THE BROOKINGS INSTITUTION

AUSTRALIA'S WORLD-LEADING ENERGY AND RESOURCES SECTOR: RIDING THE WAVES OF VOLATILITY AND EMBRACING A POST-COP21 WORLD

SPEECH BY THE HONORABLE JOSH FRYDENBERG,
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P R O C E E D I N G S

MR. MELTZER: Thank you everyone for coming out this afternoon. I'd first just like to thank the Australian government for the generous support that they provide Brookings, which makes the work here that we do possible, underscoring our commitment to independence. It's my pleasure today to welcome Australia's Minister for Resources, Energy, and Northern Australia, Josh Frydenberg. He's been in this position as Minister since September of last year. Prior to that he served as Assistant Treasurer and Parliamentary Secretary to the former Prime Minister, Tony Abbott. And prior to that he's also been a Senior Advisor to our Foreign Minister at the time, Alexander Downer, and then to the former Prime Minister, John Howard.

The Minister's also spent time as a director in global banking at Deutsche. He has law and economics degrees from Munich University in Australia, master's in international relations from Oxford University, and master's in public administration from Harvard Kennedy School, so a lot of depth and experience. Today the Minister is going to provide a speech titled "Australia's World Leading Energy and Resources Sector Riding the Waves of Volatility and Embracing a Post-Cop21 World." After the speech the Minister and I will have a moderated discussion, then we'll open it up for Q&A with the audience. Minister, would you like to come to the podium?

MINISTER FRYDENBERG: Well thanks very much, Josh. My namesake a fellow Australian, it's great to see you doing so well here at Brookings. Can I also acknowledge our Ambassador to the United States, Joe Hockey, he used to be my boss when he was the Secretary of the Treasury, and now we're walking around Washington together. Joe's a recent appointment to this very important role here and we'll do our country proud. And can I also acknowledge John Ryan, who's Australia's Special Envoy for Energy, a former Chair of the Board of Governors of the IEA, and

someone's who's also held in very high regard back home.

Ladies and gentlemen, it's a fantastic honor for me to be here at Brookings in its centennial year. It's also special for me given that two of my predecessors in my constituency of Kooyong back in Australia, Sir Robert Menzies and Andrew Peacock, had visited Brookings. Sir Robert Menzies was Australia's longest serving prime minister, and importantly with Harry Truman in 1951 entered into the ANZUS Alliance. And was very well regarded by American leaders of both political persuasions. So much so that Richard Nixon said if he had to rate one post war global leader it would be Sir. Robert Menzies. And if he had been the prime minister of Britain, he would have ranked with Gladstone and Disraeli. And Andrew Peacock was a leader of the opposition in Australia; he was also a distinguished foreign minister and went on to become a distinguished Australian ambassador to the United States. And just as an aside, I was fortunately that Andrew Peacock opened my first campaign as the member for Kooyong back in 2010. And he got up among the assembled audience, not too different to the number of people who are here today and he said, "Look Josh, if you're lucky enough to get elected by the people of Kooyong to be its seventh member since federation, I'm happy to look a draft copy of your maiden speech, your first speech to the Parliament." A bit like Sir Robert Menzies had said to him. And I said, "Well what happened?" And he said, "Well when Sir Robert Menzies received my speech, not long after the phone rang. I said hello." And he said, "Sir Robert, here." And Andrew said, "Well Sir Robert did you get my speech?" And he said, "Yes I did." And Andrew said, "Well Sir Robert, what did you think of my speech?" And Sir Robert said, "It's too long." And Andrew Peacock asked the next obvious question, "Well what should I do, Sir Robert?" And he said, "Cut it in half." And then Andrew Peacock asked the next obvious question, "Which half?" And Sir Robert said, "It doesn't matter." (Laughter)

So there is quite a history with Kooyong and the United States and our important relationship. It's also fascinating to be here at a time of your presidential election. And when I was struggling with jet lag in the middle of the night after dinner with Larry Erving and the Ambassador, three in the morning I turned on CNN and I got to watch a rerun of the boxing match from Houston (laughter) the presidential debate, which looked a bit more rigorous than the boardroom of *The Apprentice*. And it was quite fascinating to see that. But the primary purpose of my visit has actually been to Houston, where I was just a few days ago for CERAWeek, the preeminent meeting of energy players, ministers, company executives, thought leaders, which was very, very interesting. And I had the opportunity to catch up with Secretary Monies and continuing our close cooperation and important discussions.

