

Oil, Gas and Energy Resources

PARTNER ECONOMY: CHINA
ORGANISATION: MONASH UNIVERSITY

INNOVATION STORY

2016 PRIMING GRANTS



DR GANG KEVIN LI

Whether we like it or not, society still functions on fossil fuels. It's University of Melbourne chemical engineer Dr Gang Kevin Li's job to make sure these practices are as clean and environmentally friendly as possible.

He says while conventional production from the chemical industry – for instance, gas, oil and plastics – is highly polluting, it's essential to modern life.

"As chemical engineers, we have to sustain the prosperity of society, but in the meantime, reduce pollution and make the process more environmentally friendly, sustainable and efficient," Dr Li says.

His research primarily focuses on developing new technologies to tackle this concept and separate natural gases, particularly methane gas capture technology. Methane is over 20 times more potent than carbon dioxide as a greenhouse gas.

"We want to make the natural gas clean and pure so it can be upgraded to pipeline quality or LNG quality so then we can sell the gas on the domestic or international market."

The Chinese-born engineer and his colleagues at the University of Western Australia, including Professor Eric May, developed a new family of adsorbent materials that he says has the highest methane selectivity in the world – it outperforms all other industrial adsorbents separating methane from nitrogen.

He says funds from the Priming Grant meant he could present this new material to global industrial partners such as DKT Energy

Technologies Sichuan, linking him to the largest coal seam gas market in the world.

"This ATSE grant is very helpful because it's a grant that led to an even larger opportunity," Dr Li says.

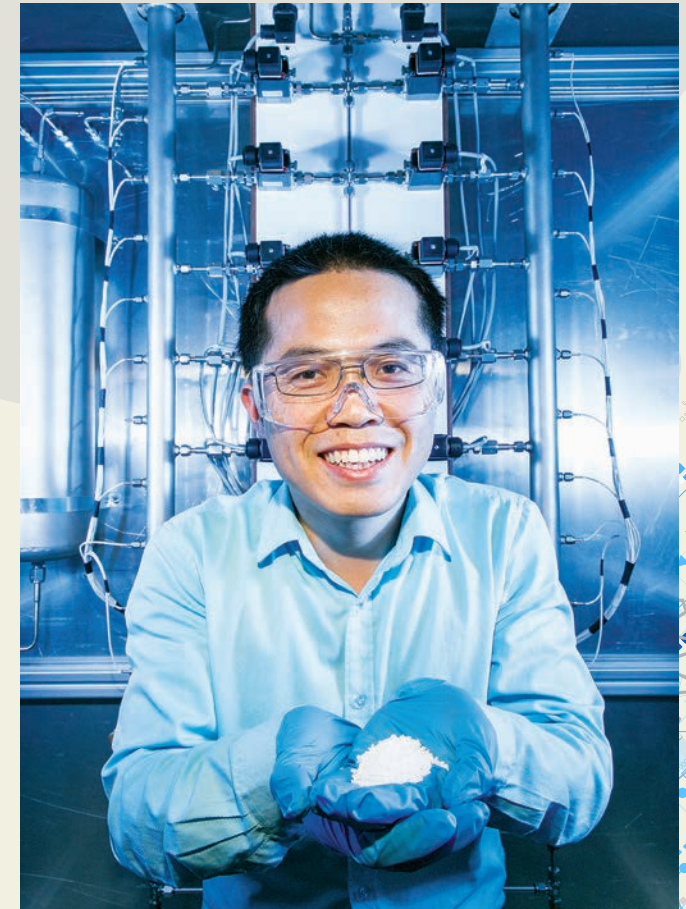
The opportunity Dr Li mentions is successfully acquiring one million dollars from the Global Innovations Linkages grant to continue this venture.

He adds that getting this grant is one the highlights of his career. "When the gas industry comes to us, and says 'we have a problem recovering the dilute gas, can you develop a better technology to help us improve profit and capture methane from the vents?'," Dr Li says.

"It's so exciting when you can solve a real-life problem."

In collaboration with Western Australian company Oilfield Technologies led by Dave Manning, his research on gas separation will be commercialised in the next three years.

For the innovative nature of his research, in 2015 Dr Li was awarded the Woodside Oil and Gas Encouragement Award and Perth Convention Bureau Travel award at the WA Innovator of the Year Awards.



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PARTNER ECONOMY: UNITED STATES OF AMERICA
ORGANISATION: AIR-GRO PTY LTD

INNOVATION STORY

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MR GARY LYNCH

It's often considered to be a cleaner source of energy than oil or coal, but many natural gas wells are leaking methane – a greenhouse gas around 86 times more potent than carbon dioxide – into the atmosphere.

Inventor and founder of Future Energy Innovations Mr Gary Lynch has made a concerted effort to cap these leaks, to capture and create beneficial use options for rogue methane that is escaping.

His solution was to engineer CALM - the Continuous Autonomous Leak Management system. It would measure the amount of methane gas leaking from a gas well.

"We're talking massive leaks. These gas wells have enormous potential to pollute," Mr Lynch says.

Mr Lynch, who collaborated with the Australian company Geo9 for this project, says the CALM system is like putting an "upside down swimming pool" over the gas well to measure and capture the methane leak.

He used the Priming Grant to secure a relationship with researchers in North America, based at Cornell University and potentially also Princeton University, to collaborate in further developing the CALM system.

And leaking gas wells are not only a problem for abandoned historic gas well, but also for recent ones, Mr Lynch says.

"We've developed a system where you can calculate the area around the gas wells. We can monitor the amount of gas coming out and record it. We also ensure the methane is captured and used as beneficially as possible," Mr Lynch says.

The 72-year-old has been an active inventor for 40 years and is an industrial chemist by trade.

While he has been retired for 15 years, he's not close to slowing down, having worked in range of scientific disciplines, including consulting work in gold mining, building greenhouse systems, and even working as a paralegal.

He says his motivation to contribute to science as a whole is the desire to "help mankind and help overcome the problems that are coming up in the world".

One of his latest projects is exploring ways to protect the Great Artesian Basin – the world's largest and deepest artesian basin – from coal seam and gas contaminants.

Part of this effort is to develop an 'underground dam' aimed at containing material that explodes out from the surface when gas wells are drilled.

"When they drill down to coal seam they remove the water and that depressurises the coal seam. You can imagine a soda water bottle shaken up. That's the same thing with all the gas that gets released," Mr Lynch says.



GLOBAL CONNECTIONS FUND

The Global Connections Fund (GCF) is a component of the Global Innovation Strategy under the Australian Government's National Innovation and Science Agenda. The GCF enables Australian SMEs to link with international researchers and Australian researchers to collaborate with international SMEs to seize opportunities in priority areas of importance to the strategic growth sectors of Australia.

The GCF is comprised of two types of grants: Priming Grants and Bridging Grants. Priming Grants are small grants of \$7,000 to enable Australian SMEs and Australian researchers to physically meet with their international partners and develop their collaborative ideas. Bridging Grants are larger grants (up to \$50,000) designed as seed funding capital to enable viable projects to grow in scope and scale, to test commercialisation and proof of concept activities.

www.globalconnectionsfund.org.au



The Global Connections Fund is a project of the Australian Academy of Technology and Engineering (ATSE) and is supported by the Australian Government. This program forms part of the Global Innovation Strategy under the Australian Government's National Innovation and Science Agenda.