



Academic Consortium for the 21st Century (AC21)  
Special Project Fund in 2022

**Net Zero Emission Transition: structural  
changes in industry, governance and society**

*Final Report*

Project lead: Shuanping Dai, Jilin University, China

Additional AC21 Members:

PD Dr. Philipp Späth, Institute of Environmental Social Sciences and Geography,  
University of Freiburg, Germany.

Prof. Dr. Philippe Hamman, the Faculty of Social Science, The University of  
Strasbourg, France.

Prof. Dr. Mark Swilling, Center for Sustainable Transition, Stellenbosch University,  
South Africa.

Prof. Dr. Maoliang Bu, School of Business, Nanjing University, China.

2023.03

## ***Part 1 Project description***

<b>Full name and title of applicant (Project Lead)</b>	Shuanping Dai
<b>Department</b>	School of Economics
<b>University</b>	Jilin University
<b>AC21 Communicator's name</b>	Ms. Shuang Liu

### **Achievement(s) made beyond AC21 SPF 2022:**

<b>Item</b>	<b>Please check the appropriate box</b>
<b>1.Type</b>	<input type="checkbox"/> Launched a new project proposal for a third-party funding <input checked="" type="checkbox"/> Joint publication <input type="checkbox"/> Others, please specify _____
<b>2.Status</b>	<input checked="" type="checkbox"/> in preparation <input type="checkbox"/> submitted/launched (date: _____) <input type="checkbox"/> approved (date: _____) <input type="checkbox"/> rejected -will be re-submitted
<b>3.Project title/Publication</b>	Special issue about carbon neutrality
<b>4. Project leads, Affiliation</b>	Jilin university
<b>5. Name of Funding Agency/ Name of journal/others</b>	

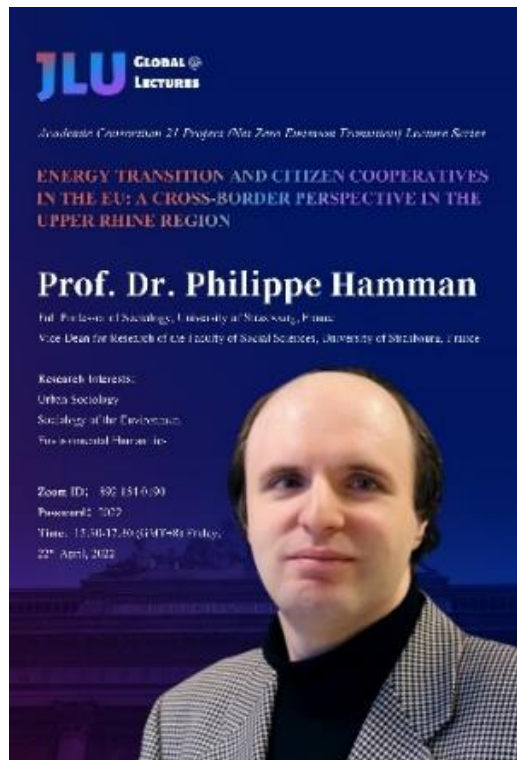
This project aims at exploring the multifaceted challenges and solutions in the ongoing decarbonization efforts of governments, enterprises and citizens. Achieving net zero emissions requires fundamental and structural changes in almost every aspect of society, in which firms have to dramatically alter heavy manufacturing-based production lines, elite groups change their high-carbon lifestyles which is under heavy attack, while environment-friendly politics challenges vested interests of in the interaction between states and businesses.

We devoted efforts to threefold parts from the multidisciplinary partners. First, under the umbrella theme, the participating partners proposed a special issue aiming at developing a joint research project. Second, we organized a series of online public lectures to manifest the various stakeholders and challenges of the decarbonization process. The lectures were given by the

leading scholars and partner experts covering various topics in structural transformation. Third, we organized an international forum online as a main event and prepared for the special issue in journals.

