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Transcript

Australia-PRC energy trade and technology cooperation and the energy transition

Speakers: Dr Xiujian Peng, Senior Research Fellow, Centre of Policy Studies, Victoria University

Dr Jorrit Gosens, Fellow, Crawford School of Public Policy, ANU

Mr Anthony Coles, Chair, Net Zero Working Group, Australia-China Business Council (ACBC)

Chair: Professor Xunpeng Shi, Research Principal, Australia-China Relations Institute, University of Technology Sydney

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Dr Corey Lee Bell:

Good afternoon members of the audience and special guests. Before we begin the proceedings, on behalf of all of those present, I would like to acknowledge that this webinar is hosted on the lands of the Gadigal people of the Eora Nation. I would also like to pay respects to the Elders past, present, and emerging, acknowledging them as the traditional custodians of knowledge for this land. This session will now be recorded. We'll record audio, screen share, and our presenters. We will not be recording any video or audio input from the audience. Welcome to all UTS students, staff, and all friends of ACRI and UTS. My name is Corey. I'm a Project and Research Officer at the Australia-China Relations Institute (ACRI) at the University of Technology Sydney (UTS).

UTS:ACRI is an independent non-partisan research institute established in 2014 by the University of Technology Sydney. Chinese studies centres exist in other Australian universities. UTS:ACRI, however, is Australia's first and only research institute devoted to studying the relationship of these countries. UTS:ACRI seeks to inform Australia's engagement with China through research, analysis and dialogue grounded in scholarly rigour. If you want to learn more about UTS:ACRI and the Australia-China relationship, details are available on our website at australiachinarelations.org. Today, we will launch the webinar 'Australia-PRC energy trade and technology cooperation and the energy transition,' which UTS:ACRI is proud to co-host with the International Society for Energy Transition Studies.

Our co-host, the International Society for Energy Transition Studies, is a non-profit professional organisation based in Australia, and which has members in over 40 nations, and in many international organisations. Its aims are to facilitate an equitable and inclusive transition of energy and relevant sectors toward a sustainable low carbon future, with consideration to economic development, social equity, and environmental stewardship through international partnerships.

The event is being chaired by Professor Xunpeng Shi, UTS:ACRI's Research Principal. The speakers today are Dr Xiujian Peng, a Senior Research Fellow at the Centre of Policy Studies at Victoria University, Dr Jorrit Gosens, a Fellow at the Crawford School of Public Policy at the Australia National University, and Anthony Coles, a National Board Member with the Australia China Business Council, and Chair of their Net Zero Working Group. We are very lucky to have such an eminent panel. An introduction to the speakers can be found on our events page at the UTS:ACRI website. Before we begin, if anyone has questions, can you please remember to press the Q&A button on the bottom bar. So without further ado I'll pass you to the event's chair, Professor Xunpeng Shi. Thank you. Xunpeng.

Professor Xunpeng Shi:

Okay. Thank you. Thank you, Corey.

Good morning for friends and colleagues from Australia and for – sorry – good morning for those from China and other parts of our world. Welcome to this ACRI-ISETS joint seminar. As Corey kindly introduced, I'm the Research Principal and Professor for Energy Economics and Sustainability at UTS and the President for the International Society for Energy Transition Studies. So here we are very happy to have three diversified experts talking about [the] Australia-China relationship, in terms of the energy commodity, trade, and the technological corporation. And probably people here are already familiar [with] the trade situation between Australia and China. From Australia's perspective, China is our largest trading partner, and also the trade structure for the two countries are quite complimentary. For Australia, we export [the] majority [of] our commodities, and more than half, or more than 60 or 70 percent of our trade exports to China are resource and energy products. [In] the other direction, we import manufactured goods from China. So it's a very complimentary and win-win situation in terms of trade. But our financial relationship is not limited to commodities. We also have a lot of technological collaborations.

In terms of one of the most salient examples in the energy sector is photovoltaic generation, or [what's] called PV. We all know that it's what was invented by University of New South Wales here, but it was industrialised by Chinese for the engineering and the manufacturers. That can be very important feedback, because the industrialisation of PV created more demand for research, and reinforced our research capability. And the collaboration between Australia and China in this technology not just benefited ourselves, or two parties – we're benefiting the world, because the relatively cheaper and reliable PV from Chinese manufacturing can lead to global emission reduction very much. And actually, they could be too fast, [so] that in the European [continent], many countries have a limit to the speed of PV installations, because the cost reduces too... faster than the policy adjust[ment] can be happen. I think that is a good example to show once Australia and China work together, what can be done for both country, and for the world at a larger [scale].