I also just want to say just how important the Australia United States relationship is. As you know, you're our most important ally and it goes back to the ANZUS Alliance. In fact it goes back a long way before that to where we fought side by side in World War I. But you're also our most important investment partner. And we have shared values and we have a commitment to freedom and democracy, so that relationship is absolutely indispensable to Australia and we will do everything to strengthen it.

Today in my speech I want to make three key points. First, that the resources and the energy sectors are at the heart of the Australian economy, and our leadership position is crucial to global energy security and elevating energy poverty. The second point I want to make is that despite the current market volatility in international markets and heightened pessimism about the global economy, we in Australia are optimistic about the future and our capacity to innovate and to seize the opportunities. And last I want to discuss the coordinated global effort to meet the challenge of climate

change, reshaping as it is the energy mix, with new technologies seeing the emergence of new business models.

Australia takes its international obligations to reduce emissions very seriously. And we are integrating effectively climate and energy policy. And we do not see effective action on climate change as being mutually exclusive from our dominate position as an exporter of energy and resources.

Australia has a remarkable economic story to tell. Our economy is the 12th largest in the world, with a population of just 24 million, which is the 52nd largest in the world spread across the sixth largest landmass in the world. We are in our 25th year of consecutive economic growth. A record that has only been surpassed by one other developed nation, namely the Netherlands, who had 26 years of consecutive economic growth which ended in 2008. We navigated our way through the dot com boom and bust, the Asian financial crisis, and the GFC. We did so for a number of reasons including the demand for our resources out of Asia, but also the diversified nature of our economy with over 70% of our economy being services. And certainly natural resources is a key part of our economy. It represents around a tenth of our GDP. It's responsible for more than half of our exports and it employs over 300,000 Australians.

As a sector, it employs a large number of skilled workers. It pays the highest wages, and has the highest proportion of indigenous Australian employees. But frankly it goes beyond that. The Australian resource sector has helped drive the transformation of East Asia which is reshaping the world. Australia's resource exports particularly iron ore, where integral to Japan's industrialization after World War II, to South Korea's industrialization after the 1960s, and more recently to the remarkable transformation of the Chinese economy.

Australia is the world's largest exporter of both iron ore and coal. And by

the end of this decade we will overtake Qatar as the world's largest exporter of LNG. Australia is also the second largest exporter of gold and zinc. The third largest exporter of nickel. And the fourth largest exporter of copper. These Australian resource exports have been essential for infrastructure and the economic development in emerging economies, lifting millions of people out of poverty. And this is not a recent development. Australia's resources and its story are synonymous with our national identity. By tracing the history of mining development in Australia, one can see how we turn from a series of struggling underpopulated British colonies in the early 19th century to a prosperous cohesive nation.

Given the close relationship our two countries share, it is perhaps unsurprising that the United States has played a major role in the history of Australia's mining sector. At time we have been competitors. The Californian Gold Rush was underway in the mid-19th century while Australian colonies were struggling to get a foothold. Fortunately, the discovery of gold in Australia in 1851 triggered our own gold rush and marked the beginning of our mining industry. The gold rush precipitated a doubling of Australia's population in less than ten years. And a five-fold increase in my home state of Victoria's population over a similar period.

Since then our two countries have been partners in many resource projects. Rio Tinto is now the world's second largest iron ore producer. And Rio's first Australian iron ore mine in the 1960s, was 40% owned by the U.S. firm Kaiser Steele and U.S. banks contributed two-thirds of the required capital. Chevron is building the largest single ever private investment project, the $54 billion Gorgon LNG plant, and is also constructing the $29 billion Wheatstone project. And Newmont owns some of Australia's largest gold mines.

One of the most fascinating examples of how our histories are

intertwined is the story of the 31st president of the United States, Herbert Hoover. Hoover came to Australia in 1897 as a 23-year old engineer looking for gold in the state of Western Australia. Interestingly, it was only two years after Mark Twain wooed audiences in Australia. Hoover successfully led a major expansion of a significant gold mine in that state and then went on to find in New South Wales and found a company which developed a new process to extract zinc. This company went to form part of Rio Tinto, which is now as I said, one of the largest mining companies in the world.

