in 2009 with portfolio company Wellbore Energy Solutions. EDS “provides mobile cuttings drying units, pressure washers, and rig vacuum systems to the oil & gas industry.”³¹
- Flogistix (2011-present). Flogistix “specializes in natural gas and coal bed methane compression systems.”³² It was purchased as Fluid Compressor Partners in January 2011; its name was changed to Flogistix in May 2011.³³
- GeoDigital International. GeoDigital “provides airborne inspection and asset management services for the electric utility and oil and gas pipeline sectors.”³⁴
- Managed Pressure Operations (2010-present³⁵). Managed Pressure Operations is “an oilfield services company that provides continuous circulation and managed pressure drilling systems to oil & gas operators around the world.”³⁶
- Viking Oil Tools (2012-present³⁷). Viking provides “oil and gas producers with high quality fishing, thru tubing, and rental equipment and services.”
- Wellbore Energy Solutions (past investment: 2008-2010). Wellbore is a provider of “wellbore cleanup tools and services.”³⁸ Halliburton acquired Wellbore in 2010.³⁹
- Dynapump (past investment: 2007-2011). Dynapump sold “mounted artificial lift systems for the oil and gas industry to optimize the production of oil and gas wells.”⁴⁰ It went bankrupt in 2011.

NGP ETP’s managing partner is Philip Deutch, the son of John Deutch, an MIT professor and another member of the Future of Natural Gas study group (see below for more on John Deutch). John Deutch is also on NGP ETP’s advisory board.

It is unclear if Moniz is compensated by NGP ETP. The MIT Energy Initiative and Philip Deutch declined to respond to PAI’s questions about whether he is compensated.⁴¹

³¹ “Portfolio Companies”, NGP Energy Technology Partners. Accessed at: http://www.ngpetp.com/portfolio_companies.php

³² *Id.*

³³ “Natural Gas Partners”, Flogistix (January 19, 2011). Accessed at: www.flogistix.com/natural-gas-partner/

³⁴ “Portfolio Companies”, NGP Energy Technology Partners.

³⁵ “Managed Pressure Operations Raises Growth Capital”, Business Wire (August 19, 2010). Accessed at: <http://www.businesswire.com/news/home/20100819005725/en/Managed-Pressure-Operations-Raises-Growth-Capital>

³⁶ “Portfolio Companies”, NGP Energy Technology Partners.

³⁷ “Viking Oil Tools Receives Significant Equity Investment from NGP Energy Technology Partners”, Business Wire (September 13, 2012). Accessed at: <http://eon.businesswire.com/news/eon/20120913006553/en>

³⁸ “Wellbore Energy Solutions Raises Growth Equity Financing”, Wellbore Energy Solutions (May 5, 2008). Accessed at: http://www.ngpetp.com/news/5-5-08_WellborePressRelease.pdf

³⁹ “Halliburton Announces First Quarter Earnings of \$0.28 Per Diluted Share From Continuing Operations, Excluding the Impact of Venezuela Devaluation”, Halliburton (April 19, 2010). Accessed at: <http://ir.halliburton.com/phoenix.zhtml?c=67605&p=irol-newsArticle&ID=1414211>

⁴⁰ “DynaPump”, Second Market. Accessed at: <https://www.secondmarket.com/company/dynapump>

⁴¹ Interview with Phil Deutch on February 22, 2013; interview with Victoria Ekstrom, MIT Energy Initiative spokesperson, March 19, 2013.

- **Other Energy Industry Ties**

Moniz has a number of other past and current ties to the energy industry.

BP Energy Sustainability Challenge. Moniz is a member of the advisory board of the BP Energy Sustainability Challenge, a research program at 13 universities worldwide funded by BP to “investigate the effects of natural resource scarcities on patterns of energy supply and consumption.” MIT and the University of Texas at Austin are members of the consortium studying the water footprints of energy production and electricity generation. BP is a major donor to MITEI, having pledged a total of \$50 million since the Initiative was launched in 2006.

BP Technology Advisory Council. The BP Technology Advisory Council is a group of 13 “independent scientists and technologists from different countries, industry and academia” that provide input to managing directors on how BP is “handling all aspects of technology.” Various bios for Moniz list him as a member through 2010.⁴² The council was overseen by “The Future of Natural Gas” study co-chair Tony Meggs when he was a vice president at BP.⁴³

American Science & Engineering. He is also a board member of American Science & Engineering, a publicly traded provider of x-ray inspection technologies. AS&E provides security systems to oil refineries, in addition to a number of other clients. AS&E recently won a \$250 million contract to provide controversial x-ray machines at airports.

Gas Technology Institute. From 2002 to 2006, Moniz was on the board of directors of the Gas Technology Institute (GTI), a non-profit research, development, and training organization focused on “providing value to the natural gas industry and energy markets.” GTI is an affiliate member of MITEI, donating \$5,000 per year to the Initiative, and was a sponsor of its natural gas study. “The Future of Natural Gas” study group member and MITEI executive director Melanie Kenderdine was vice president of GTI from 2001 to 2007 where she was “involved in major initiatives to increase domestic natural gas supplies, to enhance energy efficiency, and to promote the research needs of the natural gas industry.” GTI’s director of regulatory and government relations, Ron Edelstein, was also on the advisory committee to “The Future of Natural Gas.”

Research Partnership to Secure Energy for America. Moniz is a former board member of the Research Partnership to Secure Energy for America, a non-profit group that performs research to support the natural gas industry. On its annual IRS filing, RPSEA described its mission:

RPSEA is a multi-purpose entity established to facilitate a cooperative effort to identify and develop new methods and integrated systems for exploring, producing and transporting-to-market energy or other derivative products from ultra-deepwater and unconventional natural gas and other petroleum resources, and to ensure that small producers continue to have access to the technical and

⁴² Moniz’s bios in American Science & Engineering’s proxy statements list his BP technology advisory council membership in its 2010 filing, but not in 2011 (presumably, he left the council or it was disbanded):

<http://www.sec.gov/Archives/edgar/data/5768/000104746910006727/a2199504zdef14a.htm>

⁴³ Lisa Davidson, “Tech talk”, BP Magazine, Issue 1 (2012), 52 Accessed at:

http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/press/bp_magazine/STAGING/local_assets/pdf/bp_issue_1_2012.pdf and Tony Meggs, “Technology: Demonstrating Value To The Corporation”, BP. Accessed at: <http://www.bp.com/genericarticle.do?categoryId=98&contentId=2018393>

knowledge resources necessary to continue their important contribution to energy production in the U.S.