## ***Part 2 The AC 21 Lecture Series***

We have organized nine lectures, the information is as follows.



### **Energy transition and citizen cooperatives in the EU: a cross-border perspective in the Upper Rhine region**

Prof. Dr. Philippe Hamman

the Faculty of Social Sciences, University of Strasbourg, France

Date: April 22, 2022

This presentation addresses citizen energy cooperatives in the European Upper Rhine region, analysed as raising “communing” issues in the transition process towards a decarbonised and decentralised energy future. It shed light on the diversity of those cooperatives in terms of status and of relationship to their environment and territory. Two aspects appeared pivotal. On the one hand, energy issues must be understood as a system, through a relational approach, as pointed out by the literature both in terms of socio-technical systems and of social transactions. On the other hand, transformations are taking place continuously, including the production of hybrid forms and structures when moving from enunciations to practical and territorialised experiences, as for renewable energy

projects in the French and German contexts.



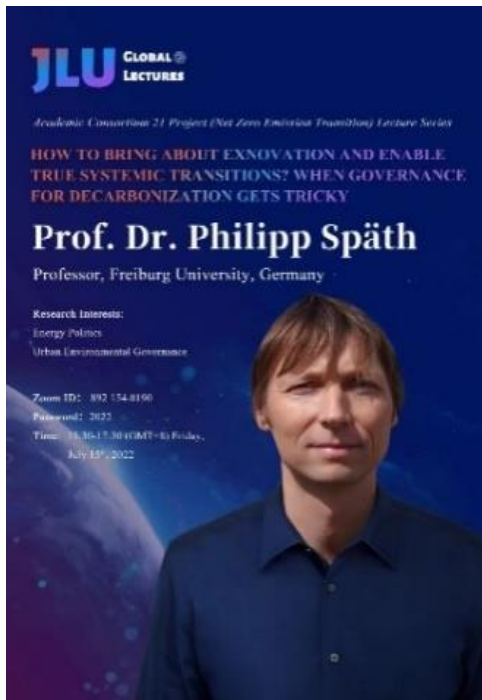
## **Sustainable city branding: is it greenwashing or deep urban transformation**

Prof. Dr. Martin de Jong

Rotterdam School of Management, and Erasmus School of Law, Erasmus University  
Rotterdam, the Netherlands

Date: May 18, 2022

The world is replete with attractive concepts such as eco cities, low carbon cities, sponge cities, smart cities, inclusive cities and many more. Local governments are happy to use them and cloak themselves in terms designating sustainability and liveability. But what is behind them, why are they used and how are they implemented in practice? In this lecture, Martin de Jong will show them to be an exercise in city branding and indicate what they mean in practice. Examples are taken from all around the world, but especially China.



## **How to bring about exnovation and enable true systemic transitions? When governance for decarbonization gets tricky**

Prof. Dr. Philipp Späth  
Freiburg University, Germany  
Date: July 15, 2022

As multiple crises demonstrate recently, the current way in which societies interact with ecosystems and natural resources cannot be maintained any longer. To the contrary, very fundamental transformations of our economies and lifestyles are required in order to enable a safe life on this planet also in the future. To orchestrate such systemic transformations is an unprecedented challenge to collective action. While politicians in the past preferred to promise that new technologies will allow to achieve such transformations without anybody being negatively impacted, the urgency of mitigating and adopting to climate change, for example, requires now to accept very quick changes that will require many people to change jobs, move to different places, and give up beloved habits. To actively bring about such changes, is much more demanding than to just foster innovation, which is why exnovation, which involves the intentional destabilization of established economic structures, is rarely talked about, especially in democratic contexts. Using contemporary policies in Germany and the EU as examples, Philipp addresses some key challenges of and experiences with such attempts and deduces some recommendations for political actors of different sorts.