And the resources and the energy relationship between our two countries goes both ways. In particular Australia's largest mining company, BHP has significant investment in the U.S. shale gas and the Gulf of Mexico.

Australia has been among the greatest beneficiaries of what is often called the commodity super cycle. This was driven by Chinese growth and a continued demand from our longstanding customers in Japan, Korea, and the rest of East Asia. But now we have reached the end of a decade long super cycle, whose record prices led to around $400 billion worth of investments in capital projects in Australia between 2003 and 2014. And this week, as I said, I spoke at the CERA conference in Houston, where there was great concern about the volatility in oil prices. In a short period of time we've seen the oil price fall from around $140 a barrel at its peak to its current price at around $30 a barrel. Why is this so?

The answer is a complex combination of supply and demand dynamics, with the emphasis being on changes to the supply side. In the last five years more than 4.2 million barrels a day have come on stream from shale oil in the United States. Saudi Arabia, which produces on average 10 million barrels of oil a day, has lifted its production by 5% in January alone. Iran, no longer the subject of sanctions, is producing nearly 3 million barrels a day with the expectation of lifting another 1 million barrels a day in the

not too distant future.

Nevertheless, with the resulting lower prices we've also seen according to the international energy agency, for the first time on record two years of consecutive negative growth in oil exploration. This has never occurred before. And this underinvestment in supply will eventually lead demand to catch up with supply, and in our review see prices rising.

So when it comes to the resources market more broadly, the end of this super cycle is seeing a return to more normalized cyclical patterns of demand, particularly in China, as its economic growth moves from double digits to settle around 6% to 7%. And its economy transitions from an investment focus to a consumption focus, and a greater focus on services.

China remains central to the global resources story. It is the world's largest producer and consumer of coal. The largest consumer of iron ore and producer of steel, the second largest consumer of oil, and the third largest consumer of gas. China importantly, is also increasing its reliance on renewables, becoming the largest investor in renewables in the world, bigger according to the International Energy Agency than the EU and the United States combined. Today I want to dispel the notion that because the Chinese economy is transitioning that suddenly the demand for hard commodities, and the subsequent export income earned from their sell will dry up.

To paragraph Mark Twain rumors of the death of the global resources sector is greatly over exaggerated. International demand for Australian resources remains strong. Our companies remain resilient and the depreciation of our dollar has acted as an automatic stabilizer increasing our competitiveness. The reality is that over the decades ahead hundreds of billions of dollars will flow to Australia as both demand and supply increases.

A good illustration of this dynamic is Australia's export earnings from coal and iron ore between 2011, '12 and 2014, '15. Despite falls in price of between 43% and 57%, export earnings from these commodities fell only 16%. And this reflects a lower Australian dollar and a 30% increase in coal export volumes and a 60% increase in iron ore export volumes.

When it comes to LNG there is even a more powerful story to tell. Export earnings between 2011, '12 and 2014, '15 have increased by more than 40%. Driven by increased volumes and a lower Australia dollar export earnings by 2019, '20, are expected to almost triple to $49 billion.

So where is this demand coming from and why is the Australia resources sectors so resilient? Let's look at the Chinese economy first. At $11.4 trillion it's two and a half times bigger than it was in 2008. This means that a 6.8% annualized growth rate in 2015 in China is equivalent to a 14.2% annualized growth rate in 2007. It emphasizes how important it is to avoid drawing conclusions from simplistic comparisons of annualized growth rates. Remarkable each year the Chinese are adding an economy the size of Turkey. Each year the Chinese are remarkably adding an economy the size of Turkey.

In December, last year, China imported more iron ore than ever before. Some is used for the production of steel for export, and the rest for domestic use. Chinese steel exports to the emerging economics are growing. With steel exports in 2015 increasing by 26% to India and 55% to Vietnam. And while China has seen rapid rates of industrialization in recent years, leading to more than 200 million people moving to the cities, 37,000 kilometers of rail track and 63 million flat completed in the last decade alone, there is still a long way to go.

For a country with such a large land mass and population, its rail system

is just one-third the size of the United States and one-sixth of that in the EU. Demand will continue to grow, providing a lot of scope for Australia's iron ore and metallurgical coal.