“The Future of Natural Gas” advisory committee members Vello Kuuskraa, Ralph Cavanagh, and Mike Ming have ties to RPSEA, as does MITEI executive director Melanie Kenderdine. Ming was the group’s president until November 2011⁴⁴, Kenderdine was a board member until March 2011⁴⁵, Kuuskraa is a current RPSEA board member⁴⁶, and Cavanagh is a member of the RPSEA strategic advisory committee.⁴⁷

Anthony Meggs

Anthony Meggs, a visiting engineer at MIT from 2008 to 2011, served as a co-chair of the “Future of Natural Gas” study group, along with Henry Jacoby. Meggs introduced the report’s findings regarding natural gas supply and environmental impacts of fracking. Meggs had significant personal ties to the oil and gas industry that were not disclosed in the final study or at the various release events for the report.

- **Talisman Energy**

Meggs joined gas exploration and production company Talisman Energy as a senior adviser in May 2011, just one month prior to the publication of the MIT report.⁴⁸ In February 2012, he was elevated to the position of executive vice president, special projects.

Talisman Energy is a Canadian oil and gas exploration and production company that is one of the top drillers in the Marcellus Shale. As of January 2012, the Pennsylvania Department of Environmental Protection had hit Talisman with 238 violations, more than any other driller.⁴⁹ In January 2011, four months before Meggs joined Talisman, the company spilled 21,000 gallons of fracking fluid at one of its Tioga County wells, and was later fined \$51,748.

When Meggs joined, Talisman noted that he would “focus initially on helping consider options associated with North American gas monetization, in particular gas-to-liquids study around Montney.”⁵⁰ In January 2012, Meggs told investors that the company was also studying the potential for converting its assets in the Montney shale play, in British Columbia, to LNG:

"I would add that this is not the only option we're looking at. We're looking at other monetization options, such as LNG, to ensure that we have pursued all possible avenues to realizing the full value for the gas that we're producing."⁵¹

⁴⁴ “Form 990”, Research Partnership to Secure Energy for America (August 15, 2012). Accessed at: <http://www.guidestar.org/FinDocuments/2011/371/438/2011-371438613-0874b706-9.pdf>

⁴⁵ *Id.*

⁴⁶ *Id.*

⁴⁷ “Strategic Advisory Committee”, Research Partnership to Secure Energy for America. Accessed at: <http://www.rpsea.org/strategic-advisory-committee/>

⁴⁸ “Tony Meggs”, LinkedIn. Accessed at: <http://uk.linkedin.com/pub/tony-meggs/12/a16/a27>

⁴⁹ Scott Detrow, “DEP Fines Talisman \$51,478 For January 2011 Fracking Spill”

<http://stateimpact.npr.org/pennsylvania/2012/01/04/dep-fines-talisman-51000-for-january-2011-fracking-spill/>

⁵⁰ “Event Brief of Q2 2011 Talisman Energy Inc Earnings Conference Call”, CQ FD Disclosure (July 28, 2011).

⁵¹ Richard Macedo, “Talisman Looking At Several Options For Montney Assets, Including LNG”, Daily Oil Bulletin (February 16, 2012). Accessed at: <http://pdf.dailyoilbulletin.com/120216/dob-2012-02-16.pdf>

In August 2012, after ending its gas-to-liquids study, Talisman CEO John Manzoni told investors that the company was in talks to convert its Montney assets to LNG. *Bloomberg* reported that the company's stock rose more than it had in over three years on news of the developments.⁵²

It is unclear how much Meggs made in his position at Talisman. Talisman did not report Meggs's compensation in its 2012 proxy statement because he was not one of the top 5 most highly compensated executive officers at the firm (each of the five named officers made more than \$3 million in 2011).⁵³ This could be due to the fact that he worked at Talisman for a partial year in 2011. Meggs is one of just nine executives named and pictured in Talisman's 2012 annual report to investors.⁵⁴

Meggs left Talisman in January 2013 as part of a company cost-cutting effort.⁵⁵

- **BP**

Prior to joining MIT as a visiting engineer, Meggs was a longtime executive at BP. He oversaw BP's natural gas operations in Africa and the Americas in the 1990s before being tapped as a "turtle" to BP's CEO at the time, Lord Browne. BP's "turtle" program was an executive mentorship program pairing young talent with top executives and giving individuals like Meggs inside access to the company's power brokers. Meggs described the experience in an interview with the *Wall Street Journal* in 2002: "It is seeing power in action... The pressure is relentless, but you can't buy such experience."⁵⁶

Meggs went on to head BP's technology division from 2002 to 2008. In 2005, Meggs told the audience at an industry conference that the cost of drilling is a significant component of the costs of BP's projects in the Gulf of Mexico, the eventual site of BP's massive 2010 oil spill, and that "having efficient drilling costs is a very important part of making projects economic," according to *The Oil and Gas Journal*.⁵⁷ That same year, in 2005, he told investors that horizontal drilling and hydraulic fracturing were important technological developments for BP:

Another important area of technology development is in our North American tight gas resources. Through the use of horizontal drilling and advanced hydraulic fracturing techniques, we are achieving well rates up to ten times higher than more conventional techniques and per well recoveries some five times higher.⁵⁸

⁵² Rebecca Penty, "Talisman Energy Rises on Montney LNG Development Options", *Bloomberg* (August 1, 2012). Accessed at: <http://www.bloomberg.com/news/2012-08-01/talisman-energy-rises-on-montney-lng-development-options.html>

⁵³ "Notice of Meeting and Management Proxy Circular", Talisman Energy (March 5, 2012), 32. Accessed at: http://www.sedar.com/GetFile.do?lang=EN&docClass=10&issuerNo=00000768&fileName=/csfsprod/data127/filings/01875270/00000001/j%3A%5Ctorsdr01%5CMar_22%5CTalisman%5CInfoCirc.pdf

⁵⁴ "Safe Profitable Growth", Talisman Energy (March 5, 2012). Accessed at: http://www.sedar.com/GetFile.do?lang=EN&docClass=2&issuerNo=00000768&fileName=/csfsprod/data127/filings/01868041/00000001/j%3A%5Ctorsdr01%5CMar_05%5CTalisman%5CAR.pdf

⁵⁵ Dan Healing, "Talisman sharpens cost-cutting goals", *Calgary Herald* (January 24, 2013). Accessed at: <http://www.calgaryherald.com/business/Talisman+sharpens+cost+cutting+goals/7866838/story.html>

⁵⁶ Bhushan Bahree, "Turtles Do 'a Dog's Job' to Advance", *The Wall Street Journal Europe* (October 4, 2002).

