

On April 16 noted academic, government, and private sector experts on energy gathered at the Georgia Tech campus to discuss the “natural gas revolution” for the 2014 Sam Nunn/Bank of America Policy Forum. This year’s forum, titled “*U.S. Competitiveness Amid a Changing Natural Gas Landscape: A View from the Southeast*,” focused on how the American shale gas boom and the expansion of liquefied natural gas trade promises to usher in a new energy landscape, with implications for a wide range of economic, security, and technological issues in the U.S. and abroad. Furthermore, the 2014 Nunn Forum took up the natural gas question from the vantage point of Southeast by exploring its status as a “net demand region,” as well as by highlighting local contributions to energy innovation and sector transformation. Senator Sam Nunn provided introductory remarks and set the stage for the keynote speaker, the U.S. Secretary of Energy Ernest Moniz.

Secretary Moniz reaffirmed the U.S.’s commitment to an “all of the above” approach to energy. He highlighted the role of natural gas in the national energy strategy; noted were significant increase in America’s hydrocarbon source usage coupled with the lowest carbon dioxide emission levels in twenty years, the potential for cheap and plentiful natural gas to revitalize U.S. manufacturing, and America’s enhanced ability to bolster the energy security of its allies as a net natural gas exporter. Secretary Moniz identified bottlenecks in the U.S.’s gas infrastructure networks as a core challenge to the prospects for natural gas and called for an integrated approach to address this set of challenges. He also identified increasing vehicle efficiency, exploring alternative fuels, and advancing electrification technology as three “thrust areas” for U.S. energy policy. Secretary Moniz closed by announcing a four billion dollar loan program for renewables designed to promote private sector investment in the areas of advanced grid integration and storage, biofuels, waste to energy technologies, enhancement of existing renewable facilities, and efficiency improvements to buildings.

In the morning panel, *Toward a New Era of Gas: Trends, Challenges, and Opportunities*, participants explored salient political and economic aspects surrounding the global surge in natural gas. The panel consisted of Sarah Ladislaw of the Center for International and Strategic Studies (CSIS), the Ambassador of the Republic of Azerbaijan, H.E. Elin Suleymanov, Raoul LeBlanc of Global Gas and PFC Energy, Professor Timothy Liuwen of the Georgia Tech Strategic Energy Institute, and Professor Thomas Kurfess of the Georgia Tech School of Mechanical Engineering. Discussion was followed by a brief question and answer session.

Sarah Ladislaw focused her remarks on global geopolitics. She described how the gas boom is enhancing energy security for the U.S. and major import markets in Europe and Asia, albeit while not resolving some key energy security challenges, as it fosters uncertainty among traditional suppliers in Eurasia and the Middle East. She also discussed the implications of the evolving gas market in arenas such as manufacturing, non-gas energy markets, and international institutions. She called on the U.S. to adopt a stabilizing posture in the face of the geopolitical and economic uncertainty that accompanies the expanding role of gas.

Ambassador Suleymanov weighed in on European energy security, with an emphasis on Azerbaijan's prospective role as a major natural gas supplier to the Continent via the trans-Caspian gas pipeline project. He characterized Azerbaijan as a safe, reliable energy partner that is not as haunted by security threats and geopolitical calculations as other Eurasian supplier and transit states. He called on the U.S. to provide a firm and consistent commitment to the fledgling pipeline project.

Raoul LeBlanc discussed the impact of the natural gas boom on American consumers. He provided a sample of well distribution in major U.S. gas plays, called on producers to start utilizing the more challenging gas plays rather than relying mainly on the "low hanging fruit" of easily extractable outputs, and briefly compared the U.S. domestic market to the global one. He forecasts that natural gas demand in the U.S. will remain strong due to the commodity's low price and high supply.

Timothy Lieuwen delved into the expanded role of natural gas in sectors such as manufacturing, power generation, transportation, energy exports, and chemical feedstock. He claimed that the natural gas revolution is serving to couple two once discrete economies; the transportation economy fueled by petroleum, and the power generation economy fueled by gas, coal, uranium, and other sources. He also noted that the U.S. is emerging as a major producer of low cost natural gas liquids such as propane, and that the Southeast was establishing itself as a hub for the manufacture of gas turbines.