When it comes to energy demand, China's per capita consumption is still a third of that in the United States. An equation that the International Energy Agency predicts will change dramatically as Chinese per capita energy use increases in the years ahead. But I want to emphasize that China is not the only game in town.

Economic growth in India and Southeast Asia is driving increased demand for Australia's resource exports. In 2015 India's economic growth and economy grew by 7.4% and is forecast to grow by 6.5% a year from now to 2020. On these numbers, the Indian economy will be five times bigger in 2040 than it is today. And as a result demand for coal, gas, iron ore, and renewables is taking off.

Consider this, today India has 18% of the world's population but represents only 6% of the world's energy use. Astonishingly, on a per capita basis, India's energy use is less than Africa. Around 300 million Indians have little access to electricity or no access to electricity. But by 2022 Prime Minster Modi wants every Indian to be connected to the grid. India's consumption of steel is also comparatively low. On a per capita basis it's a quarter of the global average and around one-eighth of that in China. India's per capita consumption of steel is around one-eighth of that in China. And with over 300 million Indians expected to move to the cities between now and 2040, demand is expected to escalate.

By 2020 India is forecast to overtake China, Japan and the European Union to become the largest coal importer in the world as it seeks to almost treble coal-fired power generation between now and 2040. All of this is good news for Australia. Contracts for LNG from our Gorgon project to petro net LNG have been signed and are soon to flow. And our coal exports to India already sizeable are set to increase.

The reality is that there will be significant demand for our energy and our minerals going forward, and this forms the basis for long term optimism for these sectors and the industrial industry. It's the consequence of simple arithmetic between 2010 and 2030 there will be major increases in the world's population by 23%, the world's urban population by 42% and the world's middle class by more than 100%. All of which fuels demands for hard commodities. The biggest movements are occurring in emerging economies right on our doorstep putting Australia in an ideal position to capitalize.

Australia has never rested on its laurels and the ongoing supply and demand dynamic emphasizes the need for a country like Australia to focus on what we can control, decreasing the cost of doing business as a means of boosting our nation's competitiveness, streamlined regulatory processes, greater labor market flexibility, and productivity enhancing infrastructure projects are all key.

We also know that we have to innovative to seize further opportunities. Australian iron ore miners like BHP, Rio Tinto, and Fortescue have pioneered the adoption of automation operating drilling equipment, trucks, and trains at their mines in the Pilbara remotely from their Perth operations some 1500 kilometers away. I went to their headquarters and I saw firsthand this remarkable development operating trucks and trains and drilling equipment remotely 1500 kilometers away. It's the equivalent of operating mining equipment in New Orleans right here from Washington. As a result of these types of innovation mining productivity is taking off.

According to the chief economist of my department output per hour grew by 22% in 2014, '15. Helping to ensure that three-quarters of Australia's iron ore production is in the bottom half of the global cost curve. Our comparative advantage and resources is maintained by very high level of investment by companies in R&D which is then captured in patents. A study by IP Australia has found that there were more than six

and a half thousand inventions in the mining sector between 1994 and 2011. This has resulted in Australia writing more than 60% of all the world's mining software. Something we're very proud of.

Coming years, it will be a sophisticated use of digital technology and data analytics and drive productivity gains. Last year Rio Tinto launched its analytics excellence center which uses predictive mathematics, machine learning, and advanced modelling to process the huge amount of data that is captured by sensors reducing maintenance costs and the incidents of unplanned breakdowns. On the energy side we're also making huge advances through technology. For example, Santos, a leading oil and gas producer in our country, has partnered with IBM to develop predictive models that can provide them with early warning of potential failures and opportunities to improve efficiency. This is helping to reduce asset downtimes, cut travel times, and resolve problems faster thereby increasing productivity.

Identifying similar opportunities GE has established its technology and learning complex just outside of Perth to act as a regional support center for the development of skills and technology. And the Australian government has invested in around 230 renewable energy projects in Australia to the tune of $2.7 billion. Recently we were proud to sign on to Mission Innovation, which was led by the United States, and become part of a project to invigorate and accelerate global clean energy innovation.