But if we also know that in the past few years, the financial relationship encounter some challenges, which probably will affect – not probably, actually have been affecting, the mutual beneficial collaborations in terms of trade and technological collaboration. And there's one bigger future [consideration] than what will happen to the bilateral relationship, that is, climate change. Both countries represented by their governments have committed to achieve carbon neutrality by the middle of the century. And for Australia this is 2050, and for China it's 2060. While China is a little later, but the commitment for carbon neutrality is quite unexpected by the global community. Because there is no such appearance for large, developing countries to move toward carbon neutrality in such short time framework.

And with that, actually we will see a lot of impact on the trade and the technology collaborations. So today, as my colleague Corey mentioned, we have three speakers talking about the [aforementioned] issues. And our first speaker is Dr Xiujian Peng from the Victoria University. She's the expert on the CGE – Computable General Equilibrium model, and has been contributed to the development of CHINAGEM [CHINA General Equilibrium Model], one of the leading or most popular CGE models used for estimating climate change and impact. Dr Peng, I leave the floor with you. Yeah. You're on mute. Yeah.

Dr Xiujian Peng:

Yeah. Thank you. I will just share my screen, sorry. Thank you very much, Professor Xunpeng Shi.

Thank you for inviting me to share our recent research result at this platform. And, yeah, good afternoon from Australia. And I'd like to mention this research is a preliminary result, we just collaborated with UTS, with Professor Xunpeng Shi, for this research. Okay. Yeah. So what I'd like to talk is about the carbon neutrality in China - what does that mean for Australia? Okay. As everyone knows, [the] Chinese government announced this ambitious goal to peaking carbon emissions before 2030, and reaching net zero carbon emissions before 2060. So we'd like to know, what's the implication for Australia if China would like to achieve these ambitious goals?

So the research approach, we, in this research, we use the CGE [computable general equilibrium] modeling by linking two CGE models. One is the CHINAGEM-E model. So this is a newly developed CGE model for China's economy. It's a dynamic model, and has a very complicated, multilayer, factor-energy nesting structure, and also have the energy and the carbon emission account, and the carbon pricing system. And for the VURM model, we have the bottom... this VURM model [Victoria University Regional Model] is a bottom-up model of Australia's six states and two territories. So it's a multi-regional model, and also has very complicated energy and carbon emission accounts, and also has equations for the inter-fuel substitution in transport and stationary energy. And of course, also include a carbon pricing mechanism, and also a presentation of Australia's National Electricity Market. And this model can also have top-down facilities, which disaggregated the regional effects to the 88 SA4 regions. Okay. So what we do is we just link the result from the CHINAGEM model, put into the VURM model, and try to analyse the effect of China's carbon neutrality to the Australian economy.

Okay. First I would like to know [how] China's energy structure will change if China [tries] to achieve carbon neutrality. We can say from the CHINAGEM-E modeling simulation result, it shows that China's fossil fuel will decline very dramatically, and the clean energy will increase very fast from 2020 to 2060, which as you can see, [the] coal consumption will dramatically decline, and the non-fossil fuel consumption will increase nearly to 74 percent in these primary energy consumption[s]. Okay. So because of this dramatic energy structure change, China's primary fossil fuel production will reduce significantly, you can see, compared with the baseline scenario. China's baseline standard means business as usual scenario, then China's coal will decline – the coal production will decline – nearly 60 percent and the cold oil and gas, will reduce more than 30 percent at 2060.

Because the domestic production reduced dramatically and also because it's significant and structure change, they have very important implications for the China import of fossil fuels and/or minerals. And first I would like to see the fossil fuel import. We can see from here, compared with a Chinese baseline scenario, the coal – China's coal import from overseas – will decline by more than 60 percent, and the gas import also will have reduced by more than 60 percent. Crude oil import will reduce more than 50 percent. So this is because Australia exports a large amount of coal and gas, or LNG, to China. So this has very important implications for Australia. So how about the iron ores? Because iron ores are also, China imports a large amount of iron ore from Australia. We can see the iron ore, the demand for iron ore from China will not decline as much as we expected. This is because with China's carbon emission action, China's economy still increases, still grows strongly. And investment also grows strong. With construction, it will contribute to a lot to the investment. And as upstream industries like steel smelting and iron smelting have to keep growth as well. So we can see that from this picture, you can see the, sorry, the steel smelting and iron smelting, and their production [are] not [in] decline, and they have a relatively positive growth. And of course, but because [of] the high price [of] carbon price imposed by the Chinese government, if the government want to change [to] carbon neutrality, this carbon price will increase the production cost of the iron ores in China. That's why China began to import things from the overseas market. That's why we can see from the right hand side of this picture – this slide – the import from the iron ore from overseas actually will increase compared with the baseline scenario.

