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Transcript

CHINA IN THE WORLD PODCAST

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Guest: **Wang Tao**

Episode 50: Petcoke and China's Efforts to
Combat Air Pollution

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From the Carnegie–Tsinghua Center in Beijing, China, this is the China in the World Podcast hosted by Paul Haenle.

Haenle: You’re listening to the Carnegie–Tsinghua “China in the World Podcast”, a series of conversations with Chinese and international experts on China’s foreign policy, international role, and China’s relations with the world, brought to you from the Carnegie–Tsinghua Center, located here in Beijing. I’m Paul Haenle, the director of the Carnegie–Tsinghua Center, and I’ll be your host today.

Today, we’re delighted to welcome back to the Carnegie–Tsinghua podcast one of Carnegie–Tsinghua’s own resident scholars, Dr. Wang Tao, who just recently published a new report, entitled: “Managing China’s Petcoke Problem.” Wang Tao is a resident scholar and runs the Energy and Climate Program, based here at the Carnegie–Tsinghua Center. Tao’s research focuses on China’s climate and energy policy, with particular attention to unconventional oil and natural gas, transportation, electric vehicles, and international climate negotiation. Wang Tao, we’re excited to learn from you today from your new report. Thank you for joining us.

Wang: Thank you, Paul. It’s my pleasure.

Haenle: I would first like to take apart the title of your new report, which we have here in front of us: “Managing China’s Petcoke Problem.” What is Petcoke, and why is China’s growing use of Petcoke a problem?

Wang: Well, thank you, Paul. Petcoke, or otherwise known as petroleum coke, is a byproduct of the petroleum refinery process. It’s kind of like the bottom of the crude has come out to the last and heaviest product when the refinery is done. We’re talking about two sorts of Petcoke. There is one type of Petcoke, which has lower sulfur content, and most of them will be used in metal manufacturing, such as aluminum or steel. But what catches our eyes more these days is the increase in volume of high sulfur content of Petcoke, which is coming out with much higher sulfur content, and because of that, it cannot be used in most traditional areas in metal manufacturing and actually is being used as an alternative fuel to coal. And that is causing problems because, first of all, we don’t know how much is being used, and secondly, this is actually quite dirty in terms of the emissions.

Haenle: So we don’t know how many tons of Petcoke China produced last year? Or consumed last year?

Wang: We know roughly about that, but that is about as good as we can estimate. We also got some data from official agencies and some consulting companies. But people don’t really know what has been consumed in each of those plants and where it has been used, and that actually matters very much. We also want to know more details in the breakout of the different sectors.

Haenle: Why is this an attractive alternative fuel source for industry here in China?

Wang: Petcoke itself is, actually, as I said before, the bottom of the product. So actually, most of the refineries get a lot of their profits, or most of their profits, out from the liquid products like

gasoline, diesel, wax, and other kinds of products. So the Petcoke is already kind of like an end. It doesn't so much matter for the profits of the refineries. And in the international market, Petcoke, which we will mention later, is actually cheaper than coal, especially when it's exported from the United States. So that makes it a very competitive fuel when the price of coal is very high. On the other hand, in China, we also knew that when the economy was very hot for the last few years, the coal supply was at a stretch. A lot of the coal could not reach the small or medium users because they either lacked relations or find it difficult to guarantee the supply from the state-owned mines. So they actually turned to the alternative fuels, and Petcoke is one which is also very cheap. So, they have been very popular in some of the smaller users.

Haenle: But with the higher sulfur content, Petcoke can be very dangerous for climate and local air quality. Is this phenomenon known to Chinese policymakers?

Wang: In that, I think Petcoke, especially the high sulfur Petcoke, actually has a lot of damage to climate change efforts and the Chinese government's own efforts to reducing the air pollution. For example, the high sulfur Petcoke has very high sulfur content compared with even the very dirty Chinese coal. We're talking about Chinese coal having 1 percent on average of sulfur content whereas Petcoke, especially high sulfur Petcoke, it's usually at above 3 percent, and some of them could be as high as 5 or 7 percent. So, that means when you're burning one ton of Petcoke, the equivalent is burning 3 or 5 or even 7 tons of the coal, in terms of the sulfur dioxide. On the other hand, it also has higher carbon content than the coal. So its own carbon emission released from the combustion will be higher than coal. What I haven't included is also the life cycle analysis of the Petcoke because it comes from heavy oil, so its extraction, refinery, and transportation also incurs much higher greenhouse gases emissions. So, that actually is very dirty in terms of contributions to both climate change and air quality.

Haenle: And is this well-known? Is this phenomenon well known to policymakers?

Wang: The Chinese policymakers have already gathered some information about this. As I said before, they started to release the official data on consumption of Petcoke starting from 2010. By the way, we also understand the lack of very detailed information about it especially at the user level. How much has been used, how it's being used, and which sector or which users in each sectors are using them, and whether they have been desulfurized before they released to the air? So that is something we want to do more research on.

Haenle: Well, perhaps your report can have a positive impact on letting policymakers here in China understand the ramifications. In your report, you also mention the special role played by the U.S. in facilitating the use of Petcoke in China. How exactly is that? How is the U.S. involved in this process?