## **Efficiency vs. Equity as China's National Carbon Market Meets Provincial Electricity Markets**

Prof. Dr. Feng Song  
Renmin University of China  
Date: August 17, 2022

Emissions reduction in the electricity sector is critical in achieving China's carbon neutrality target. While a national carbon trading market that covers the electricity sector has been established, its effectiveness depends on how this sector evolves into being a more integrated market. This study evaluated the impact of China's electricity market integration on the cost-effectiveness of carbon pricing. An integrated (regional electricity market) and a segmented (provincial electricity market) market scenario were used to identify possible reform paths going forward. Using high-frequency datasets of the five southern provinces in 2018, we assessed the impact of electricity market integration on the abatement potential and cost-effectiveness of carbon pricing. We found that carbon prices need to be as high as 200 yuan/ton to begin achieving overall carbon reduction. In this context, the regional market is more cost-effective in reducing emissions than the provincial one, as the abatement costs are saved by around 60% compared to the latter under the same emission reduction targets. However, the regional market may also raise potential equity issues. The provincial-level distribution of carbon emission reductions, as well as the withdrawal of coal power, are more concentrated in the regional market than in the provincial one, which indicates an inequitable social-economic-environmental impacts of market integration. Our research findings would help to improve policymakers' understanding of the interaction between carbon pricing and electricity market reforms. This would then assist them in coordinating an effective design of both the carbon and electricity markets, in addition to supporting China's carbon neutrality target.



## **Carbon emissions and economic development in China**

Prof. Dr. Zhifu Mi  
University College London, the UK  
Date: September 16, 2022

China has entered a new phase of economic development in which large-scale, rapid and multidimensional changes in economic structure are happening. We constructed the time-series of CO<sub>2</sub> emission inventories for China and its provinces. Environmentally extended input-output analysis and structural decomposition analysis were applied to investigate the driving forces behind changes in emissions. China's annual emissions growth has declined greatly since 2012, and the gains in energy efficiency were the most important factor to offset emission growth. The relative decoupling of economic growth from carbon emissions is technology driven rather than pure outsourcing. The emissions embodied in China's exports peaked, mainly due to the changes in production and export structure.





## **The Impact of Digitalization on Firm's Environmental Resilience: A staggered DID Estimation**

Prof. Mingming Xi  
Jiangxi University of Finance and Economics  
Date: November 2, 2022

This article examines the impact of digitalization on a firm's environmental resilience using a staggered difference-in-difference (DID) estimation. The study finds that firms with higher levels of digitalization show greater environmental resilience, as measured by their ability to adapt to changes in environmental regulations and weather patterns. The results suggest that digitalization can be a powerful tool for improving a firm's sustainability practices and reducing its environmental impact. The article provides important insights for policymakers and business leaders seeking to improve environmental outcomes while maintaining economic growth.