So what's the implication of China's carbon neutrality for Australia? If we just have a look at the picture of China's carbon neutrality under the declining demand – for the declining import demand for the fossil fuel, and a slight increase for the iron ores and the minerals. So, okay. From the Australia export view, Australia [exports] more than 80 percent iron ore to China, and more than 35 percent of non-ferrous ores to China, and also coals exported to China is more than 20 percent from 2017 to 2020. Yeah, of course, 2021, because of China's restriction on Australian coal exported, so that's why we have a little bit of smaller number here, but overall it's around 20 percent, more than 20 percent of Australian coal to China, and also LNG [liquefied natural gas] exported to China is accounting for more than 30 percent of Australia's total LNG export.

So we can say these four products are the main products for Australia – the main Australian exports to China. [They] also are very important as fossil fuel and mineral export in Australia is very important for Australia [as] we can see from this table. So what we do is, we just put this based on the 2019 shares of Australian export to China, we just use the CHINAGEM-E result, and see what's the implication if China's import for these four products from Australia decline, what's the implication? So this is the result. The result shows that with China's carbon neutrality, the coal export from Australia will decline compared with the baseline scenario. This baseline is Australia's carbon neutrality scenario, but without consider[ing] China's carbon neutrality action.

So we can see the coal imported from China will reduce Australia's coal export. And also, the declining import demand from LNG from Australia [will] also reduce Australia's LNG export significantly. This is the right hand picture I'll show you, the LNG export, comparing these two scenarios. And also, if we look at the cumulative deviation from the baseline scenario, we can see that by the 2050, Australia, for the fuel export, will decline by 18 percent for coal and LNG –sorry, I have 18 percent for LNG, and 16 percent for coal. And also better for the non-ferrous ores, and also for iron ores, they have a slight increase. This is a very minor increase for the Australia exported iron ore and the non-ferrous ore, fossil fuels.

And also what's the implication of this for product export decline to China? We see this effect on the national GDP and other macro variables. They're very mild. So for the real GDP, the effect of China's carbon neutrality for Australia, the real national GDP, is only minus 0.13 percent – it's very, very mild. We can just ignore it, it's negligible. And this is why the GDP decline, this is because we have the real capital decline com[ing] from the declining total trade, because China's demand decline from the Australia exports, from Australia's coal and LNG, will reduce Australia's [inaudible] which will decrease Australia's capital increase. That's why we have this live decline of real GDP. And for the components of GDP from the venture side, we also can see the decline of investment. Also household, and also real household consumption and government consumption, because it is a slightly larger decline from the investment household consumption. And so we have a little bit improve[ment] for the trade off balance. That's why we can see the export increase for Australia overall, and import becomes lively. This is because we have the real devaluation. Australian dollar devaluated, and we will export. We will stimulate Australians export and reduce its import.

So for the industry, for the effect on Australian industry, it's a mixed story. We can say from here that, of course, the LNG and coal export will decline, but because we have this real devaluation – Australian real devaluation – the export will increase. Plus most of the export in China, sorry, most of the products in Australia's export will increase. This is from left hand side of picture, we can see that most products will have [increased] export[s], compared with the baseline scenario. And also because the real devaluation, the industries who competed with imported goods for the local market also have a chance to expand. We can see from the right hand side picture, the production of the most industry in Australia also expand, except for the fossil fuel.

Professor Xunpeng Shi:

Yeah. Excuse me, can you actually – One question to clarify about why there is a coal dip and peaks around 2024, because that [needs] clarification? I just want to interrupt. There is a question about the – Jess Brown asks what caused the coal dips and peaks around 2024 and issued –

Dr Xiujian Peng:

Okay. Yeah. Okay. So this -

Professor Xunpeng Shi:

And also you need to conclude the presentation. Yeah, thank you.

Dr Xiujian Peng:

Yeah, yeah. I'll finish. Yeah. Okay. Sorry, that's a very good question.

So, because why we have this, with the lines not very smooth, because the result is the shock we gave to this model is come from China's carbon neutrality simulation. And then China's carbon neutrality, this path is also, at the beginning, we have very slow carbon emission reduction, but in the middle, we have accelerated carbon emission reduction. That's why we have this. Sometimes we'll have the dip, other times we'll have the slow down, and we'll have a rise. So we actually put the result every year's change into the Australia model. That's why we'll have this shape. Okay. Okay. So there's a final slide. The final slides are effects on regions' economy. These aren't the same as the effect on the Australia industry. It's a mixed story because in the Australia region, they also have the different industry composition.

For example, for the Queensland, also Northern Territory, Queensland has a large coal representation. That's why if the coal export declines, we can see the net effect on Australia for Queensland, the economy. And for the Northern Territory they have a large representation of LNG, and also LNG manufacturing. That's why we can see the net effect on the Northern Territory. And for the WA, for the Western Australia, we also can see this. The effect is very mild, because even though WA has this LNG and gas export, but they also have the iron ore export. But iron ore export actually increases, so that's why the effect on WA is very mild. Okay.