Innovative energy service companies, like Tesla, are eyeing Australia as a potential test market for the rollout of residential battery storage products. And we're also investing in hybrid solutions for some large off grid users in remote Australia to move them off diesel and on to micro grids with renewable energy. While important progress has been made in cost reduction, and the deployment of clean energy technologies, the pace of innovation must continue whether it's in large scale carbon capture and storage,

or in household battery rollout.

Last year, the United Nations Climate Change Conference in Paris saw a historic commitment of 187 countries to pursue efforts to limit the global average temperature to quote well below two degrees of Celsius above pre-industrialized levels. Further with Mission Innovation, we've seen 20 leading countries, such as the United States and Australia come together to agree to double clean energy research and development expenditure over the five years to 2020. However it must be recognized that countries have different energy mixes and face different economic challenges. And therefore the responses to energy supply and climate change will understandably and necessarily be different.

We do know that the global energy supply dynamic is transitioning to lower emission energy sources. Notably the International Energy Agency forecast that as a percentage of global electricity generation, coal fired power generation will decrease from around 40% today to around 30% by 2040. Meanwhile, renewables will increase from around 22% today to 34% of global electricity generation in 2040. And gas demand is forecast to increase by around 50% over the same period.

When we look at individual countries we see that in China renewables will grow from 20% to 35% of electricity generation by 2040. During this period China's gas fired generation share will actually quadruple. The United States has announced a number of its own initiatives. There is the Clean Power Plan debate which could accelerate the shift away from coal fired electricity generation. This change will be enhanced by the rapid development of gas resources as a result of the shale boom. Here gas fired electricity generation will increase its share from 27% to 31%. Meanwhile nuclear power, fueled in part by Australian uranium, will play an increased role with five reactors currently under construction and another five planned.

Other countries like India are delicately balancing their climate and development goals. In doing so they are seeking to provide electricity by 2022 to around the 300 million people who either don't have access to electricity or very little access. India will increase its coal fired generation capacity three fold, while quadrupling its renewable capacity. In Australia, we are taking our COP21 commitments very seriously. The Australian government has adopted a strong target to reduce greenhouse emissions by 26% to 28% below 2005 levels by 2030. On a per capita basis this is the second highest reduction in the world. We have implemented a suite of measures to address our carbon footprint. Our $2.5 billion emissions reduction fund has been very successful. It provides a market based mechanism where participants bid for the lowest cost method of abatement.

The renewable energy target, an integral part of our framework, will raise the share of renewable generation in the electricity sector from around 15% today to over 23% by 2020. We have set a target of increasing our energy productivity by 40% by 2030 through the National Energy Productivity Plan, which will include new vehicle, building, and appliance efficiency standards. This will deliver at least one quarter of Australia's 2030 emissions reduction target, while worldwide the international energy agency forecasts that increased energy productivity will make the largest contribution to CO2 emissions reductions by 2040.

And we have invested $1 billion in renewable technologies through the Australia Renewable Energy Agency, which has seen nearly $2 billion additionally leveraged from the private sector. And we have a $10 billion Clean Energy Finance corporation which undertakes commercial investments in renewable energy, energy efficiency, and low emission technologies.

Significant progress towards less carbon intensive energy generation is

being made. Australia has already reduced the percentage of its electricity generated from coal from 77% in 2004 to around 60% today. This will continue to fall. Renewable energy now makes up 100% of all new investment in grid connected electricity generation. And Australia already has the highest proportion of households with solar panels in the world, at around 15%. This is almost double the second highest country per capita, which is Belgium.

What these country comparisons show is that lowering emissions from the energy sector cannot be one dimensional as countries are starting from different positions and face different challenges. One such challenge will be the need to question traditional energy supply. Such a discussion is currently taking place in Australia. Although Australia does not generate any electricity from nuclear sources, one Australian state, South Australia, is currently undertaking a royal commission into the nuclear fuel cycle, which has revived the discussion about the role nuclear power could play in a low carbon economy.

Given South Australia has 78% of Australia's uranium reserves, which are the largest in the world, as well as having the stable geology to store high-level waste, this debate is shifting community attitudes and has some way to run.

Regardless of the chosen generation method, a cornerstone of each country's plan will be the development and use of clean energy, technology, and innovation. Indeed technology will be the swing factor to achieving the world's climate goals. Home batteries, carbon capture and storage, high efficiency, low emission coal fired plants, large-scale solar, are all likely to feature going forward. These new technologies will bring enormous opportunities including the ability to align energy and climate policy.