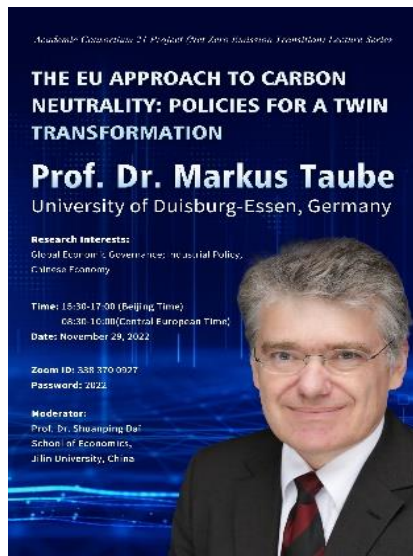




## **Carbon neutrality target and climate risk**

Prof. Dr. Fei Teng  
Tsinghua University, China  
Date: November 16, 2022

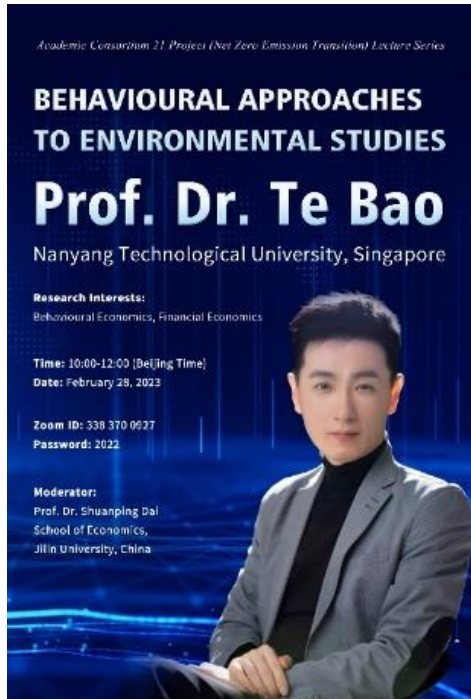
Carbon neutrality has become a critical target in addressing the impact of climate change. As the global community continues to see the effects of greenhouse gas emissions, many businesses and governments are taking steps to reduce their carbon footprint and achieve a carbon-neutral status. However, achieving carbon neutrality is not without its challenges, particularly in managing climate risks. Climate risks refer to the potential negative impacts of climate change on the economy, environment, and society. These risks can present themselves in various ways, such as sea level rise, extreme weather events, and natural disasters. In this context, it is crucial for policymakers and businesses to prioritize measures that both mitigate climate risks and contribute to the achievement of carbon targets. This paper discusses the importance of balancing carbon neutrality goals while also managing climate risks and presents various strategies that can help organizations effectively achieve both objectives.



## **The EU to carbon neutrality: policies for a twin transformation**

Prof. Dr. Markus Taube  
University of Duisburg-Essen, Germany  
Date: November 29, 2022

The EU has set a goal to become carbon neutral by 2050, which requires a significant transformation of the economy and society. This paper examines the policies needed for a twin transformation that simultaneously addresses climate change and digitalization. The analysis focuses on three key areas: energy, transport, and construction. The paper argues that to achieve carbon neutrality, policymakers must prioritize the deployment of renewable energy sources, electrification of transport, and implementation of energy-efficient building standards. Additionally, the digitalization of these sectors can contribute to reducing greenhouse gas emissions and increasing energy efficiency. The paper concludes by emphasizing the importance of a comprehensive policy framework that promotes innovation, investment, and stakeholder engagement to achieve the EU's ambitious carbon neutrality target.



## **Behavioural Approaches to Environmental Studies**

Prof. Dr. Te Bao

Nanyang Technological University, Singapore

Date: February 28, 2023

Behavioral approaches to environmental studies focus on the human behaviors that impact the natural world. By understanding how individuals, groups, and organizations interact with the environment, researchers can identify new strategies and interventions that promote sustainable and environmentally friendly practices. Key areas of focus within behavioral approaches include attitudes, beliefs, values, and social norms, as well as the impact of incentives, education, and communication on behavior change. This perspective highlights the importance of considering human behavior as a critical component of environmental issues, and offers insights into the complex factors that contribute to positive environmental outcomes. Overall, the behavioral approach provides a useful framework for understanding and addressing environmental challenges from a human-centered perspective.

***Part 3 The AC21 International Forum***

***AC 21 International Forum***

***Net Zero Emission Transition: structural changes in  
industry, governance, and society***



Hosted at the School of Economics, Jilin University



Supported by the Academic Consortium for the 21st Century (AC 21)