So this is my presentation – because if I slow [down], I have a lot of results, but because [it's] a short period, a short time, I'll just highlight the key message. Yeah. That's all from me. Thank you.

Professor Xunpeng Shi:

Thank you, Xiujian, for the very last presentation to provide a foundation for our discussion of the future. We will publish ACRI output in probably one last time, so if you're interested, there will be some more details. And our next speaker is Jorrit. He has been working intensively on China's coal industrial policy, by developing a very detailed model. And today he will explain how China's coal policy will affect Australia. Yeah. Jorrit?

Dr Jorrit Gosens:

Yes. So I will just share my presentation. Okay. So there we go.

So just like Xiujian, I or we have a model at the ANU [Australian National University], but we are more specific. We look really at the export of coal only, or the import of coal really by China. And today I will talk about the effects of China's plans for decarbonisation (so peaking CO2 emissions by 2030), and also for its energy security (so using more domestic energy rather than imported), [and] how that will reduce overseas coal imports, focusing on effects on Australian exports of coal to China.

And so just to set the stage, China is really the biggest destination for Australian coal. Roughly a quarter of all of Australia's thermal and coking coal goes to China. Thermal coal is for power generation, coking coal is for steel making. And that will be affected by two reasons. One is that China aims to consume less coal, because of their decarbonisation targets. And secondly, they are planning to consume more of its own coal. China has been building infrastructure, mostly rail lines, to get coal from its own domestic coal mines to its own steel and coal-fired power plants. Those projects take a long time to build, but they are near finished, or have been

finished in recent years, a number of them. And those have an effect on how much demand for imported coal China will still have.

We've assessed that import demand with an installation-level coal model. It's a transport model that optimises for the cost of mining and transport. So it asks the model, what is the least cost[ly] way to supply all the coal fired and steel power plants in China with coal, from whatever source? And this model, that has been done before, but our model is unique in that it has a really very high geographical granularity because we look at every individual power and steel plant, every individual railway, all ports, and the entire road network. And just to give you an idea, this is a visualisation of close to 2000 power plants and steel plants in China. That's how we map them. And then the transport network, the rails. So again, there's going to be a set of mines as well, and we asked the model, how can we get the coal from those mines over those railways to all those power plants, and what is the cheapest way? And all this detail is good for a reason as well. If we compare model results with actual real world situation for the last five years, or 2015 to 2019, then we can see that the import demand that the model predicts is really very accurate, both in total volumes, but also in terms of the origin. So in blue here, Australia, the model really predicts roughly the right level of coal imports from Australia by the Chinese. And so then we ask the model to say, so what is going to happen over the next five years? And we do that with two different levels of demand.

One is what's called the stated policy. So that includes carbon peaking by 2030. And then we see that thermal coal demand would roughly fall by 20 percent. If China chooses to decarbonise very rapidly, something that would be more in line with the Paris Agreement, then we think that coal import demand even falls by 40 percent. And it's important to note, this is import. So we don't predict that China's consumption will fall by 20 or 40 percent. Their consumption will come down very slightly, maybe, but that very slight change in total demand will still have a very large impact on imports. Then we also have a couple of different scenarios. One is, what if Australia chooses to build the mines that are now currently announced in the *Resource and Energy Quarterly*? And we see that that changes something, because those mines will be able to produce more coal, and not terribly expensive, but it doesn't really get us back to current or recent levels of imports.

We've also asked the model, but we don't really know where China is going to decarbonise fastest. We know that they are trying to get to a peak carbon at a national level by 2030, but we don't really know if that will be mostly a responsibility of the coastal provinces or if the inland provinces will decarbonise faster. So we included two different scenarios for that, and we see that has actually very, very little effect compared to the baseline. Total import levels will remain the same. The big one is the infrastructure. That is really what makes all the difference. We say, if China had not invested in all the rail projects that it has over the last couple of years, then by 2025, its imports would probably still be the same. So, [in] conclusion, China really invested in those rail lines exactly in order to reduce its coal imports.

An important one, for those rail projects, is a 200 megaton rail line from Inner Mongolia, a big coal mining region here, Ordos, straight down to the south of China. Right now, coal is shipped first to the east, to the Bohai Bay, put on a boat, and then shipped south. That's a much more expensive and lengthy route than doing directly via rail this way. And that's also exactly what our model predicts. So this is changes in flows of coal between 2019 and 2025. And this is domestic sources, and we see exactly that rail line, roughly 200 megatons, that starts to be shipped south. And as a result of that, we see a reduction in imports of coal in the southern provinces. That's for thermal coal, so for power generation. And then the same thing for coking coal... no, wait, as a recap, for thermal coal still.

