Research Topic for the ParisTech/CSC PhD Program

Fields: 3. Economics, Management and Social Sciences
5. Environment Science and Technology, Sustainable Development, Geosciences
9. Mathematics and their applications

Subfield: Long-term modelling, Energy system, Carbon market, Optimization

Title:The role of Carbon Market in the Chinese Energy Transition: long-term optimization of the Chinese energy system

ParisTech School: MINES ParisTech, Centre for Applied Mathematics

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(Lab, website):Centre for Applied Mathematics, MINES ParisTech, http://www.cma.mines-paristech.fr/en

Short description of possible research topics for a PhD: The Centre for Applied Mathematics (CMA) is a research Centre at MINES ParisTech reputed for its expertise on optimization of the energy system and on prospective modelling for energy-climate issues. The Centre develops methodologies to build multi-scale (spatial and temporal) models to address the challenges of evolutions in the energy system. It develops models using the TIMES model generator, which is widely employed in the international community. The general framework of this research is the prospective assessment of the Chinese energy system challenges in the long-term 2050-2100. This question will here be considered from the angle of the decisions between different technological options leading to a reduction in greenhouse gases emissions and the ambitious carbon market that can deep the Chinese action on climate change. In other words, how China can pursue its modernization, with a huge industrialization and urbanization project started since thirty years with high growth rates, undertaking a low carbon pathway in the future? And how optimizing these pathways between the new Carbon market and mitigated technologies. This analysis should be done through the development of a Chinese TIMES optimization model.

Required background of the student: The candidate (s) must demonstrate a strong interest in this field of research and obtained a Master level (or equivalent) in optimization, applied mathematics or mathematical economics.

A list of representative publications of the group:
S. Kang, S. Selosse, N. Ma ïzi. Contribution of global GHG reduction pledges to bioenergy expansion. *Biomass and Bioenergy*, Elsevier, 2018, 111, pp.142-153.

S. Postic, S. Selosse, N. Ma ïzi. Energy contribution to Latin American INDCs: Analyzing sub-regional trends with a TIMES model. *Energy Policy*, Elsevier, 2017, 101, pp.170-184.

S. Kang, S. Selosse, N. Ma ïzi, Strategy of bioenergy development in the largest energy consumersof Asia (China, India, Japan and South Korea),*Energy Strategy Reviews*, 2015, 8, pp.56-65.

N. Ma ïzi (Co-Author), *A Global Renewable Energy Roadmap: Comparing Energy Systems Models with IRENA's REmap 2030 Project*, in Informing Energy and Climate Policies Using Energy Systems Models, Lecture Notes in Energy, Volume 30, 2015, Springer, pp. 43-67