Going forward, these two policies should not be seen as mutually

exclusive. And I'm confident that with such an alignment in polices Australia and indeed the world, will be able to balance the need to create economic and social change while meeting our climate commitments.

Ladies and gentlemen, in conclusion the resources and the energy sector have been here before. Peaks and troughs are part of a cycle reflecting complex supply and demand dynamics. This is a long term business, and I'm proud of the role that Australia plays. The good news is that Australia has the economies of scales, the innovative practices, the highly skilled workforce and the proximity and the access to markets that give us the resilience that we need at this time. There is however no room for complacency. We are operating in a fiercely competitive global market. At the same time we are working effectively to address the problem of climate change and trying to reduce our carbon footprint. I'm confident that this approach will see Australia's role as a global energy and resources powerhouse in a sustainable future assured. Thank you very much. (Applause)

MR. MELTZER: Minister, thank you for what I think is a very substantive overview of some of the key drivers of supply in Australia. You've given us a tour de force of where the aggregate demand for resources in energy is going to come from globally. You've spoken in detail on an issue which I think is particularly significant when you think about this space, but doesn't normally get spoken about, which is the role of data and data analytics and data flows, and how that's driving productivity in Australia, but also obviously globally. And of course the key role of technology in addressing energy challenges generally and of course the role that it plays for addressing the climate change challenge as well. So thank you for that.

Sitting here in Washington I think there seems to confluences of challenges which I'd just like to ask you elaborate on a little bit further. You picked up

quite a bit of this in your speech. China is well understood as being Australia's most significant trading partner, $250 billion approximately in trade, a lot of that in energy. But you did talk about the investment side, and it's probably not enough well understood that the United States is the most significant investor in Australia and certainly in the energy sector, as well. We are in a sort of cycle of declining pricings. We see oil down. We see gas down. And pressure on profits as a result. At the same time we have the Paris Climate Change outcome -- I think everyone acknowledges it was a very significant step, but certainly not enough. The IEA estimates we're only around 2.7 degrees, if we want to get to the two degree goal, and there's a five-year cycle of reviews built into the agreement going forward, so we expect more on that front as well.

So I think given these combined challenges I'd like to hear your views a little bit more on how the energy sector is adjusting, what their responses are, and what you see in terms of foreign investment, what that might mean for bilateral investment between the U.S. and Australia, and possibly globally.

MINISTER FRYDENBERG: Yeah. Well you're absolutely right to say that China is a critical market for our resources, and particularly iron ore and coal, and increasingly gas. But it's interesting with LNG over 80% of our exports go to Japan and Korea. And both of those countries are very important markets for us in other hard commodities and have been very good long term friends. So we do have a diverse range of markets and (inaudible) in energy space.

What's really interesting at the moment is the decline in exploration expenditure. And as I said, around 20% in 2015 and 20% to date in 2016. The first time that's ever happened on record. And this is going mean that down the track it won't be the supply to meet the increase in demand. And so what we are thinking about as a country is how do we continue to attract that level of investment, which will see us

position Australia as a valuable supplier, not just with the existing projects, but with the ones going forward. And that's about decreasing the cost of doing business.

I think what's happening in the United States is fascinating because just a few years ago the United States was building import terminals for LNG. And just a couple days ago you had your first LNG export cargo, ironically -- well not ironically, but going to Brazil of all places and going out of Louisiana. And so 90% of all the new production capacity in LNG over the next five years comes out of two countries Australia and the United States. But you are absolutely vital in this space as a supplier of energy going forward. And there's so many questions at the moment because of what's happening in shale and the shale oil and gas sector. Because at $30 a barrel there's huge pressure on the balance sheets of those companies. And I got the sense, when I was in Houston, about how much money is being lent by American banks in particular to that sector. And covenants are being broken and loans are being called in, and that's going to impact on the ability of the sector to stay strong. And some 400,000 barrels per day of production has been removed from the shale oil and gas sector sense mid last year, and that's as a result of the low prices.