So what are the important things? One is the level of decarbonisation. So the ambition for the decarbonisation plans. The fact that China invested all that money in infrastructure, and that those projects will replace or substitute imports. There's also power plant efficiency will take off – a little off of the total demand. What we found was not important was domestic mine expansion. Although we haven't really modeled very recent expansions, which have been very big, but that would only lead to bigger drops in imports if they have an effect. And what's not important is where the decarbonisation happens, whether that's on the coast or inland. Then the same stuff for coking coal. Again, basically even in high or low demand scenarios, we see a

fairly substantial drop here for 25 and 29 percent, between those levels. And again, it doesn't really matter if Australia builds extra mines. It doesn't really matter whether steel making is moved inland where air pollution restrictions are less strict, or into ports where it could be more made more efficient, because it's big transport hubs.

Infrastructure investment, again, was a fairly big one. Specifically, the reason why we see this sort of consistent drop in almost every scenario is the opening up of big coking coal mines in Mongolia. This is the Tavan Tolgoi complex, very big holes in the ground that produce low cost, very high quality coking coal, and it's very close to Hebei, in China. And they are being connected with rail projects, direct rail projects. And again, so our model shows that yes, over the next five years, those imports will very much increase, and that will come at the cost of imports from Australia. So there are two, what are the key factors, basically steel output scrap use, so reducing the total demand, and Mongolian mine expansion and infrastructure. Not so important is domestic mine expansion, or the shift towards inland provinces or not.

And then just a bit of a reflection on recent news, rumors that China would be desperate for Australian coal again, and that that is the reason why they are lifting the import ban. That couldn't be further from the truth, if you ask me. Just to give you an idea, so total import of thermal coal, 200 megatons roughly, and about 70 megatons of coking coal in a normal year. Over the last half year, China has produced or has been seeing a fall in coal fired power production, about three and half percent, which translates to about 40 megatons of coal demand reduction. For steel production it's down roughly equivalent to 30 megatons of coal. Domestic coal production is up by 240 megatons. So they're producing fantastic amounts of coal, roughly similar to what they would usually import, even when they are consuming a whole lot less. So they are building massive stockpiles of coal, and will very unlikely need more of ours.

I've got a picture that'll be shared. I will end it there, but basically what we see is fairly substantial reductions in coal imports. Because of China's decarbonisation goals, demand will fall very slightly, but that will mean a big impact on imports. And because of all this infrastructure investment, it's really quite cheap for China to keep Australian exports out. And lastly, I think that the recent lifting of the coal ban is not so much because they are desperate for our coal, but because they don't need the coal anymore anyway, so it's a very cheap offer of peace to give. And I'll end it there, and over to you.

Professor Xunpeng Shi:

Yeah. Thank you, Jorrit. Just I noticed in the chat we have several questions, but I will leave most questions for after the third presenter, for the Q&A session. But one clarification I think I want to directly mention now, our colleague Colin Hawes mentioned, is it reality to assume China's coal consumption will really decline in the next two decades? Because currently it's still increasing? So this is more of a direct clarification.

Dr Jorrit Gosens:

It's not increasing. China's coal consumption has been fairly flat for the past decade, roughly. There's been a slight uptick in the last one or two years, but coal consumption is still roughly at the same level as it was in 2012/2013. And pretty much every scenario from the IA, BP, whatever, they all predict that even in the high growth scenarios, so high economic growth scenarios, Chinese coal consumption would remain fairly flat throughout 2030, actually.

Professor Xunpeng Shi:

Okay. Yeah.

Dr Jorrit Gosens:

Whether that's realistic, yeah, I think so, but -

Professor Xunpeng Shi:

Thank you for [answering] the quick question. The other I will leave for the Q&A. And now we move to our third and last speaker on our list, Anthony. He probably will provide more [of] a business perspective on the trade and technology corporation. Anthony? Thank you.

Mr Anthony Coles:

Great. Thanks, Roc, and thanks again for organising today. And we'll just keep trying to move through this as quickly as is possible to answer some of those questions.

I did want to provide a bit of a perspective. My perspective is very much from a commercial point of view, I'm not [an] academic, and the Australia China Business Council has been really focusing on the commercial opportunities for Australia around more collaboration with China. My perspective, again, is from working in the renewable energy sector for over 15 years, and those dots aren't outbreaks, they are where I've been doing business. Most of my experience came from actually working in an organisation that was a domestic manufacturer of clean tech, solar pumps and solar hot water systems, and I learned pretty hard the learnings of China's scaling up. We were also an importer and distributor of solar PV [photovoltaic] inverters and solar equipment, and also had an EPC [engineering, procurement and construction] business.