⁵⁷ Nina Rach, "Industry leaders discuss new technology development and deployment", *The Oil and Gas Journal* (April 4, 2005).

⁵⁸ "Bp PLC Technology Presentation & Conference Call", Voxant (December 12, 2005).

As a BP executive, Meggs oversaw BP's technology advisory council, which included Ernest Moniz (see above).

John Deutch

John Deutch, an MIT professor and the former director of the CIA, served as one of the members of the "Future of Natural Gas" study group. Deutch chaired the hydraulic fracturing advisory subcommittee convened by Energy Secretary Steven Chu in May 2011. Deutch had significant personal ties to the oil and gas industry that were not disclosed in the MIT report.

- **Cheniere Energy**

Deutch has been a director of Cheniere Energy since 2006. Cheniere is in the business of transporting and selling liquefied natural gas (LNG), and has the distinction of being the only company with a permit to export LNG from the lower 48 states. In March 2013, the *Wall Street Journal* reported that Cheniere Energy had filed a request with the Department of Energy to add gas export capacity to its LNG terminal at Sabine Pass.⁵⁹

When Deutch was elected to Cheniere Energy's board of directors, in 2006, chairman and CEO Charif Souki said that Deutch's expertise "will greatly complement Cheniere's business model as we continue to articulate the important role of LNG in US domestic energy supply."⁶⁰

The Cheniere directorship has been lucrative for Deutch. He currently owns 59,043 shares of Cheniere Energy stock, worth \$1,392,233 as of March 11, 2013.⁶¹

- **NGP Energy Technology Partners**

Deutch also serves on the advisory board of NGP ETP (discussed above, under "Ernest Moniz"). Deutch's son, Philip Deutch, runs the firm, which invests in several oil and gas companies.

- **Other Ties**

Deutch has several other significant ties to the oil and gas industry. He sat on the board of Schlumberger, the world's largest oilfield services company, from 1997 to 2007. MIT's current president, Leo Rafael Reif, joined Schlumberger's board in 2007 and is currently a director of the company. Reif owns 13,000 shares of Schlumberger stock, worth \$1,011,140 as of March 11,

⁵⁹ Ben LeFebvre, "Cheniere Files Request with US to Expand LNG Export Capacity," *Wall Street Journal*, March 5, 2013. <http://online.wsj.com/article/SB10001424127887324678604578342562768676672.html>

⁶⁰ "Cheniere Energy Elects John M. Deutch to Board of Directors", Cheniere Energy (December 15, 2006). Accessed at: http://www.cheniere.com/2006%20press%20releases/PR_12-15-06_Deutch_Election_to_Board.htm

⁶¹ Shares of LNG were worth \$23.58 at the market's close on March 11, 2013. "Ownership Information: John M Deutch", United States Securities and Exchange Commission. Accessed at: <http://www.sec.gov/cgi-bin/own-disp?action=getowner&CIK=0001179111>

2013.⁶²

Other Study Authors

Other study authors have notable past and current industry ties, as well.

Melanie Kenderdine, a member of the research team and the Initiative’s executive director, is a former vice president of the Gas Technology Institute (GTI), which is discussed above under “Ernest Moniz.”

Joseph Hezir, a member of the research team and a visiting engineer at the MIT Energy Initiative when the study was released, owns the EOP Group, a lobbying firm. In the first quarter of 2011, prior to the release of the study, lobbying disclosure forms show that Hezir lobbied on behalf of NRG Energy on the issue of “climate change legislation.”⁶³ NRG’s holdings include natural gas-fired power plants. Hezir has lobbied on behalf of a number of other energy companies, including Constellation Energy and Con Ed.

Though PAI has not found significant industry ties for other authors, in the absence of proper public disclosure it is impossible to say whether other members of the report’s study group had industry ties and financial conflicts of interest.

B. Advisory committee

The majority of the study’s 18-member advisory committee, acknowledged in the study as bringing “important perspective and experience to our discussions,” had strong ties to the oil and gas industry. 12 of the study’s 18 advisory committee members have ties to the energy industry, with ten currently employed by the petroleum industry or with a financial stake in oil and gas companies.⁶⁴

Thomas F. McLarty III, former Clinton chief of staff, was the chairman of the study’s advisory committee and is a member of MITEI’s external advisory board. He is the president of McLarty Associates, a “strategic advisory firm” that lists Chevron and London-based oil and gas company Afren among its clients.⁶⁵ McLarty Associates also has a partnership with the law firm Covington & Burling, which lobbied for BP and Kosmos Energy in 2012.⁶⁶

⁶² SEC Form 4, Rafael Reif:

<http://www.sec.gov/Archives/edgar/data/87347/000124636012002188/xslF345X03/form.xml>Schlumberger’s stock was worth \$77.78 at the market’s close on March 11, 2013.

⁶³ See lobbying disclosure filing at Open Secrets:

<http://soprweb.senate.gov/index.cfm?event=getFilingDetails&filingID=F3CB7D3D-A2D6-4802-B5A7-9397CC9FC3C9&filingTypeID=51>

⁶⁴ “The Future of Natural Gas”, Massachusetts Institute of Technology (June 6, 2011) at vii.

⁶⁵ “Home” McLarty Associates. Accessed at: <http://www.maglobal.com/>

⁶⁶ “McLarty Associates”, Covington & Burling. Accessed at: <http://www.cov.com/mclarty/> and “Lobbying: Covington & Burling”, Center for Responsive Politics. Accessed at:

<http://www.opensecrets.org/lobby/firmsum.php?id=D000021942&year=2012>

Denise Bode, listed as the CEO of the American Wind Energy Association, is the former CEO of the American Clean Skies Foundation and former president of the Independent Petroleum Association of America.⁶⁷

Joseph Dominguez is a senior vice president at Exelon, a conglomerate of electricity generation, sales, and transmission companies that relies on natural gas power plants for 28% of its output.