Thomas Kurfess focused the recommendations of the Advanced Manufacturing Partnership Steering Committee, placing emphasis on the gas boom will drive innovation in manufacturing as well as the need for education and training in gas-powered economy. His remarks also highlighted the importance of having technical experts weigh in on national economic policy.

In the afternoon panel, *Two Revolutions, One Region: Bridging the Digital and Energy Revolutions in the Southeast*, the conversation shifted to the interplay of information technology and energy. The panelists were Peter Evans of the Center for Global Enterprise, John Trawick of Southern Company, Professor Donald McConnell of the Office of Industry Research at Georgia Tech, Professor Valarie Thomas of the School of Industrial and Systems Engineering at Georgia Tech, and Jan Vrins of Navigant.

Peter Evans argued that the natural gas revolution is best viewed through a network lens. He claimed that various types and levels (horizontal and vertical) of networks, such as road and highway systems, pipeline monitoring technology, electrical grids, and human expertise networks, are currently merging together to optimize energy infrastructure. He discussed the increasing interest in bolstering energy resilience. Emerging gas networks (which would tend to be denser and contain bi-directional pathways) are better able to weather system shocks presented by both natural disasters and non-commercial disruption.

John Trawick described how the gas revolution is anticipated to alter the Southern Company's business model. He forecasted that the production fleet will rely more heavily on natural gas by 2020, especially should prices remain low. Trawick also discussed the difficulty of linking supply with customers who may be in different regional markets, the scheduling challenges that power companies face, and the role of improved infrastructure and new technology in resolving related problems.

Donald McConnell picked up on the convergence of the electrical system of natural gas, information technology, and enhanced network management capabilities. He claimed that this convergence will represent a major evolution for energy networks; especially if systems can be designed to move gas where it is needed in a timely manner, data can be appropriately administered, markets can be regulated to promote efficiency and security of supply, and shocks such as extreme weather and cyber-attacks can be mitigated. McConnell used the harsh 2013-2014 U.S. winter as a case study throughout his presentation.

Valarie Thomas explored the implications of the natural gas revolution at the residential consumer level. She advocated avoiding the temptation to treat natural gas as a cheap way to power and heat traditionally-designed homes. Rather, she underscored the need to reconfigure residential construction along energy efficient and ecologically sound lines. She discussed a variety of technical fixes that could help achieve this regarding building construction and retrofit, such as the use of passive solar heat, wood heated water, and improved thermostats.

Jan Vrins closed out the 2014 Nunn Forum by discussing the concept of an "energy cloud." Vrins defined the energy cloud as series of distributed energy resources. It relies on digitalization and multi-directional flows. As such, energy clouds are flexible, dynamic, and resilient. The success of an energy cloud hinges on a regulatory structure that can support complex market structures and transactions. Vrins noted that crafting the appropriate rule set will be challenging. However, the evolution toward the cloud model will increasingly allow utility companies to act as a producer and a seller of energy, as well as facilitate a merging of different industries around the energy sector.

The event wrapped up with a second question and answer session. As with the morning panel, the experts answered questions from students, academics, industry professionals, and the general public.

The Sam Nunn/Bank of America Policy Forum brings together noted academic, government, and private sector experts on technology, public policy, and international affairs to address issues of immediate importance to the nation. Open to the public, the Policy Forum was developed from former U.S. Senator Sam Nunn's vision of increasing understanding among policymakers, academic researchers, technologists, and citizens. It is designed to connect the academic and policymaking communities to craft effective and creative responses to critical challenges

confronting the United States in the twenty-first century. Transcending disciplinary boundaries and engaging scholars, practitioners, students, and interested citizens, the Policy Forum offers a significant venue for policy-relevant research and dialogue. Insights and findings produced at the forum are shared with policymakers and the broader public through congressional testimony, circulation of proceedings, policy papers, journal articles, and educational television and Internet broadcasts.