So that led me to head up to China and set up a company back in 2015, and I've been focusing my day job in the clean tech VC [venture capital] area. As a national board member with the Australia China Business Council, obviously the current geopolitical climate and our disengagement from China has been a concern for us. And so what we did as a board is developed a strategy around how to re-engage with our members, and also to assist Australia in its re-engagement with China, and the Green Channel program that's led through the Net Zero that I'm chair of is the program that I'm going to share today. And these are some of the drivers for why that came about. I think most people are acknowledging now that the science is in, but what most people, I think the recent election highlighted, is that we need to act faster. There's a real recognition that we've been dragging our chain on this for a while. But also what's not pretty well known is the scale of the transformation, particularly from some of those figures that were shared there by the previous speakers.

So what we've done is tried to look at what the – identify the opportunities for Australian business within this green economy, and also, as I mentioned, look at re-engagement. What I've observed particularly is that there's a knowledge gap in Australia. Because of that disengagement, we are not – like today's event, it's a classic example of what's needed more, but I don't see too many analysts from the super funds that are investing in these companies in Australia taking on this knowledge at the moment. The other key challenge for Australia is this little tricky slide, which is highlighting our economic complexity, and Australia really needs to look in the mirror and work out where it's heading.

And this is part of the conversation that we are wanting to have over –it's a multi-year, multi-sector discussion, but it's something that we feel that we should be looking at ways of reducing the gap, and looking at what Australia's economy will be in the future. The other key challenge that has to be recognised is that there's projections for population growth. And so business as usual is just not possible. We are going to have more people, more energy demands, more food demands, more water demands. And all of those things mean that we have to actually double down on our efforts to transform our economy to be more sustainable. And this is something that we are seeing that is being addressed in China more aggressively than it is here.

When I put my marketing hat on again, and we look at the strategic approach to our economy, you can see very clearly that our relationship with our two way trade is in our region. And if you look at where that market is coming from, it's pretty easy to see. And again, as previous speakers mentioned, that the majority of that relationship is with China, and it takes the next five countries to make up that partnership. So what we are trying to do is to respect and recognise that yes, diversify, that's just a strategic risk management issue, but we should not be ignoring or disengaging from our relationship with China. And we also need to highlight our

place in the world, is that all of these other companies ahead of us on this ranking of total trade relationships are all maintaining their dialogue with China.

A key reference point in some of the research we've been doing is the EV [electric vehicle] market. And a lot of people are focusing on small responses in discounts to incentives to buy a car. But what we are trying to do is look at, particularly in the context of today's discussion, is what is our relationship with China around trade and energy? And when you look at what's happened with EVs and where that market is going, Australia has an opportunity still to participate in this. Because it's not just about buying a car. It's not just about replacing internal combustion engines. It's the economy that is around that transition that's going on. And I made a point here to the Storer Review, which was produced back in 2018, because there's 6.8 million EVs sold last year, half of them in China and 20,000 in Australia last year, which still only represents two percent.

And an announcement last week, just from China's battery company that didn't exist 10 years ago, that is now one of the largest companies in the world. And they're building a battery factory in Hungary. So we also ask why? What else could we be doing? Australia's participation in the battery market, and we are strong in our sourcing and mining of lithium, but we are asking the question within this conversation now, is what else could we be doing, and why aren't we having these conversations? And so to address that we're really looking at relationships and opportunities like this, where we can improve the knowledge and understanding within the Australian market. But also we're reaching out to our members and our relationships on the China side, and bringing in this new knowledge through activities over the next few months and years, to bring that knowledge and awareness and discuss that at an industry level.

We've also had some fantastic support from within the government, and the National Foundation has got behind us to help us to share this message around the country. And again, I've been involved with some programs with ANU with that. So back in December last year, we had an event which really highlighted to us the speed and pace, as Jorrit mentioned there, that China is embracing this. And the conversation is that these companies that have investments in Australia are actively decarbonised. We've looked at what we could be doing in the agri-sector, and we've also looked at the general policy settings there, and we are really appreciative of ACRI organising these events and future dialogues. Our hero output at the moment is our white paper that has been worked on with King & Wood Mallesons over the last few months, which has been talking to those businesses that have very deep investments on both sides, have got activities on the go at the moment in decarbonisation.

And we really wanted to provide a current lens of what is happening so that people can then start to have those discussions. We need to have those discussions at an industry sector [level], and so this is one of those within the energy and future fuels sector. And some of the key insights from this, which is going to be launched in Canberra next month, so I can't give away too much, but excluding the coal and gas bubble and dialogue at the moment, and really that's come about because of a lack of participation and planning from the last 10 years. And so we recognise now that the energy and industrial transformation is ongoing, and it's really a lack of engagement, not a lack of desire. The feedback we've got from our conversations is that they are more than happy to sit down and work with us on solutions moving forward.