Ron Edelstein is the director of regulatory and government relations for the Gas Technology Institute.

John Hess is the chairman and CEO of the Hess Corporation, an oil and gas company.

James T. Jensen is the president of Jensen Associates, a consulting firm focused on natural gas.

Former Senator **J. Bennett Johnston** is the chairman of Johnston Associates, where he lobbied for the American Petroleum Institute in 2012.⁶⁸ Johnston Associates has an alliance with the law firm Steptoe & Johnson, which lobbied for the American Gas Association in 2012.⁶⁹ Johnston is also a former Chevron and Columbia Energy board member.⁷⁰

Vello A. Kuuskraa is president of Advanced Resources International, a research and consulting firm “providing services related to unconventional gas.” Kuuskraa is also on the board of Southwestern Energy and the Research Partnership to Secure Energy for America (RPSEA), discussed in the profile of Moniz above.

Mike Ming, currently the Oklahoma Secretary of Energy, is a former managing member of K. Stewart Energy Group and former vice president of production for Bracken Energy Company.⁷¹ Ming is a former RPSEA president, as discussed above.

Octavio Simoes is vice president of commercial development for Sempra Energy, a diversified natural gas utility company that owns natural gas-fired power plants, natural gas pipelines and storage, and liquefied natural gas terminals.

Greg Staple is the current CEO of the American Clean Skies Foundation and a former partner at the law firm Vinson & Elkins, where he was a lobbyist for Chesapeake Energy.⁷² Chesapeake’s

⁶⁷ Anne Mulkern, “Sharp-elbowed leader brings oil-patch swagger to wind group”, *Greenwire* (May 24, 2010). Accessed at: <http://www.eenews.net/public/Greenwire/2010/05/24/1>

⁶⁸ “Lobbying: J. Bennett Johnston”, Center for Responsive Politics. Accessed at: <http://www.opensecrets.org/lobby/lobbyist.php?id=Johnston%2C%20J%20Bennett&id=Y0000031406L&year=2012>

⁶⁹ “J. Bennett Johnston”, Steptoe & Johnson. Accessed at: <http://www.steptoe.com/professionals-660.html> and “Lobbying: Steptoe & Johnson”, Center for Responsive Politics. Accessed at: <http://www.opensecrets.org/lobby/firmsum.php?id=D000022267&year=2012>

⁷⁰ “Senator J. Bennett Johnston”, Bipartisan Policy Center. Accessed at: <http://bipartisanpolicy.org/about/senator-j-bennett-johnson>

⁷¹ Michael McNutt, “Gov.-elect Fallin names new energy secretary”, *The Oklahoman* (January 6, 2011). Accessed at: <http://newsok.com/article/3529743>

⁷² “Gregory C. Staple, CEO”, American Clean Skies Foundation. Accessed at: <http://www.cleanskies.org/about/team/gregory-staple/> and “Lobbying: Gregory Staple”, Center for Responsive Politics. Accessed at: www.opensecrets.org/lobby/lobbyist.php?lname=Staple, Gregory&id=Y0000034894L&year=2009

founder, Aubrey McClendon, also founded ACSF and was its chairman until he left Chesapeake in 2013.

Peter Tertzakian is the chief energy economist and managing director of ARC Financial, which bills itself as “Canada’s leading energy focused private equity manager.”⁷³ ARC is invested in approximately 35 companies, many of which are oil and gas production and well services companies.

C. Funding

The funders of the report also have strong oil and gas industry ties. These funders are named in the acknowledgments section of the report.

The American Clean Skies Foundation (ACSF), which the study’s authors acknowledge “first and foremost” as a funder, is a nonprofit organization founded by Aubrey McClendon, CEO and director of the gas giant Chesapeake Energy. According to its website, ACSF “seeks to advance America’s energy independence and a cleaner, low-carbon environment through expanded use of natural gas, renewables and efficiency,” though it mainly acts as a natural gas advocate.⁷⁴

ACF’s board includes Robert A. Hefner III, founder and CEO of the gas driller GHK Companies and Andrew J. Littlefair, the president and CEO of Clean Energy, a provider of natural gas as vehicular fuel. Until Aubrey McClendon’s departure from Chesapeake, the Clean Skies board was made up of McClendon; Ralph Eads, vice chair of Chesapeake financier Jefferies & Co.; and Thomas S. Price, Jr., the senior vice president for corporate development and government relations for Chesapeake.⁷⁵ McClendon, Eads, and Price were subsequently replaced by Clean Skies senior regulatory counsel Warren G. Lavey and former Oklahoma Corporation Commissioner James A. Roth.⁷⁶

The rest of the study’s acknowledged funders are also gas industry players, including Hess and Exelon, which drill for gas and use it for power generation, respectively; the Gas Technology Institute, a research, development, and training organization for the gas industry; and the Colombian National Hydrocarbons Agency, which administers the country’s oil and gas resources.⁷⁷ The report also acknowledged an anonymous donor.

While a press release announcing interim results from the year before disclosed the study’s funders, the release accompanying the study’s publication, the press stories that followed, and Moniz in his congressional testimony did not note that “The Future of Natural Gas” was funded by the petroleum industry or that the Energy Institute’s largest donors were oil and gas companies.

⁷³ “ARC Financial Corp.,” ARC Financial. Accessed at: <http://arcfinancial.com/>

⁷⁴ “About,” American Clean Skies Foundation. Accessed at: <http://www.cleanskies.org/about/>

⁷⁵ “Form 990,” American Clean Skies Foundation (October 22, 2012). Accessed at:

<http://www.guidestar.org/FinDocuments/2011/208/837/2011-208837141-08c4125c-9.pdf>

⁷⁶ “ACSF Board of Directors,” American Clean Skies Foundation. Accessed at: <http://www.cleanskies.org/about/board-bios/>

⁷⁷ “The Future of Natural Gas,” Massachusetts Institute of Technology (June 6, 2011) at iii.

D. MIT Energy Initiative Funders

The MIT Energy Initiative, which released the report, relies on an extraordinary amount of oil and gas industry funding.

