



## THE ENERGY TRILEMMA REQUIRES INNOVATION, RESEARCH AND TECHNOLOGY

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**G**eorge Mitchell, a geologist by education, is well regarded as the father of shale gas. In early 1981 George, much to the surprise of everyone, began to explore the possibility of producing natural gas from the very thick rock of the Barnett Shale.

For over 15 years Mitchell Energy drilled well after well, without success, spending over a quarter billion dollars throughout the 1990s, and coming close to losing it all. But George never lost his vision – that a technological breakthrough was possible and one that would change the future of the entire industry. As we know now, George’s perseverance and belief in the force of innovation and in the value of investing in technology paid off and the outcome has been spectacular to say the least.

The scale and impact of continuous innovation and technological advancements in exploration and production of natural gas are rarely recognised, and often misunderstood – because they simply often get overlooked in the mainstream tech discourse.

In actuality, the volume of technological progress and innovation that has been occurring in the natural gas sector over the past few decades is nothing short of amazing. And perhaps we as the industry should speak out about it a bit more and share the valuable lessons with other sectors. There are many valuable lessons, particularly given the highly capital and risk intensive nature of the business – innovation is not easy to do here, but it is necessary, not only to survive as an industry, but to deliver on social and environmental goals, to grow value, and to help solve the world’s biggest challenges, such as the energy trilemma.

For example, a lesson that we can all learn from George Mitchell is that technology development in the energy industry is a long game. It requires a lot of patience and a high tolerance to risk and failure. It also requires a lot of capital, which can be difficult to come by (often when one is closest to that final eureka moment); and it requires collaboration with others, both in the private and public sectors.

The other lesson is that innovation is a product of a continuous chain of knowledge and cross-pollination between sometimes completely independent discoveries.

Everyone is aware of the outcome of the energy revolution that we have experienced in the past decade, where breakthroughs in renewables, batteries, natural gas, and the digital space have been enabling an energy transition that the world has not seen before. But few are aware of the countless inputs, failures and successes in the long chain of inventions that brought us here.

To name just a few of the links in the long chain of natural gas innovation: improvements in seismology, the invention of horizontal drilling and the eventual arrival at sophisticated directional drilling, finessing environmental standards and incredible water treatment with green completions in shale. And it has not stopped there. Today, these continue to be built on and improved with digitisation, the internet of things, smart controls, and so on. The possibilities can be infinite when it comes to things that have not yet been discovered.

All those individual innovations combined together to propel productivity, reduce costs and minimise the environmental footprint of the extraction process. All those took vision and time and were all dependent on their predecessors’ knowledge and investments, both private and public.

Today, the world is facing perhaps the greatest challenge of our time, sometimes referred to as the Energy Trilemma. The challenge is how to – sustainably, securely, and affordably – provide sufficient energy to the world’s growing populations and economies, while doing it in a way that urgently improves air quality and meets climate change commitments.

We must accept that these challenges cannot and will not be met unless we unleash a new era of energy innovation, research and technology.

We must also accept that even with renewables and natural gas taking center stage, as we transition our energy systems, there are no silver bullets and a mix of solutions will be needed. As such, I argue that technology, research and innovation funding should not be limited by choosing winners, it should be distributed strategically by choosing outcomes, opening the invention possibilities to all sectors.

Governments have a very difficult task in implementing policies that fuel innovation, to serve long term energy goals – those that normally stretch beyond electoral cycles. Picking winners and losers risks missing out on breakthroughs, which currently might not seem imaginable, and not doing so may be politically challenging.

To ensure this continued momentum and to meet the critical energy trilemma challenge of this century, the industries, governments, and civil society have to join forces. Without government support, the market alone will simply not deliver sufficient innovation in the short timeframe available to meet the challenge. The natural gas industry is ready to play its part and we call on the public sector and other players in the energy space to work together toward a common goal of achieving a sustainable and prosperous energy future for all. ■