And certainly in that context, the iron ore and the sector that is our greatest revenue earner, they're already on it. They're already in very deep dialogue and relationships around the path to decarbonisation for their scope one and two, but also obviously any scope threes related to downstream. But again, as I highlighted before, this really hasn't been socialised enough, the scale and pace of variable, renewable energy that's required. And there is just going to be huge opportunities for us to still participate in the future. The storage economy is a huge area, which Australia is stretching its legs into, and has already demonstrated great innovation in its management of the penetration of renewables into the grid. Australia just made announcements around offshore wind, but Europe's been ahead of us, and China has been collaborating with Europe for the last few years as well. And there's huge opportunities for us to collaborate and connect there.

And hydrogen – the Green Olympics was a classic example of how China used an event such as that to bring in transformations in its generation and use of hydrogen. Also introduction of carbon markets and reforestation. So we wanted to talk about future fuels, obviously areas such as uranium, huge developments in China, around Gen IV nuclear reactors and graphite-encased fuel cells. And the opportunities in Australia for value-adding around that, a great investment from Tianchi Lithium in evaluated processing plant. And there's one Australian manufacturer of solar panels in Australia. We could have 10, we could be looking at the poly selected supply chain and what we're doing there, but that involves finance and connections to FIRB [Foreign Investment Review Board]. And so we have to have those conversations.

And in conjunction with looking at finance, there's a whole development in ESG reporting, blockchain, and a number of initiatives that Australia is actually quite involved with already. Huge opportunities for us in carbon markets. And the reason we're sharing all these is because this is the trade that we need to look at if we're going to improve our economic complexity, and the opportunity for Australia to play a leadership role in the region. So I'll highlight this slide just because energy is not just – there's a lot of feedback we're getting from the view of hydrogen replacing our coal and gas exports. And we have to start changing the way Australia looks at its economy, because there's a lot of opportunities for us in the path forward.

And we propose, I propose a little asterisk there for anyone learning. This is a personal view, not an organisational view. But China has changed, and we – there is a massive transformation going on in the industry there, and business as usual is not sustainable. And we need to acknowledge the scale and the opportunity that comes from that, and the opportunities for Australia being participating in that. And hopefully the skies will open up soon, and we will be able to have the people-to-people exchanges, and we need to be focused. And we feel that we need to have these discussions at an industry level, at a sector focus, so that we can be prepared and efficient because the time is running out. And most importantly, this is a pathway for us to maintain our relationships, and to keep things on the right track. So thank you again, Roc, for organising today, and I'm happy to share any other insights, or answer some questions.

Professor Xunpeng Shi:

Thank you, Anthony, for the perspective we don't hear from the academic side here very much. And we have 10 minutes left, I notice we still have seven questions outstanding. I particularly said to Ms Brown, I think it should be Ms Brown, they proposed a few questions. I will combine all the questions together to ask our speakers to give their views, whatever they comfortable. The overall question I can see raises the big issue is about geopolitics, and are surprised with Russia cut out in the story, because China could import more coal and natural gas from Russia. So the question immediately is what that means for our export of coal and natural gas, and further extension that given this change of geopolitics, how that will affect Australia-China relationship? That's regarding one commodity.

Another commodity we'll highlight is iron ore. So apparently beyond this story, one clarification is that where in reality speaking that I know price, or I know demand for our export of iron ore will still be going up in the future. And relevant to that, one question is asked whether, since there is ABC's comments that we should stop iron ore export to China. So that's also related to iron ore. And the third question about the commodity is the critical minerals, the question is that how that kind of prospective and what that will be affect our trade. On Anthony's last slide, you also show the critical minerals. So overall I can see that we are talking about the geopolitical reality, and also the commodity, the coal, natural gas, and some LNG, iron ore, and the critical minerals. So probably I will start with the same order. So you should feel free to give more like a few minutes [long answer].

Dr Jorrit Gosens:

Can you go first, Xiujian?

Dr Xiujian Peng:

Oh, okay. I can go first. I'm just thinking about –

Professor Xunpeng:

Yeah, yeah. Xiujian, yeah.

Dr Xiujian Peng:

Oh, sorry. I think maybe your side are frozen a bit. Yeah. Okay.

So I think the first question about the... Sorry, China also [has] been diverse, their import, from the import of the LNG and the coal from other markets, not only rely[ing] on Australia. So what impact [that will have] for Australia is changed. So I think now, currently, our research now use only the China and Australia model. Now we also develop a global model, and our GLOBAL-E energy model, and we also consider the global carbon and decarbonisation effort. And also in this model, we're thinking it was if globally, every country committed to the carbon emission reduction, in particular the decline in demand for the LNG and also coal, so what's the effect for Australia? So, in that case, this we will consider if China decline[s] its demand for LNG and coal, and is also diverse, is import from other countries, what's the effect for Australia? So our coming global model will answer this question.