The Energy Initiative's four biggest donors, known as "founding members," have pledged \$125 million combined since 2006. They are all oil and gas companies: BP, Eni, Saudi Aramco, and Shell. Each company has pledged to donate \$25 million to the institute over five years.⁷⁸ On October 26, 2012, MIT announced BP's second \$25 million pledge to the program, bringing that company's total contribution to \$50 million.⁷⁹

Pledges from other oil and gas companies bring the total oil and gas industry contribution to the Energy Initiative to over \$145 million.

Other funders include companies involved in every facet of the energy industry from production to utilities and power generators to the private equity and venture capital firms that finance projects to lobbying and law firms that promote pro-gas policy. Especially notable:

- Chevron is a "sustaining member" of MITEI, pledging \$5 million over five years.
- Schlumberger is another sustaining member.
- Duke Energy, an "associate member," donates \$100,000 per year.
- Hess Corporation is also an associate member.
- Constellation Energy, an electric and gas utility now owned by Exelon, is an "affiliate member" for its \$5,000 per year donation.
- GTI is also an affiliate member.
- Hogan Lovells, which has lobbied for Anadarko Petroleum in the aftermath of the Gulf of Mexico oil rig explosion, is an affiliate member.
- NGP Energy Technology Partners (see above, under "Ernest Moniz") is an affiliate member.
- Osaka Gas Co. is an affiliate member.⁸⁰

As detailed on the Energy Initiative's membership page, different levels of support gain a company different perks, including offices at Initiative headquarters, intellectual property rights, and roles in program governance including oversight for sponsored research.⁸¹

- Founding members (\$25 million commitment) participate in the "Sponsored Research Program," developing research projects "through an iterative process involving the Member and MIT" and guaranteeing members "certain Intellectual Property (IP) rights associated with their sponsored research." Founding members also get a seat on MITEI's external advisory board, an office at MITEI headquarters, seats on the MITEI executive committee and governing board, and oversight of sponsored research. "With faculty

⁷⁸ "Membership", Massachusetts Institute of Technology Energy Initiative. Accessed at: <http://mitei.mit.edu/support/membership>

⁷⁹ "BP renews commitment to MIT with second \$25 million pledge", Massachusetts Institute of Technology Energy Initiative (October 26, 2012). Accessed at: <http://mitei.mit.edu/news/bp-renews-commitment-mit-second-25-million-pledge>

⁸⁰ "Members", Massachusetts Institute of Technology Energy Initiative. Accessed at: <http://mitei.mit.edu/about/members>

⁸¹ "Membership", Massachusetts Institute of Technology Energy Initiative.

consent, Founding Members may place a researcher in a participating MIT faculty member's lab," as part of their joint oversight role.⁸²

- Sustaining members (\$5 million) also participate in the Sponsored Research Program and have seats on the MITEI executive committee and on the MITEI governing board.⁸³
- Associate and affiliate members do not have governance roles at the Energy Initiative, but have fellowships named after them and are entitled to the same outreach perks as members with greater donations.⁸⁴

⁸² "Founding Membership", Massachusetts Institute of Technology Energy Initiative. Accessed at: <http://mitei.mit.edu/support/membership/founding-membership>

⁸³ "Sustaining Membership", Massachusetts Institute of Technology Energy Initiative. Accessed at: <http://mitei.mit.edu/support/membership/sustaining-membership>

⁸⁴ "Associate Membership", Massachusetts Institute of Technology Energy Initiative. Accessed at: <http://mitei.mit.edu/support/membership/associate-membership> and "Affiliate Membership", Massachusetts Institute of Technology Energy Initiative. Accessed at: <http://mitei.mit.edu/support/membership/affiliate-membership>

Timeline of Events: MIT and “The Future of Natural Gas”

Fall 2006 – MIT launches the MIT Energy Initiative “to partner with industry as a prime locus for the clean energy transformation needed to address economic, environmental, and security concerns associated with the current energy system.”

2006 – Ernest Moniz, study chair and director of MITEI, joins NGP Energy Technology Partners, a private equity firm affiliated with NGP (Natural Gas Partners) Energy Capital Management, as advisory board member. NGP ETP invests in numerous oilfield services companies.

December 15, 2006 – Study group member John Deutch joins Cheniere Energy board of directors.

2009 – Anthony Meggs leaves BP and joins MIT as a visiting engineer and co-chair of “The Future of Natural Gas” study group.

June 25, 2010 – “The Future of Natural Gas” interim results are released.

May 2011 – Meggs joins Talisman Energy as a senior advisor; Department of Energy approves Cheniere Energy to export liquefied natural gas (LNG) from its Sabine Pass terminal.

June 3, 2011 – Moniz joins board of directors of ICF International, a consulting firm with oil and gas industry contracts. ICF’s CEO had recently cited analysis of shale gas in the energy mix as a key growth driver for the firm.

June 6, 2011 – “The Future of Natural Gas” study is posted on MIT Energy Initiative’s website; Press surrounding the study focuses on conclusions that natural gas can be used as “a bridge to a low-carbon future.”

June 9, 2011 – MIT holds a press briefing for “The Future of Natural Gas.”

July 19, 2011 – Moniz testifies before the Senate Committee on Energy and Natural Resources on “The Future of Natural Gas.”

April 2012 – FERC grants Cheniere Energy permit to build export plant at Sabine Pass. Cheniere is the first, and so far only, company to obtain authorization from the U.S. government to export liquefied natural gas to non-free trade countries.

February 2012 – Meggs is named executive vice president of special projects at Talisman Energy, overseeing gas monetization and technical functions.

February 6, 2013 – Reuters reports that Moniz is being considered for Energy Secretary post.

March 4, 2013 – Moniz nominated for Secretary of Energy.

Sources: MITEI website; Phone call with Phil Deutch; Cheniere Energy Press Release; LinkedIn – Anthony Meggs; MITEI Press Release; Bloomberg Businessweek Executive Profile: Anthony Meggs; “Cheniere wins OK for LNG export”, Houston Chronicle; ICF International Form 8-K; MITEI Press Release; Testimony of Ernest Moniz before the Senate Committee on Energy and Natural Resources; “Cheniere Wins Approval for Biggest U.S. Gas-Export Terminal”, Bloomberg; “Obama considering MIT physicist Moniz for energy secretary – sources”, Reuters.