March 10, 2023

## **Main Session**

Zoom ID 892 154 0190 Password 2023

Zoom link

<https://us02web.zoom.us/j/8921540190?pwd=Z1RWUTNqRnY4Wkt5anBGdHBCRlg4dz09>

**Chair: Shuanping Dai (Jilin University)**

<i>Time</i>	<i>Presentation</i>
<i>16:00-16:10(CN)</i> <i>9:00-9:10 (EU)</i>	<i>Welcome and Introduction</i>
<i>16:10-16:30(CN)</i> <i>9:10-9:30 (EU)</i>	<i>Philippe Hamman &amp; Sophie Henck</i> (University of Strasbourg) Assessing “tactical” urbanism in the context of the Covid-19 pandemic: Permanence and evolution of mobility practices in a French intermediary city
<i>16:30-16:50(CN)</i> <i>9:30-9:50 (EU)</i>	<i>Kejia Yang</i> (University of Oslo) & <i>Kaidong Feng</i> (Peking University) Going beyond catch up: reflecting on the governance challenges of low-carbon energy transitions in China
<i>16:50-17:10(CN)</i> <i>9:50-10:10 (EU)</i>	<i>Philipp Späth</i> (Freiburg University) Guiding Visions and Agency in Transition Studies
<i>17:10-17:30(CN)</i> <i>10:10-10:30 (EU)</i>	<i>Yu Wang</i> (Inner Mongolian University) & <i>Shuanping Dai</i> (Jilin University) Greening Ghost City: a technology driven-just transition
<i>17:30-17:50(CN)</i> <i>10:30-10:50 (EU)</i>	<i>Martin De Jong</i> (Erasmus University Rotterdam) Low carbon and eco city branding: greenwashing or entry point to deep urban transformation
<i>17:50-18:10(CN)</i> <i>10:50-11:10 (EU)</i>	<i>Dongying Xie &amp; Weilong Gao</i> (Jilin University) How farmland size affects the net carbon effect of the planting industry? The underlying mechanism of green agricultural technology adoption

## **Student Session**

Zoom ID 892 154 0190    Password 2023

Zoom link

<https://us02web.zoom.us/j/8921540190?pwd=Z1RWUTNqRnY4Wkt5anBGdHBCR1g4dz09>

***Chair: Markus Taube (University of Duisburg-Essen)***

<b><i>Time</i></b>	<b><i>Presentations</i></b>
<b><i>18:10-18:25(CN)</i></b>	<b><i>Kunfang Zhang</i></b>
<b><i>11:10-11:25 (EU)</i></b>	Net-zero emission transition governance and decision making: literature review and research outlook
<b><i>18:25-18:40 (CN)</i></b>	<b><i>Richu Zhao &amp; Weike Zhang</i></b>
<b><i>11:25-11:40 (EU)</i></b>	The implementation of Carbon trade and Carbon Tax, and the Micro-foundation of Carbon reduction.
<b><i>18:40-18:55(CN)</i></b>	<b><i>Yihe Han</i></b>
<b><i>11:40-11:55 (EU)</i></b>	Active leadership or passive engagement? Strategic development and prospects of climate governance in the post-Brexit UK
<b><i>18:55 (CN)</i></b>	<b><i>Discussion &amp; Conclusion</i></b>
<b><i>11:55 (EU)</i></b>	

The image shows a Zoom meeting interface with a 3x3 grid of participants. The top row includes a 'REC' indicator, a placeholder for 'HONGQR 已离开', and participants Shuangping Dai and Markus Taube. The middle row features Philipp Hamman, Philipp Spath, and Kaidong Fang. The bottom row has Gweielong, Martin, and Keila Yang. Below the grid are three more placeholder tiles for 'JLU-经济学院-字真俊', '方轶芳', and 'JLU-蓝晓璐 (Francesca)'. A 'REC' indicator is also present at the bottom left of the grid.

The presentation slide is titled "AC 21 International Forum" and "Net Zero Emission Transition: structural changes in industry, governance, and society". It features the logos of Jilin University and Academic Consortium 21. The text on the slide reads: "Hosted at the School of Economics, Jilin University" and "Supported by the Academic Consortium for the 21st Century (AC 21)". The date "March 10, 2023" is displayed at the bottom of the slide content.

At the bottom of the screen, a notification box states: "已启用实时转录 (字幕) 谁能看到此转录文字? 录制已开启". A small video thumbnail of Shuangping Dai is visible in the bottom right corner of the meeting window.