CHINAMADE BRIEF

China's Nuclear Belt & Road

Tim Oakes, June 2022

Taishan nuclear power plant, units 1 & 2, Guangdong, China. Credit: EDF Energy via Wikipedia.

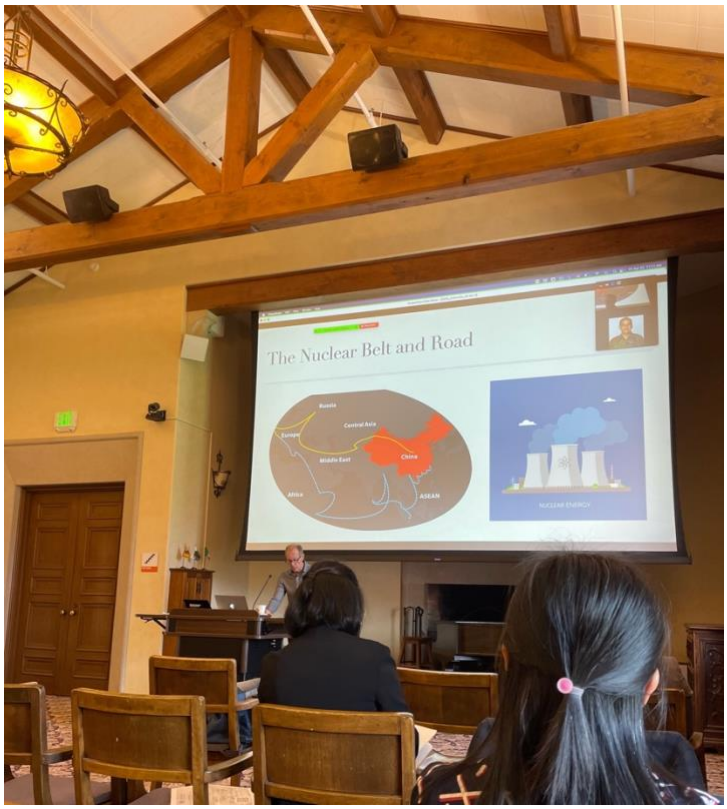
In April, 2022 the Center for Asian Studies at the University of Colorado Boulder, in partnership with the China Made Project, hosted the 2-day workshop "China's Nuclear Belt & Road: Socio-technical Perspectives on China's Export Nuclear Infrastructures." The workshop was the second of three workshops organized for the project *A Tale of Two Asias: Living In and Beyond the Nuclear Age*, and brought together a group of experts, both remotely and in person, to explore China's emergence as a global player in the development of commercial nuclear power.

The *Tale of Two Asias* project overall seeks to analyze the similarities and differences in Japanese and Chinese experiences of nuclear energy development. Project workshops explore Japanese and Chinese modes of living in the nuclear age through a socio-technical lens, including considerations of the impacts of energy infrastructures on everyday life, social movements and cultural engagements with nuclear energy development, and the political implications of infrastructural risk and vulnerability. In the broadest sense,

the project asks: What are the socio-technical dimensions of efforts to both survive in and move beyond the nuclear age in Asia? What do we learn from paying particular attention to the Japanese and Chinese contexts of these efforts?

In March 2021, we hosted (remotely) "A Decade of Fukushima: socio-technical perspectives on surviving the nuclear age in Japan." This first workshop in the project featured an international gathering of 10 scholars, with 5 papers presented. Workshop papers and discussion comments can be found on the project website. Our discussions focused on the case of Japan which experienced a decade ago the triple disaster earthquake, tsunami, and nuclear reactor meltdown in the northern Tohoku region. Presentations explored socio-technical perspectives on how people in Japan have lived with the aftermath of the March 11, 2011 events. Our approach for the workshop was meant to recognize that nuclear power enrolls people, as individuals and as social collectivities, into a particular and peculiar set of relationships with technology. Those relationships blur the boundaries between science and society, and between technology and culture, in unique and compelling ways. The workshop focused on questions such as: How do people – in their everyday lives – understand and practice their relationship to radiation? How do they calculate different kinds of risk? How do they come to be involved in the measurement of radiation and the science of predicting health-related effects of radiation? But probably the most important insight to emerge from the workshop was to recognize the crisis of expertise and the uncertainty of knowledge about nuclear risk, radiation exposure, and sociotechnical relationships more generally.

Three years after the Fukushima disaster, China's President Xi Jinping announced his signature foreign policy initiative: the 'Belt & Road' (一带一路). Designed in large part to address China's chronic oversupply of domestic infrastructural construction capacity, much of the BRI focuses on developing energy infrastructure connectivities across Asia and beyond, with nuclear power being a significant part of this infrastructure development. With 47 existing reactors which already account for 1/5 of global nuclear power generating capacity, China proposes to build at least 30 new reactors across Asia, as part of the BRI, by 2030. This in addition to the 43 new reactors already planned for construction *within* China. In contrast to Japan, then, China's future reliance on nuclear power seems guaranteed. Indeed, China increasingly presents itself as a model of how to live in the nuclear age, while in Japan there has been much greater emphasis on living *beyond* the nuclear age.



The project's second workshop, on China's Nuclear Belt & Road, explored the prospects for, and possible consequences of, China's efforts to position itself, and Asia more broadly, as the global leader in nuclear power production. We asked: What have been the social, economic, cultural, and/or political effects and implications of China's nuclear

energy infrastructure development both within China and in other Asian countries where China is currently investing in nuclear energy development projects? In our discussions, several key themes and topics emerged.

