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More effective models needed for goal of carbon neutrality

China has set its goal of achieving carbon neutrality by 2060, which is an extension and enhancement of the Nationally Determined Contribution (NDC) at the heart of the Paris Agreement.

While responding to global concerns, China's proposal of this goal will also bring a series of climate, environmental, and socio-economic benefits. Achieving carbon neutrality would mean unprecedented and profound systemic changes. Further analysis is needed to draft a blueprint by 2060, as we must understand the impact of the low-carbon transformation and what climate change may bring.

Western experience in model developing

Developed countries in the West have accumulated nearly 40 years of profound experience in developing models for climate change. Since the 1970s, Professor William Nordhaus of Yale University has worked on the first global system model—Dynamic Integrated Model of Climate and the Economy (DICE), which won the 2018 Nobel Prize in Economics. Other well-known integrated assessment

models include those developed by the Massachusetts Institute of Technology, National Institute for Environmental Studies, Japan, and Netherlands Environmental Assessment Agency, and so forth.

These models have received long-term financial support from their countries and have become powerful tools for formulating national climate policies. Relevant research based on these models has also become an important basis for assessment reports prepared by the Intergovernmental Panel on Climate Change (IPCC) under the UN Framework Convention on Climate Change and other international climate negotiations.

Model construction in China

Unfortunately, there are few Chinese models seen in the systems currently agreed upon and adopted by IPCC reports.

In fact, Chinese scholars have been exploring the R&D of integrated evaluation models for many years and have laid solid foundations. For example, the Integrated Policy Assessment Model for China (IPAC model) developed by the Institute of Energy Studies at the National De-



Hydropower generation is widely adopted around Dai Lake, Wuhu City, Anhui Province, which contributes to China's goal of carbon neutrality.

Photo: Xiao Benxiang/CNS

velopment and Reform Commission has considerable influence in assessing China's future path to a mid-term low-carbon transition. Teams from the University of Chinese Academy of Sciences independently constructed an Energy-Economy-Environmental Model with Endogenous Technological Change by Employing Logistic Curves (E3METL) and Chinese

Energy-Economy-Environmental Model with Endogenous Technological Change by Employing Logistic Curves (CE3METL) models and published important research results evaluating the Paris Agreement targets, which attracted wide attention.

The Integrated Model of Energy, Environment and Economy for Sustainable Development (IMED)

model, constructed by the Laboratory of Energy, Environmental Economics and Policy Studies at Peking University, evaluates the macroeconomic costs, and coordinated benefits of a green, low-carbon transformation on global, national, and provincial levels.

However, it must be pointed out that China's self-developed integrated assessment models still face challenges. Due to obvious technical bottlenecks, the models' scale is relatively small. Few models can evaluate climate policies that cover all regions across the globe and further propose long-term emission reduction plans based on these calculations. In addition, more stable funding support for research programs and professional talent pools are necessary. The cost curve of knowledge investment for constructing such models is very steep, which requires many years' dedication from a talented team who are competent enough to carry out long-term, coherent scientific research.

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Family care system calls for more public support

The Second Shift: Working Families and the Revolution at Home by Arlie Hochschild asked a question that many dual-career households face: Who does the housework after an exhausting day of working in the office? This point of inquiry is based on America's industrialization process. Following the era when predominantly men were engaged in economic production, family care became a job for women. But although women have begun contributing to economic production, correspondent cultural understandings have not appeared. The tension between this change, of women entering the workforce, and the absence of gender parity in other sectors is called the "stagnant revolution" by the author.

As a scholar who pioneered emotional sociology, Arlie Hochschild brought us into the lives of ten American families with a subtlety and acumen unique to female sociologists. In her sharp, sober story writing, we see family bewilderment and a culture that has been split by more than 150 years of industrialization.

Family care system crisis

In today's China, underlying the question of "who does the housework" is the superposition

of multiple transformations—industrialization, urbanization, and modernization—which makes this type of divided culture advance rapidly and adds complexity. It not only needs to be appropriately addressed in the private sphere, but also to be valued and emphasized in the public sphere. This is the significant context with which we reread this book now.

Unlike in the West, China experienced a period when the country provided public care through national planning, to enable women to fully enter societal production. Social transformation meant that public services were reduced and private responsibility for family support was increased. At the same time, individualization and consumerism have brought about expanding demand for care, while the value of care has not correspondingly improved. As a result, the conflict between "economy-oriented" production and "human-oriented" social reproduction is increasingly prominent.

First, we see the internal conflict of women. The comprehensive liberation of the female labor force made it "ethically legitimate" for Chinese women to obtain employment outside the home. This reduced mothers' moral pressure at

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their job posts, but at the same time, it intensified the cultural contradictions that mothers experienced when facing the expectation to be "an ideal caregiver" and "an ideal employee." Paying equal attention to the demands of production and family brings not only double-shift work pressure, but also emotional depletion, which makes women feel guilty about not being competent once they become mothers—of either choosing to be a "working mother" or a full-time housewife.

Children, as important recipients of care, also face some kind of loss. On one hand, under the influence of the one-child policy, which had long been implemented in China, and child-centered values of Western families, refined parenting methods have been widely recognized, and children have become the focus of investment and attention within

families. But on the other hand, social support networks and urban public spaces, have not been developed as auxiliaries to parenting, and the current schools and workplaces still mostly continue with production-centered cultures and institutional systems. A rupture thus exists in child upbringing within the family and outside it.

Unfortunately, no matter the social situation in the US, as depicted in Hochschild's book, or the situation we are experiencing today in China, the efforts to repair such cracks are only made at an individual level, and it is difficult to develop substantial support from society. This attempt in the individual sphere is far from closing the rift between male and female roles regarding household affairs. It neither bridges the division of social production responsibilities from "family" to "country," nor resolves the care system crisis caused by social changes.

Intervention needed from state and society

As China enters a new stage of economic development and people now have an ever-growing need for a better life, the "human" and "emotional" dimensions have gradually received more attention. Given

this, it is necessary to place a higher premium on family care and expand non-market approaches while adopting market-oriented methods for care systems. This new ideal points to a collaborative care system that requires intervention from both the state and society.

Looking to the future, as the "human" identity expands beyond being merely labor, we hope that there are more interactive moments where careers and families find areas of intersection and where the two can both be redefined.

Indeed, the institutional design of care systems is linked to how a society views its people from the perspective of their basic meaning of existence. Facing the future of a highly competitive international workforce, will the current institutional arrangements cultivate children who can meet the demands of the future? Will our women be treated as the main caretakers who work at marginal job posts, or as workers on a par with men, or as offspring producers with unique advantages in nurturing the next generation? These gentle but strong-minded groups of women, who make it possible for production and reproduction to be integrated under current social conditions, require more external support.

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