A Synthesis of Energy Transition Policies in Finland and China[1]

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Abstract

Since 2017, Finland and China have been developing a future-oriented partnership based on mutual economic and business interests. The starting point for this work is the recognition of significant differences in size, culture, and political as well as economic systems between the two sides. The Sino-Finnish cooperation in energy transition can provide a good example of mutually beneficial partnership where countries complement each other in terms of know-how and resources. This paper brings together the main findings from the policy study on energy transition in Finland and China. It aims to identify potential policy initiatives for expanding Sino-Finnish cooperation towards green growth.

Key words

Energy Transition, Policy, Sino-Finnish Cooperation

Cite this article as

GUO, W., PAN, JF., LIANG, LT., *et al*. A Synthesis of Energy Transition Policies in Finland and China. *Bulletin of the Chinese Academy of Sciences*, 2022, 36: 2022002 DOI: https://doi.org/10.1051/bcas/2022002

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1 This work is supported by the Sino-Finnish International Cooperation Platform Program, which is sponsored by the Institutes of Science and Development, Chinese Academy of Sciences (CASISD).

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Introduction: Key Policy Challenges and Opportunities

Commitment to emission reductions required by the *Paris Agreement* and EU targets will mean significant changes for an energy-intensive economy like Finland. Lack of progress in the key technologies addressing emission reduction will incur significant costs for the country. It will also be very costly for Finland, if important economies outside of the EU do not make the same level of commitment to the reduction of greenhouse gases. Such developments would have a negative impact on the international competitiveness of Finland as a result of the increased price of energy production, raw materials used and transportation. Finland has introduced policies and a number of medium-term objectives and targets for a path towards growth and climate-oriented energy transition. It aims to be an active global player in providing leading solutions for global environmental and energy challenges. Such solutions are based on the nation's capabilities in digitalisation, new services, citizen participation and energy and climate research. However, Finland is yet to combine innovation, energy and climate policy in a new way of pursuing its policy objectives. In particular, achieving success in the global energy transformation requires Finland to develop an international-oriented holistic innovation policy addressing not only energy technologies but also all key economic, social and political, organisational, institutional and other factors that influence the development, diffusion and use of innovative energy solutions globally.

China has made some encouraging progress in cutting its carbon intensity and emissions. Its carbon dioxide pollution output has already become lower than the level promised by its government in the *Paris Agreement*, and that trend seems likely to continue. However, despite China's move to promote less-pollutive energy sources, its energy and economy are still dominated by coal. China has been seeking progressively greater reliance on clean energy resources, but the success is likely to take years to come. In particular, China faces the challenges of securing sufficient energy for economic development while also achieving environmental targets. Policy measures to pursue the two goals may not be always complementary. In response to these challenges, China has intensified its policy measures to cut down the coal consumption. It has also made great efforts in driving the economy to a much more low-carbon economy in addition to promoting a much cleaner energy mix. In the meantime, China is taking the lead in renewable energy generation by investing heavily in renewable energy projects around the world as it is seeking to capitalise on the global green renovation.

Energy Consumption and Supply

With a highly industrialised economy and cold climate, Finland's energy consumption per capita remains very high and it keeps growing. However, there are signs that the increase in final energy consumption has already levelled off: despite a small rise in 2016, the total consumption of Finland in this regard was the world's second lowest in the 2010s. The strength of Finland's energy production has for long been the diversity of the production palette in both electricity and heat production such as wood fuels, oil, coal, natural gas, nuclear power and peat. Finland does not have domestic sources of its own for fossil fuels (*e.g.* coal, oil or natural gas), but it does have bio-fuels, rich reserves of peat, and extensive wood resources. A balanced production mix has guaranteed that the price of electricity and district heat in Finland is among the lowest in Europe, taking into account purchasing power. In particular, Finland has been active in expanding the role of renewable energy in energy production for decades and is considered as one of the world's leading countries in clean energy utilisation (especially biomass). In 2020, with 39.6 per cent of final energy consumption from renewal resources, Finland exceeded its target of 38% set for 2020 concerning the share of renewable energy[3]. On the other hand, as Finland is highly dependent on imported fossil fuels, the security of energy supply has been considered as one of the nation's top priorities. The government has set up its target of

[3] Source: Statistics Finland

increasing its energy self-sufficiency rate to 50～60 per cent of total consumption in the next couple of decades.