Now, if you'll think about what is Saudi Arabia's motivation for their increase in production, because it's again a fascinating question. Saudi Arabia at $30 a barrel are still making a lot of money because their cost per barrel can be $5 or $6. But in terms of their budget they can't run budget surpluses or even balance the budget at $30 oil, they need much higher. And you've just seen their credit rating being downgraded two notches by Standard & Poor's. So there's real pressure in Saudi Arabia. So why is Saudi Arabia contributing to the lower oil prices? And the answer, according to many people in Houston, was because they want to put pressure on those higher cost producers, including the United States, and to drive them out of the market. And one of

the things I've been grappling with is how does that work? Will that actually happen? We're starting to see it happen.

But as it's been pointed out that shale gas technology it's now in existence. It was a leap to do it, and it's there. So even though you might dismantle the rigs, and even though you might send the crews home, the technology is there. So when prices actually go back up shale oil and gas production will also start to go back up. And so I'm starting to think there's been a structural change now in the oil and gas markets as a result of what's happened in the United States, which is very significant. And the geopolitics of this is fascinating, because Iran's made it very clear they don't want to be part of any OPEC deal. So OPEC has lost the currency that it had, right? No doubt about that. Saudi and Russia so called agreed to freeze production, but Iran for the first time is getting access to hard currency, 3 million barrels a day, an extra million barrels potentially, obviously them and Saudi Arabia have an interesting spat at the moment.

So the dynamics in this industry are absolutely fascinating on the supply side. And it is also interesting on the demand side. So for Australia, we take a step back. We say we can't control that geo political framework. We can't put the genie back in the bottle when it comes to shale oil and gas, what can we do. We can control the cost of doing business in our country. And if we can drive that cost down, and there's a lot of companies out there who are now successfully driving the cost of business doing down. And we can through streamline government regulation, infrastructure, tax reform, labor market flexibility, I'm very confident that we will attract that next wave of investment that will be needed to meet the growing demand, particularly out of Asia.

MR. MELTZER: Thanks. I might try this opportunity to open up for a Q&A from the audience. If you have a question, please raise your hand. There's a roaming microphone. Please introduce yourself and where you're from. And please end

everything with a question. This gentleman here at the front.

MR. WESSNER: Thank you for an excellent talk Mr. Minister, that was very engaging. And I'm heartened by your optimism about continued global growth. But I was impressed by your focus on innovation in the long term, and improving your business environment. I wonder if you might want to comment a little bit about two aspects of your innovation ecosystem, and one being the role of small companies in aiding your supply chain on the mineral side, which is very much in your brief. And then more broadly what measures are you taking to aid the development of stronger venture capital industry? Many people in the world believes that's the American magic, and that's because they don't understand the system. And angel investment, which is an important part of our system, and of course public finance for small companies, which is about three times what venture puts into seed financing. So are you doing anything in this? And I ask you because I will be asked to comment on this in a matter of a week in your country. So I'm very interested.

MR. MELTZER: Could you just --

MR. WESSNER: Oh, I'm sorry. I'm Charles Wessner. I teach Global Innovation Policy at Georgetown University.

MINISTER FRYDENBERG: Okay, great. Well thank you for that fascinating question. So the largest sector of the Australian economy is actually small business. There's more than two million small businesses, employ more than four million Australians. And it's vitally important in, as you say, all aspects of the supply chain. And our Ambassador, in his previous guise, was the Treasury Secretary of Australia, and he cut the small business tax rate in Australia to the lowest level in 50 years and that was very significant and provided what is called an accelerated depreciation allowance, which was very substantial. And so we've seen a major surge in small business activity, as a

result of those budget measures, but also a great emphasis on deregulation and red tape production for small business. So there's a lot of things happening in relation to small business across the economy including in the resource space.

When it comes to innovation, we realize we've been very good at R&D. And the resources and energy space makes up about 10% of Australia's R&D spend. So we've been very good in R&D and we have an organization called the CSIRO, which is our leading scientific organization which consistently ranks in the world's top 1% of scientific intuitions.

But where we could be better is the commercialization of R&D. So this is where we're focusing on and now in the renewable energy space, that's why I mention this group ARENA, because that is a billion dollars of government money about commercialization of renewable energy leveraging off another $2 billion from the business sector. But the Prime Minister, who himself was a successful business person in the e-commerce space, and you know was head of Goldman Sachs in Australia and has a lot of street cred when it comes to an economic background, and his own performance in the innovation space before going to politics, he led the charge for a $1.1 billion innovation statement just a few months ago. And this led to changes right across the economy.