Wang: As we mentioned before, the Petcoke is actually a byproduct of refineries, so whoever has the largest refinement capacity has the potential to produce more Petcoke. And in the world now, the U.S. and China are the number one and number two refineries in the world. So, the U.S. actually produces more Petcoke than anyone else in the world. With the increased import of the heavy oil and tar sands oil from Canada and Venezuela, the U.S. actually produces more of the high sulfur Petcoke. The volume is increasing very quickly and also starting piling up at refineries

in the U.S. And, on the other hand, the EPA recently—actually, in 2013, stopped issuing the new combustion license for the users in the U.S. So, it actually become redundant waste so you cannot find a new use for it. So the refineries actually start to piling them up in some of the places like the riverbanks and then later on we heard of the very infamous cases. For example, in the river near Detroit, the people actually started to recognizing that the huge piling of the black stuff actually and wanted to know what is and if there is a concern for health. So, they start to protest and asking the refineries to remove them. And then, as a result, the Petcoke become very unwelcome in the United States and the refineries actually became eager to find a way to get rid of them. So, starting from 2008, actually, together with the increased amount from China, the exports from the U.S. of the high sulfur Petcoke to China has increased significantly. It has risen about twenty times in less than five years. So, as a result, together with China's own production in the domestic and together with the imports from U.S., China now become the world's largest user of the high sulfur Petcoke. That actually made quite an alarming situation for China.

Haenle: You talk often about the changing global energy landscape of... the United States, for example, with its shale revolution. The U.S. is also reducing its imports from the Middle East, relying more on heavier crude from Venezuela and Canadian oil sands. How is this changing global energy landscape having an effect on the Petcoke problem?

Wang: Exactly. As we already touch upon for a little bit, the U.S. is actually starting to reduce the import from the Middle East and instead increasing the import of the heavy oil and super heavy oil from Canada and Venezuela, and that actually increases the resultant production of the high sulfur Petcoke. And, on the other hand, if you look at the global level, all the conventional oils started to decline. We are not really facing a drying up of the oil itself, but we are actually facing a declined production of conventional oil, and that conventional oil actually produces low sulfur Petcoke. So, now it has been replaced by the increased exploration and the supply of unconventional oils like the very dirty, high sulfur, and heavy oils from places like from the Middle East. If you look into the future, we are definitely looking into a world with more high sulfur Petcoke productions. At the same time, China is also increasing the import from the Middle East, some of the high sulfur and heavy oils. In China itself, the production of high sulfur Petcoke is increasing and the Middle East, let's not forget about them, they are trying to integrate their own oil industry or industries. They are not happy just to export the oil, so they are also expanding their refinery capacity very quickly, arguably one of the fastest regions in the world. And they will also end up with a lot of high sulfur Petcoke. So, we have to find a way to deal with this increase in production of high sulfur Petcoke globally, not just by one country exporting to another country or even a third country. So that has to be a global solution and has to be brought up to a global discussion as well.

Haenle: Wang Tao, you mentioned that this particular issue or problem is not well understood by policymakers here in China, that China's State Council's air pollution action plan only references high sulfur Petcoke imports. It does not look at or target domestic production. What combination of measures would you suggest or advocate to raise the awareness of this Petcoke problem and to mitigate its impact?

Wang: The State Council's own action plan only refers to, as you described, to the import of the Petcoke, but I think there has been no measures applied to them yet because of the concern of industries. On the other hand, the MEP, the Ministry of Environmental Protection, has already

started identifying the high sulfur Petcoke as a dirty fuel and will be banning the use of it in the, specifically, areas with high concern or high risk of air pollution. So, it's down to the implementation of them to control the use of it, but I think there are areas that we still need to improve before we can have a better effectiveness of the Petcoke management. For one, we first have to increase and improve the statistics of the Petcoke use. At the moment, the data is still inaccurate and less open than ideal, and people have difficulties understanding where it has been transferred and how it's being used. So, I think it's the data, and we have to improve the statistics. Secondly, we also need to start employing more of the economic tools, such as the carbon pricing or even carbon tax, or certain taxes subject to the high sulfur Petcoke so we will be able to change the distorted price advantages of the Petcoke to other fuels. At the moment, Petcoke is just way too cheap so people will always have that economic incentive to use it. So, only relying on the command and control measures is not going to remove that. We have to take this together with economic tools or instruments.

Haenle: Are there ways technology can play a role?

Wang: There is, certainly. For example, we can also identify one of the technologies, called “circulative fluid dyes boilers”, otherwise known as CFB boilers. They actually could quite effectively use the Petcoke as a normal fuel and remove most of the sulfur dioxide, and that will alleviate some of the concern of air pollution. In fact, some of the state-owned refineries in China are already using these technologies because they are one of the larger users and subject to very stringent monitoring from the MEP. So, they can remove that part of the consumption of high sulfur Petcoke, but we also need to make this a mandate and strengthen the control of the sulfur dioxide emissions from other to a large number of the small and medium users. There is another way of actually using another type of technology to control the production of high sulfur Petcoke. If able to add another set of the facilities to add hydrogens at end of the refineries, you will be able to transfer some of the Petcoke into more production of liquid fuel, which is more valuable. So, in that way, we can also reduce the production of the high sulfur Petcoke. That is difficult, costly, and also requires much better management skills to the refineries, but I think that would be a good way forward. The Chinese government should also support the refineries to take that path.

Haenle: Well, Wang Tao, thank you very much for spending time with me today and congratulations on your report.

Wang: Thank you.

Haenle: That's it for this edition of the Carnegie–Tsinghua “China in the World” podcast. If you'd like to read Wang Tao's report on managing China's Petcoke problem, you can find that report and his other reports on Carnegie–Tsinghua's website at www.carnegietsinghua.org. I encourage you to explore our site and see the work of all our scholars at the Carnegie–Tsinghua Center. Thanks for listening, and be sure to tune in next time.