III. Evidence of Poor Scholarship

Though a comprehensive review of the MIT study is outside the scope of this report, a closer look at two of the report's most widely cited, industry-friendly claims suggests that key findings in the MIT study were not grounded in sound scientific research.

- **Environmental impacts are “challenging but manageable.”⁸⁵**

The report's assertion that fracking-related environmental impacts are “challenging but manageable” appears several times in the report. It was also highlighted in the press release, at the press conference announcing the study, and in Moniz's congressional testimony, suggesting that it was one of the study's more important findings. The finding is key to the MIT report's central assertion that natural gas is a clean “bridge” fuel.

There are significant problems with this claim. First and foremost, the MIT report contains virtually no substantive research on the question of environmental impacts. MIT devoted nine pages of its 170-page report to environmental concerns. The section consists primarily of background information on the drilling process, an explanation of why “fracturing itself” does not pose a groundwater contamination risk, and a list of five other potential environmental concerns.

The section also includes a brief analysis of “widely reported incidents” related to fracking in a high-level view “intended to give a sense of the relative frequency of various types of incidents.” These are reported in the below table, from chapter 2 of the study.

No original research was performed for this section; data on these “widely reported incidents” was aggregated from three other reports, and an appendix to the report does not clarify how MIT decided to focus on these reports or incidents. The study's handling of research on environmental impacts is reminiscent of the University of Texas's analysis of environmental impacts, which was primarily a literature review, and yet purported to be a definitive study on the question of whether fracking contaminates groundwater (UT's study was released after MIT's).

Table 2.3 Widely Reported Incidents Involving Gas Well Drilling; 2005 – 2009

Type of Incident	Number Reported	Fraction of Total
Groundwater contamination by natural gas or drilling fluid	20	47%
On-site surface spills	14	33%
Off-site disposal issues	4	9%
Water withdrawal issues	2	4%
Air quality	1	2%
Blowouts	2	4%

Source: “The Future of Natural Gas”, Massachusetts Institute of Technology (June 6, 2011) at 39.

⁸⁵ “The Future of Natural Gas”, Massachusetts Institute of Technology (June 6, 2011) at xiii

Furthermore, the MIT study mischaracterizes the minimal data that it did compile for the study. Researchers say that, of the case studies they looked at, there were no incidents “which conclusively demonstrate contamination of shallow water zones with fracture fluid.”⁸⁶ However, in an appendix to Chapter 2 (Appendix 2E), there are several such instances named. In fact, of the 43 “widely reported” incidents, ten (23%) involved water contamination with fracture fluid.⁸⁷

The MIT study also suggests that the small number of incidents indicates that fracking is relatively safe.⁸⁸ In his presentation of the report’s environmental impact findings, co-chair Anthony Meggs highlighted this finding, which was also amplified in the press release announcing the report⁸⁹:

First of all, I'd say, that there's 42 [sic] incidents on here, out of tens of thousands of wells drilled. I don't claim it's comprehensive. It doesn't include every single incident. But it does include the widely reported incidents and, it is not trivial, but neither is it all-encompassing – only a very, very small fraction of the wells experience problems.⁹⁰

Leaving aside the question of whether 42 or 43 is a significant number of incidents, it is unclear what this number can possibly indicate about the relative safety of fracking – it was drawn from a meta-study of three reports, not an in-depth analysis of regulatory data or data collected in the field. This data also appears to be the basis for the MIT study’s assertion that “the environmental record of shale gas development has for the most part been a good one.”

The MIT study took several years to complete, involved many authors, researchers, and advisers, and appears to have been well-funded, and yet the study’s authors chose to opine on the question of environmental impacts without actually conducting any substantive research. Significantly, Meggs – who presented this section of the study and appears to have been responsible for it – was not an academic, but rather a former BP executive who joined the gas company Talisman Energy prior to the release of this report (see above). His opinions about environmental impacts are, indeed, in line with many other oil and gas industry executives.

- **Support for global gas market and gas exports.**

The “Future of Natural Gas” researchers concluded that a global natural gas market integrating the North American, European, and Asian markets would be in the country’s best interest and recommended that the US “pursue policies to encourage the development of an efficient and integrated global gas market” and “not erect barriers to natural gas imports and exports.”⁹¹

The study provides little justification for this endorsement. It asserts that there are “substantial economic benefits” to a global gas market, but offers no serious analysis of the economic consequences of market integration. The study projects that a global gas market would result in

⁸⁶ “The Future of Natural Gas”, Massachusetts Institute of Technology (June 6, 2011) at 40.

⁸⁷ “The Future of Natural Gas”, Massachusetts Institute of Technology (June 6, 2011) at Appendix 2E, 3-7. Accessed at: http://mitei.mit.edu/system/files/NaturalGas_Appendix2E.pdf

⁸⁸ Appendix 2E notes that “The number of incidents should be placed in the context of the many thousands of natural gas wells drilled in the U.S. over the period under review.”

⁸⁹ “Report: Natural gas can play a major role in greenhouse gas reduction”, Massachusetts Institute of Technology (June 9, 2011). Accessed at: <http://web.mit.edu/press/2011/natural-gas-full-report.html>

⁹⁰ Video here: <http://mitei.mit.edu/publications/reports-studies/future-natural-gas> (starts at 20:50)

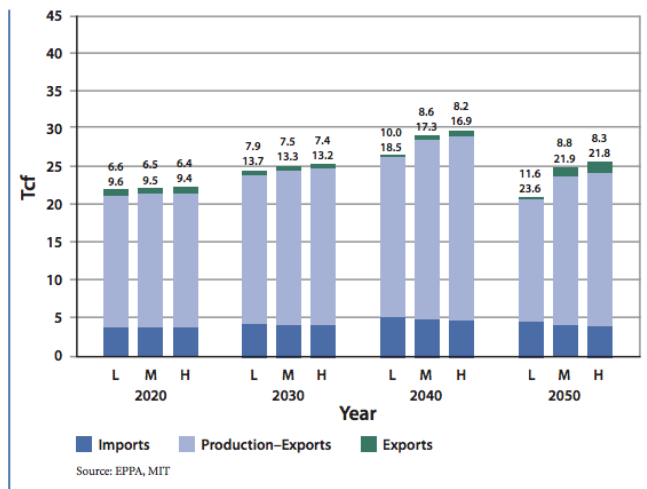
⁹¹ “The Future of Natural Gas”, Massachusetts Institute of Technology (June 2011) at 14, 157.

increased natural gas sales and appears to assume that this would be economically beneficial for the US. Factors such as the costs to US consumers and manufacturers are not weighed or discussed.