The **first** of these focused on the role of *international institutions and standards* as a central part of any analysis of China's nuclear export ambitions. One line of argument here focused on the idea that many BRI countries are not ready for nuclear energy development, but China seems willing and ready to provide it anyway. Many of these countries are weak states with poor institutional capacity, poor safety and security records, and an inability to store radioactive waste. Some participants argued that these countries will depend on China for these things, but that China will have minimal incentive to provide the kind of oversight and follow-through that will be in the best interests of the host state. The experience of Pakistan as an early recipient of Chinese nuclear technology and the subsequent transfer of this technology from Pakistan to North Korea is one data point here. Going forward, can China provide needed leadership among weaker states? Is Beijing interested in doing this?

But another line of argument present in our discussions emphasized that it is not really up to the host country or to China alone, and that nuclear energy is multilaterally regulated by norms, standards, and international agencies such as the International Atomic Energy Agency (IAEA). China is just as beholden to these norms and standards as anyone, and they're quite robust. Indeed, many argued that China is not interested in contesting the international regime on this front; its nuclear program's legitimacy depends on the viability of international nuclear energy regulation. This school also suggests that China will follow international regulatory norms and standards, and does not seek to operate outside of these (indeed, it is impossible to do so).

A general consensus among the presentations was that China *is* adhering to international standards and norms; IAEA protocols are followed; and China really has no choice but to follow them if it wants to develop nuclear energy infrastructures for export. There was a general sense that China does not take a leadership position in the international arena of norms and standards, and there is uncertainty whether China will become a leader in this arena if it becomes the dominant market player. Most presenters were not overly concerned that China's involvement in nuclear energy development came at the risk of greater weapons proliferation or nuclear technologies falling into the 'wrong hands.' But there are many out there who remain very concerned about this issue.

What does it mean to export nuclear power? What gets exported? Cooperation agreements? Joint-ventures? Expertise? Capital? Hardware construction? A nuclear power plant is already the outcome of many multinational agreements, connections and collaborations..

A **second** theme revolved around the question of just what kind of *infrastructure* is nuclear power? Building a nuclear power plant is a vastly different and more complicated undertaking than building a highway, or a pipeline, or even a high-speed rail. This is in part because of the complexity of the technology itself, and because of the dominant role of international institutions like the IAEA in the process. And nuclear power plants are typically multinational assemblages of parts, expertise, and systems sourced from many different places and sectors. The *uniqueness* of nuclear power was an issue that often came up discussion, and we were reminded of Gabrielle Hecht's argument about 'nuclear exceptionalism' (in her 2012 book *Being Nuclear*). Hecht does not raise the question of China as a nuclear player in her

discussion, but we found that it would be interesting to think about 'nuclear exceptionalism' in conversation with the 'Chinese exceptionalism' that the China Made project has made efforts to counter. Then there was the question of China's international profile as an extension of (and effort to bolster) its domestic nuclear industry. A series of fascinating exchanges emerged in response to questions like: What does it mean to export nuclear power? What gets exported? Cooperation agreements? Joint-ventures? Expertise? Capital? Hardware construction? A nuclear power plant is already the outcome of many multinational agreements, connections and collaborations. China has played many different roles in different nuclear power-related projects, so it remains difficult to generalize its role in the 'export' of nuclear power infrastructures.

Finally, amid many other topics too numerous to mention, we considered the broader social and political implications of nuclear power as a potentially dominant source of energy in China, throughout Asia, and around the world. Nuclear power development entails particular kinds of supply chains, particular material properties and toxicities, and particular kinds of labor (from uranium extraction to scientific research and development). This line of thinking follows Timothy Mitchell's approach in his 2011 book *Carbon Democracy*. We grappled with questions about whether nuclear power is especially prone to fueling authoritarian nationalism, about its hierarchical, centralized, technocratic and top-down nature, and about how this fits well with centralized, Leninist state socialism. But its impacts are country-specific. In China, it was suggested, nuclear development could even be democratizing in unexpected ways. But another possibility, instead of bolstering nationalism, is that international nuclear development networks establish more internationalism, more collaboration and cooperation among international actors. For example, participants brought up the somewhat hidden history of nuclear cooperation and collaboration between the US and USSR during the Cold War. Nuclear scientists, it turns out, did a lot of political and diplomatic work during the Cold War. And so perhaps China's Nuclear Belt & Road could lay the groundwork for future internationalism at a broader scale.

These were but a few of the rich topics of discussion during the workshop. Papers have been posted at the project website here. Ultimately, an edited volume for the project as a whole will be published.

Participants included:

Ipshita Bhattachary (Jagran LakeCity University): *The Weight of China's Nuclear Projects May Lead to Global Spondylosis*

Lami Kim (US Army War College): *China's Pledge on Overseas Coal and the Nuclear Belt and Road*

Lynn Lee (Princeton University): *China's Nuclear Cooperation and Global Security*

Jessica Lovering (Good Energy Collective): Keynote Speech - *China's Nuclear Export Ambitions in Context*

Tim Oakes (University of Colorado Boulder): workshop convener and moderator

MV Ramana (University of British Columbia): *Exporting Reactors? Nuclear Energy and China's Belt and Road Initiative*

Xu Yi-chong (Griffith University): *Nuclear Innovation: China's Strategy*