China's fast-growing economy has made it the world's largest energy consumer and producer. It accounts for 26.13% of global energy consumption in 2020 (Dale, 2021). Despite the government's efforts to diversify its energy mix, coal is still holding the dominant position in its total energy consumption. However, the share of coal has been continuously decreasing since 2014 due to its lower use in the industrial and residential sectors, driven by China's policy efforts to cut its carbon intensity. In the meantime, the portion of other fuels, such as renewables, natural gas, and nuclear power, has been gradually increasing. In its 13th Five-Year Plan for Energy Development, China has showed its determination to significantly reduce coal's share in the country's energy mix. In its 13th Five-Year Plan for Renewable Energy Development, China has set up targets of increasing the share of non-fossil energy in its total primary energy consumption to 15% by 2020 and to 20% by 2030. In 2020, the proportion of coal consumption in China's total energy consumption decreased significantly by 12.5 percentage points from 2010. The proportion of total clean energy consumption in total energy consumption increased from 13.4% to 24.4%, an increase of 11 percentage points, and the energy consumption structure kept changing to greener and more low-carbon (Electric Power Planning and Engineering Institute, 2021).

The General Policy Framework on Energy Transition

Over the recent years the EU directives have set a framework for the energy transition of Finland. A growing share of energy- and climate-related legislation is being decided at the EU level, and national legislation in Finland is linked to the EU-level decisions. The key elements in the EU plan for energy transition include: functioning energy markets, energy security, and reduction in the climate impact. A long-term objective in Finland is to be a carbon-neutral society. The National Energy and Climate Strategy towards 2030 represents the latest national strategy on energy transition of the country. It lays out a systematic plan and concrete actions that will enable an 80～95 percent reduction in greenhouse gas emissions by 2050. In addition to the reduction of greenhouse gases in line with the European targets, the main drivers of the Finnish energy policy include: security of supply, self-reliance, and competitive pricing. These are important objectives given the geography, climate and energy-intensive nature of the industries in Finland. The targets set up in the policy framework include the promotion of renewable energy sources (in transport and the final consumption of total energy), improving energy self-sufficiency, halving the use of imported fossil oil, and phasing out coal.

China's energy strategy development has traditionally been linked to its economic development plan. Securing energy supply to meet domestic demand has been among the top priorities in its energy policy agenda. In recent years, the increasing domestic and international concern over pollution, climate change, and environmental damage has driven China to actively promote the transformation of its energy system towards a sustainable, low-carbon mode of development. In 2020, China set its aim to peak carbon dioxide emissions before 2030 and achieve carbon neutrality by 2060. In 2014, President Xi Jinping announced an energy revolution strategy in China, addressing energy revolution on demand, production, technology and institutional governance, in addition to incorporating international energy cooperation, which is known as the "Four Revolutions and One Cooperation" vision. In China's 13th Five-Year Plan published in 2016, the government established the concept of "green development," concerning green lifestyles, high energy efficiency, low carbon emissions, and the introduction of market mechanisms in the energy market. The "Four Revolutions and One Cooperation" vision and the green development concept are serving as guiding principles for China's energy transition. According to its 13th Five-Year Plan for Energy Development, the targets of China's energy transition cover the promotion of energy product and consumption reform, optimising the energy structure, and establishing a clean, decarbonised, safe and efficient modern energy system.

Policy Instruments on Energy Transition

Finland has combined market-based means and regulatory instruments in promoting energy efficiency,

energy saving and energy security as well as emission reduction. Market-based means such as emission trading and energy efficiency agreements are favoured by industries because of their flexibility and potentially lower costs. Finland is one of the few European countries where these voluntary means on energy efficiency have proved to work and yield profits. At the same time, regulatory instruments such as feed-in tariffs and energy audits have been effectively combined with the voluntary means to achieve policy goals.