In fact, the study argues that a global gas market would result in economic benefits without offering any significant analysis of how US natural gas prices would respond to market integration. Though there are many graphs in the study, there is no graph comparing projected natural gas prices in a global market scenario to the current, regional market setup.

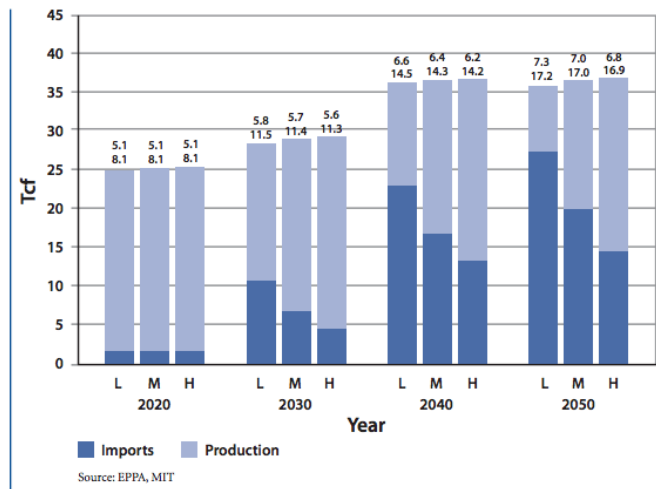
The study does include price projections under the global scenario and the regional market scenario that seem to suggest that US gas prices would be lower, across-the-board, with gas exports. The price projections are in two different graphs separated by several pages (see below), and it is unclear if the prices are meant to be compared. The global market graph includes US natural gas prices that are significantly lower in both the short term (2020) and long term (2050) than US natural gas prices in the regional market graph.

Figure 3.3 U.S. Gas Use, Production and Imports & Exports (Tcf), and U.S. Gas Prices (\$/1000 cf) for Low (L), Mean (M) and High (H) U.S. Resources, Price-Based Climate Policy and Regional International Gas Markets. Prices are shown without (top) and with (bottom) the emissions charge.



Regional market graph, page 58.

Figure 3.9 U.S. Gas Use, Production and Imports & Exports (Tcf) and U.S. Gas Prices (\$/1000 cf) for Low (L), Mean (M) and High (H) U.S. Resources, Price-Based Climate Policy and Global Gas Markets. Prices are shown without (top) and with (bottom) the emissions charge.



Global market graph, page 66.

The above is a side-by-side comparison of two graphs of projected gas use, production, and imports and exports drawn from the MIT study (the graphs are not shown side by side in the study). The prices (shown above the bars) appear to be higher in the regional market scenario than the global market scenario over the entire period studied. Exports appear to be unaccounted for in the global market graph.

It is unclear if the MIT study is actually putting forward this finding, as it is never explicitly stated in the study, but if so it contradicts many other projections of US natural gas prices in a global market scenario. The following table, from a Brookings study, shows the consistency with which economic studies project higher prices as a result of increased exports.

Table 4: Study-by-study comparison of the Average Price Impact from 2015-2035 of 6 bcf/day of LNG exports (unless otherwise noted)

Study	Average Price without Exports (\$/MMBtu)	Average Price with Exports (\$/MMBtu)	Average Price Increase (%)
EIA*	\$5.28	\$5.78	9%
Deloitte	\$7.09	\$7.21	2%
Navigant (2010)** (2 bcf/day of exports)	\$4.75	\$5.10	7%
Navigant (2012)***	\$5.67	\$6.01	6%
ICF International***	\$5.81	\$6.45	11%

* Price impact figure for EIA study reflects the reference case, low-slow export scenario.

** The Navigant study did not analyze exports of 6 bcf/day.

*** Navigant (2010 and 2012) and ICF International studies are based on Henry Hub price.

Source: EIA, Deloitte, Navigant, ICF International.

Source: Charles Ebinger, Kevin Massy, and Govinda Avasarala, “Liquid Markets: Assessing the Case for U.S. Exports of Natural Gas”, Brookings Institution (May 2012) at 33.

The study also fails to consider the environmental consequences of shifting to a global market. The study projects that by 2050, the U.S. will be using more than 35 trillion cubic feet of gas per year in a global market scenario, over 40% more than the 25 trillion cubic feet projected in the regional market scenario. The study includes no analysis of the environmental consequences of this increased gas usage, such as greenhouse gas emissions.

The study projects increases in natural gas imports that would seem to undermine the country’s energy independence. In the mean resources estimate, the researchers estimate that the U.S. will import nearly 20 trillion cubic feet of natural gas per year by 2050, almost as much as they project the country would use in the regional market scenario. The study group acknowledges a range of security concerns stemming from a global gas market, including concerns about the vulnerability of long natural gas supply chains (especially LNG terminals and tankers) to malevolent attacks, and says that a dependence on imports could constrain US foreign policy. But the report’s abstract ignores these concerns and argues that a global gas market “advances security interests through diversity of supply and resilience to disruption.”

While it is questionable whether a global market in natural gas would be good for the United States in terms of economic benefits, energy security, or climate change, it is quite clear that it would be good for natural gas companies. Gas prices in Europe and Asia are near \$12 and \$16 per thousand cubic feet, far above U.S. prices, which have hovered around \$4, the break-even point for U.S. gas wells, since 2011.⁹² The ability to export natural gas to markets that would pay more could help energy companies realize tremendous profits. Richard Bass and Gordon Pickering, energy analysts at Navigant, wrote about the benefit higher global prices represents to U.S. gas companies on the Forbes website:

⁹² “If Barack Obama wants a cleaner world and a richer America, he should allow natural-gas exports”, The Economist (March 2, 2013). Accessed at: <http://www.economist.com/news/leaders/21572769-if-barack-obama-wants-cleaner-world-and-richer-america-he-should-allow-natural-gas>

Assuming a long-term North American natural gas price of \$4.00 to \$6.00 per mmBtu, liquefaction and shipping costs will add approximately \$4.00 per mmBtu. This offers an attractive \$3.00 to \$5.00 per mmBtu arbitrage opportunity to the \$13.00 per mmBtu price currently achievable at Europe's LNG terminals. The real prize, however, would be realizing LNG exports to Asia. While shipping costs would be higher (due to the much greater distance to Asia than to Europe), the current Asian LNG price of \$17 per mmBtu provides the prospect of a much greater arbitrage opportunity.⁹³

Particularly poised to profit from a global market for U.S. natural gas is LNG company Cheniere Energy, which has been awarded the first permits to export LNG from the lower 48 states. As mentioned above, "The Future of Natural Gas" study group member John M. Deutch sits on Cheniere's board of directors and owns \$1.4 million in Cheniere stock.