There was some significant changes around the tax system and around the insolvency laws to basically make it easier for directors, who have been involved in insolvent organization, to get back into the marketplace after something has gone wrong rather than being banned for years, and years, and years. Because we don't have the Chapter 11 in Australia. We sort of trade your way out of problems, with all your airlines have done that in America and everything else. We don't have that sort of flexibility. So now we've introduced more flexibility around tax and insolvency.

We've announced some changes around incubators, more support for incubators, crowdsource funding. Dramatic changes around employee share ownership schemes. So you're not being now taxed the minute you get a share in a company, even though the company hasn't really made its money, or made a start. You only get taxed on the way out once they company has been successful, which is very important for the person who's in receipt of the employee share ownership schemes. And we're focusing a lot on education, particularly STEM, science, technology, engineering and mathematic skills. And particularly with young people and coding and all those sort of things. So we're looking, and we're looking at visas for people. A better streamlined visa processes for people to come to Australia with those sort of innovative, entrepreneurial skills. So it's across the board.

And one of the key focuses for us, is what you do well in the United States with, which is better collaboration between research institutions and industry. And how do we leverage off government organizations and tertiary institutions so that the private sector can actually turn those institutions and the work that they do into job creating opportunities. So there's a lot that's happened. It's worth having the rate of that innovation statement. It was very significant. And it's not just the $1.1 billion worth of initiatives. It's going to be the knock on effects from the improvements to culture, which have been around the changes to the tax and insolvency laws.

MR. MELTZER: Any other questions at the moment? I want to pick up briefly on the view in your speech, which I think was very well articulated, about how China's not the only game in town. And particularly the role of, or the potential role I think from India. I think in Washington across a range of fronts, India is a continual potential that never quite gets there. Trade has doubled more or less with India over the last three to five years, and a lot of exports of coal to India and potentially there's a lot of demand

there going forward. I know that Australia's negotiating bilateral trade agreements with India, that you're part of the regional comprehensive economic partnership negotiations, which also involves India, so there's an opportunity there I guess for some new rules of the road to underpin further trade and investment between Australia and India. Could you articulate a little bit further, particularly focusing on energy and coal, and whatever else the opportunities are there for that trading relationship, but also the investment relationship with India, whether there's an untapped potential there on the energy side that Australia can play.

MINISTER FRYDENBERG: Yeah. So a couple of weeks ago I had the Minister for Power, Coal, and Renewable Energy in India, Piyush Goyal visit me in Australia. We have a bilateral dialogue but it's very few years, we've agreed to do it as an annual basis now. And we'll rotate between New Delhi and Canberra effectively. And we'll have a whole lot of working groups under that, which will be looking at renewable energy, traditional fossil fuels. And interesting area is mining, engineering technology services. It's a $90 billion sector in Australia. It's called METS. It's actually the services that are provided to the energy and the resources sector. It's very big in Australia. And one of the benefits of the TPP, the 12 nation TPP, is that eradicates all tariffs on METS. So they're very keen in India to leverage off us in that area.

So where are we cooperating? Well you're right, on coal we export $5 billion worth of coal to them. They have their own coal, but their coal is not as clean as Australia's coal, if you like. We've got low sulfur, low ash coal in Australia. So there's capacity there. There's capacity on the gas side, and there's that contract that we've now signed between Exxon, or that Exxon has signed with a group called Petronet in India, to export gas from Gorgon when that's up and running very, very shortly.

And then on the solar side, the largest solar thermal project in the world

is in India. A group called Adani, which ironically is also the biggest player there in the coal space as well. Which really in a nutshell encapsulates this game that the Indians are playing, which is big increase in renewables, big increase in the fossil fuel side as well. And why? Because development ranks there and the other challenges rank there. So we'll be looking to collaborate with them and share technology on the renewable side as well.

MR. MELTZER: So I want to say thank you for finding time in what I know has been a very busy schedule.

MINISTER FRYDENBERG: My pleasure.

MR. MELTZER: To come to Brookings. And it's been a very learning and substantive speech, and we look forward to hosting you next time we're in town. And good luck on your future travels.

MINISTER FRYDENBERG: Thank you very much. (Applause)

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