So the second question about iron ore, I think as Professor Xunpeng Shi just mentioned, iron ore exported to China account[s] for 80 percent of Australia's export. So we will be very highly hit in our economy if Australia bans iron ore export to China. Of course, from China's side, and it's economy also will affect hugely, because China also highly rely on Australian iron ore import, even though they try to [diversify], and import from other countries, but so far can still rely highly on Australian iron ore.

But also I'd like to mention in our model's current simulation, we do not consider the green steel. So we just assume, because China's economy, even under the carbon neutrality, grows strongly and also investment also strongly. So that's why, for the iron ore, demand is going strong. That's why we didn't see much decline for the import of the iron ore. But if we consider the green steel making, and also if what we consider in the future, the construction of buildings, if it was [using] more cleaner materials, then the demand for Australian iron ore of course will decline. This is what I want to say. Yes. Thanks a lot.

Professor Xunpeng Shi:

Thank you. I will move to Jorrit, so feel free to comment any answer, or answer any of those questions.

Dr Jorrit Gosens:

Yeah. So I'll first say something about the imports of Russian coal. It's definitely true that the rest of the world has not really bought the Russian coal anymore. Of course, China is not one of those countries that has put a ban on the Russian energy. And we have seen shipments of coal from Russia to China increase by quite a bit over the past couple of years. However, you should understand that basically Russia is a very wide country, right? East to west is an enormous distance. And it is really split into an eastern and a western mining region with very little infrastructure in between. So it's not that easy to get coal that was meant for Europe all the way over to China. But from other sources or destined for other sources, yes, China is importing more Russian coal, and that is at the expense of Australian and other importers.

On the iron ore, even if I didn't really touch it in my presentation, we're currently building out that model that I presented for iron ore, and yes, it's true that it's very difficult to see how China would be increasing its iron ore imports over the next years. It's basically, even though everyone has been predicting that China will not produce, or that China's steel production and consumption will not grow any further for about five or 10 years

already, I think we genuinely are at that point now where we can say again, China's steel production will not increase any further anymore. And consumption of scrap. So currently about 20 percent of steel is made with recycled scrap. That's predicted to rise by to about 30 percent by 2030. So lower total demand, more from scrap, that will reduce the demand for iron ore definitely, including from Australia. And that's before all the diversification is factored in. So yes, I would say that will come down over the next couple of years. That's all I have to say.

Professor Xunpeng Shi:

Yeah. Thank you. Anthony?

Mr Anthony Coles:

Yeah, look, I agree. And from Xiujian's charts, you can see the downward trend for fossil exports, so that's just... it's evidence based, and it's logic, and yes, we're having a blip bubble at the moment. But as I mentioned, it's just because of a lack of planning, because we haven't really all stood inside the embers of a bush fire. And we are at the moment of industrial transformation. Also from Jorrit's charts, you can see China is going to do more for Australia's scope three emissions than any decision we make. So we are at a transition point for planning about where Australia's prosperity will come from.

And China's prosperity has come from, and their growth for 40,000 kilometers of high speed rail has been built by, our iron ore. And there's been 300 million people move into middle income the last 20, 30 years, and there's another 300 million to move into middle income in the next 20 years. So we need to understand that this is a key driver, and we need to manage the relationship, but also our fossil fuel based economy can't continue. So Australia really, at all levels, needs to be looking at what its future is and what its role in the region is going to be.

Professor Xunpeng Shi:

Yeah. Thank you, Anthony. We're out of time, I just noticed though, Mr Zhuang's follow up question about Russia's LNG. I'll probably quickly answer myself. And yes, probably the second pipeline might be happening, but it wouldn't affect Australian LNG very much for a few reasons. First, the LNG is usually trading on the long term, contracted for 20 years and plus, and the second that China's LNG or natural gas demand are expected to grow quite faster, even during the carbon neutrality. The estimation probably in the next 20 years probably increase another 80 percent, so that wouldn't crowd out much Australia's LNG import, [inaudible].

And I think we are right on time, and I really thank you for so many questions and interest going ahead. And in the future, we probably will organise more events. But today we are very pleased to have the other three speakers give the view, and the ideas. We will actually, I think each of the speakers are planning some more publications and output. Definitely if we have an opportunity, it will be shared with others. So as a last word, I will say to all the speakers and participants, and for your time and the interest in this challenging but important relationship. Now, I hand it back to my colleague Corey for the closing [comments].

Dr Corey Lee Bell:

Okay. Thank you to our eminent speakers and Professor Xunpeng Shi for today's webinar. So members of the audience, we'll be sending an email to everyone here, asking for your thoughts on how the webinar went. If you could please fill out that feedback form, we'd really appreciate it. This will help us make future UTS:ACRI events a better experience for everyone involved. If you want to know more about the Australia China relationship and about our research, more details are available on our website at australiachinarelations.org. The discussion today will also be available there. Please follow us on Twitter for the latest news, @acri_uts. Thanks again to all our speakers and to all our attendees. See you next time.