⁹³ Richard Bass and Gordon Pickering, "The U.S. Has A Natural Gas Glut; Why Exporting It As LNG Is A Good Idea", Forbes. Accessed at: <http://www.forbes.com/sites/energysource/2012/06/13/the-u-s-has-a-natural-gas-glut-why-exporting-it-as-lng-is-a-good-idea/>

Conclusion

MIT has a great deal of influence and credibility as an academic research institution, but situations like the one surrounding its natural gas study raise serious questions about how the university handles conflicts of interest – and whether its influence and credibility are being misused. Was the university merely acting as an academic front for the gas industry with its release of the natural gas study?

The undisclosed industry ties outlined above – particularly those of Moniz, Meggs, and Deutch – are significant. At the very least, journalists, policymakers, and the public should have been informed of the authors' conflicts of interest. Disclosure aside, there is also some question as to whether it is appropriate for individuals with these kinds of personal, financial ties to the natural gas industry to conduct research on natural gas. Why should an academic report examining the benefits of natural gas be authored by individuals personally profiting from natural gas industry ties?

Though the MIT Energy Initiative has issued a response to PAI's query about the authors' conflicts of interest, there are still many unanswered questions surrounding the natural gas study. For instance, did Moniz and the Energy Initiative leadership follow the university's conflict of interest policies? Did they view the authors' industry ties as conflicts of interest, and if so did they take steps to manage and disclose these conflicts? Did they consult with other MIT officers in order to make this determination? How does the Energy Initiative manage relationships with donors and outside advisers, and what procedures does it follow in order to protect research integrity and academic freedom? Internal investigations at the University of Texas and the University at Buffalo handled similar questions about fracking studies produced by those schools.

Like MIT, Ernest Moniz has a great deal of influence and credibility. President Obama has even described him as a "brilliant scientist." But similarly, the problems with the MIT study raise serious questions about how Moniz handles conflicts of interest, and whether he has misused his influence and credibility in the past. As energy secretary, will Moniz allow the oil and gas industry to write the rules, or will he take steps to safeguard the department against improper influence?

Questions such as these are particularly important in light of the growing push for natural gas exports. As detailed above, Moniz's study gave a full-throated endorsement of a "global gas market" with increased LNG exports, but offered little rationale for this support and failed to note that key authors of the study had ties to companies poised to profit from an expansion of LNG exports. Will a similar team be installed at the Department of Energy under Moniz, and will it continue this advocacy for LNG exports from a new position of influence?

Under Moniz's watch, the MIT Energy Initiative acted not as an industry partner, but as an industry puppet. Will the Department of Energy do the same with Moniz at the helm?

Appendix: MIT's Response

PAI's director, Kevin Connor, sent the following email asking the MIT Energy Initiative about the study authors' ties to industry, whether the Energy Initiative and Ernest Moniz view them as conflicts of interest, why the relationships were not disclosed, and whether Moniz and Deutch are compensated by NGP Energy Technology Partners:

My question is regarding the Future of Natural Gas study that the MIT Energy Initiative released in 2011, and specifically how the Initiative managed conflicts of interest surrounding the study.

We've taken a closer look at the report and found that the authors had financial ties to the oil and gas industry that were not disclosed in the body of the report or in presentations of the report. Some examples:

- Study chair Moniz took a paid directorship at ICF International, a consulting firm with significant oil and gas contracts and a proprietary natural gas market analysis tool, just prior to the release of the natural gas study.
- Study group co-chair Tony Meggs joined gas company Talisman Energy as an executive prior to the release of the study.
- Study group member John Deutch sits on the board of LNG company Cheniere Energy and receives substantial compensation in this position.
- Moniz and Deutch are also on the strategic advisory board of NGP Energy Technology Partners, an energy firm that invests in oil and gas companies.

Do Moniz and the Energy Initiative view these as conflicts of interest? Why didn't the Energy Initiative disclose these relationships when the report was released, and who determined that these relationships did not warrant public disclosure? Also, are Moniz and Deutch compensated or reimbursed in any way for their advisory board service at NGP?⁹⁴

The MIT Energy Initiative issued the following statement in response:

The notion that these findings are developed based on anything other than the unbiased research of MIT researchers is false.

We have published a whole series of "Future of..." reports (Nuclear, Coal, Nuclear Fuel Cycle, Natural Gas and Electric Grid, and are working on Solar Energy) all driven towards the same goal – assessing the best pathway for a low carbon future. As with all of our studies, the natural gas study was prepared by the faculty and researchers at MIT, and received input from an advisory committee that was drawn from energy experts – including representatives from environmental organizations and relevant industry. While we do accept sponsors for the development of these reports, those sponsors have no

⁹⁴ Kevin Connor, "Moniz request," email to MIT Energy Initiative spokesperson Victoria Ekstrom, March 16, 2013.

role in determining the outcome of the study. Additionally, the faculty and top researchers participated on a voluntary basis. They were not compensated for their work on the study.

Many sections of the reports also include recommendations and best practices for industry that industry may or may not agree with. One example from page 8:
"A concerted coordinated effort by industry and government, both state and Federal, should be organized so as to minimize the environmental impacts of shale gas development through both research and regulation. Transparency is key, both for fracturing operations and for water management. Better communication of oil- and gas-field best practices should be facilitated. Integrated regional water usage and disposal plans and disclosure of hydraulic fracture fluid components should be required."

As is MIT's policy, all researchers file financial disclosure reports.⁹⁵

⁹⁵ Victoria Ekstrom, "Moniz request," Email to Kevin Connor, March 19, 2013.