Traditionally, China's energy transition has mostly been driven by regulatory instruments, but the government has gradually increased the adoption of market-orientated policy tools. For example, China has set up binding targets for energy conservation and emission reduction in the form of laws and regulations. It has also set up an energy-saving assessment system that evaluates governments at all levels and controls the total energy consumption volume and energy intensity through regulatory means. At the same time, China has established a unified carbon trading market at the national level in order to promote the effective implementation of energy conservation and emission reduction via a market mechanism. In addition, market-oriented trading pilots for distributed power generation, and green power certificate trading systems for renewable energy have been introduced. However, given the complexity of China's energy system, regulatory tools may continue to remain as an important policy instrument in China's energy transition.

Sino-Finnish Cooperation in Energy Transition

Finland is the first Western country that signed a bilateral trade agreement with the P.R. China, and the relations between the two countries have been developing steadily since the establishment of diplomatic relations between the two countries in 1950. Since 2000, Finland and China have initiated policy actions to promote Sino-Finnish cooperation from research to innovation in energy transition. The two governments have signed several policy agreements. Cooperation in the energy field mainly focuses on clean technologies such as energy saving, cleaner production, renewable energy, green building and air quality control. The China-Finland Digital Eco-city can become the main platform for China-Finland cooperation. At present, different types of cooperation in business have dominated Sino-Finnish cooperation in energy transition.

China's economy is going through a historic transition. Sustainable energy solutions and increasing energy efficiency have been recognised as fundamental elements of smooth historic transition. Given Finland's strength in energy solutions, Sino-Finnish cooperation on energy transition has plenty of potential to develop

over the coming years. However, some policy actions are needed in order to boost Sino-Finnish cooperation in energy transition, such as:

• Deepening mutual understanding of enterprises between the two countries;

•Strengthening the implementation of Sino-Finnish agreements by setting up action plans involving broad ranges of stakeholders;

• Enhancing the visibility of Sino-Finnish corporation activities.

Overall, although some policy actions have been initiated, so far there are limited systemic policies supporting such cooperation between the two countries. Policy studies addressing the gaps and opportunities in the policy development can be critical in fostering the Sino-Finnish cooperation on energy transition.

Main Policy Recommendations

• Expanding the breadth and depth of cooperation between China and Finland on national and regional levels

Sino-Finnish cooperation platforms, which are located mainly in eastern regions in China, such as digital eco-parks and smart cities, have promoted cooperation that includes SMEs in the new energy field between the two countries. But for the central and western regions, as well as less developed regions, there is still plenty of space for co-operation. Due policy should be designed to build such platforms in order to strengthen cooperation in areas of energy efficiency and clean technology between Finnish and Chinese cities with traditional energy-intensive industries and many high energy-consuming enterprises. This is aimed at accomplishing the regional industrial upgrading and building environmentally friendly "beautiful cities" in China.

• Setting up a China-Finland platform to speed up co-operation among industry, universities, and research entities

At present, the cooperation is mostly carried out by enterprises and universities. It is necessary to further deepen and expand the cooperation among Chinese and Finnish universities, enterprises and research institutes. Centring on the strategic needs of energy transition and international cooperation strategies, the two governments could promote the establishment of a platform for bridging the industries, universities and research entities between China and Finland. The task of such a platform is to promote joint research, student exchange and knowledge transfer between universities and research institutes in China and Finland. Furthermore, such a platform can assist in designing a jointly developed research and education curriculum focusing on technical, administrative and social aspects of advancing energy transition. Finally, such platforms could promote technology transfer, talent flow and coordinated industry development between the two countries.

• Broadening the scope of Sino-Finnish science, technology and innovation policy cooperation

The existing projects funded by China-Finland cooperation focus on technology transfer and innovation cooperation. In addition, it is vitally important to study potential new approaches and modes under the Future-oriented New-type Cooperative Partnership between China and Finland. Meanwhile, the policies designed to support implementation of the Joint Action Plan between China and Finland should be further studied. For example, what types of strategic choices exist in different policy systems in respect of energy technology field? In particular, it is important to strengthen the systematic research in technology and policy regarding energy governance, clean energy, and smart energy management.

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