

Agrivoltaics in China: A Study of the Current State of Agrivoltaics Development, Governmental Support Schemes, and Stakeholder Groups' Perspectives and Acceptance based on Expert Interviews

Tienan Fan^{1,*}, Max Trommsdorff^{1,2}, Sebastian Gözl¹, Jijiang He³

¹Fraunhofer Institute for Solar Energy Systems ISE, Heidenhofstr. 2, 79110 Freiburg, Germany

²Wilfried Guth Chair, Department of Economics, University of Freiburg, Wilhelmstr 1b, 79085, Freiburg, Germany

³Research Centre for Energy Transition and Social Development, School of Social Sciences, Tsinghua University, No. 30 Shuangqing Road, Haidian District, 100084, Beijing, China

*Corresponding author: fantienan@outlook.com

Abstract

This study provides a relatively comprehensive and systematic theoretical description and analysis of the current state of development of agrivoltaics (or Agri-PV, APV) in China and the underlying drivers through literature review, policy document study, expert interviews, and case studies. The acceptance of APV projects by various stakeholder groups (see Fig. 1) is scientifically analyzed and summarized. One of the highlights of this study is the high level of the experts interviewed by the author, many of whom are authoritative national level PV, APV, or agricultural experts in China. The experts are also widely geographically distributed, e.g., central-western China, southwestern China, southeastern China, etc., so their perspectives can be used to understand the development and the acceptance of APV in their regions. The 16 Interviewees are divided into 9 stakeholder groups, the name of stakeholder groups and the number of experts in each group are: Policy advisor (n=2), Farmer (Farmers' opinion collector, n=1), Scholar (n=3), PV company (n=2), Administration (n=3), PV or APV Association (n=3), Project designer (n=2). The Jobs-To-Be-Done (JTBD) theory is used in this study to analyze in depth the acceptance of APV by stakeholder groups from the perspective of four forces: Push, Pull, Anxiety, and Inertia (see Fig. 2).

The APV industry in China is large, but there are no official macro statistics. According to the author's projections combined with information obtained from expert interviews, the PV installations with additional agricultural land use in China has exceeded 64 GW by the end of 2021, and the total installed capacity of APV as a percentage of the total installed PV capacity is trending upward year by year. For the APV industry, the main governmental support schemes are the PV poverty alleviation scheme under the targeted poverty alleviation strategy and the national level PV power generation front-runner base scheme. The PV poverty alleviation policies have relaxed the original strict land policy for the PV industry, making it easier to get local government approval to build APV projects on general agricultural land other than basic farmland. Overall, the PV poverty alleviation program has achieved the initial goals set. While the PV poverty alleviation policy solves the land problem, the national level PV power generation technology front-runner base scheme is more inclined to the promotion of the PV composite project (PV+) model. Through the Tongchuan APV front-runner base project and other projects, the "PV + Agriculture + Tourism + Poverty Alleviation" model is promoted extended to the whole China. China's rural revitalization strategy is one of the most important long-term development strategies after the targeted poverty alleviation strategy. The rural revitalization strategy emphasizes the revitalization of rural industries. The "PV + Agriculture + Tourism + Poverty Alleviation" model promotes the integration of the primary, secondary, and tertiary industries and meets the requirements of the rural revitalization strategy. It is foreseeable that the APV project will become one of the powerful tools for rural revitalization in China.

Keywords: Agrivoltaics in China, Social acceptance, Jobs-To-Be-Done (JTBD) Theory, PV poverty alleviation, National level PV power generation front-runner base, Rural revitalization strategy, Carbon neutrality

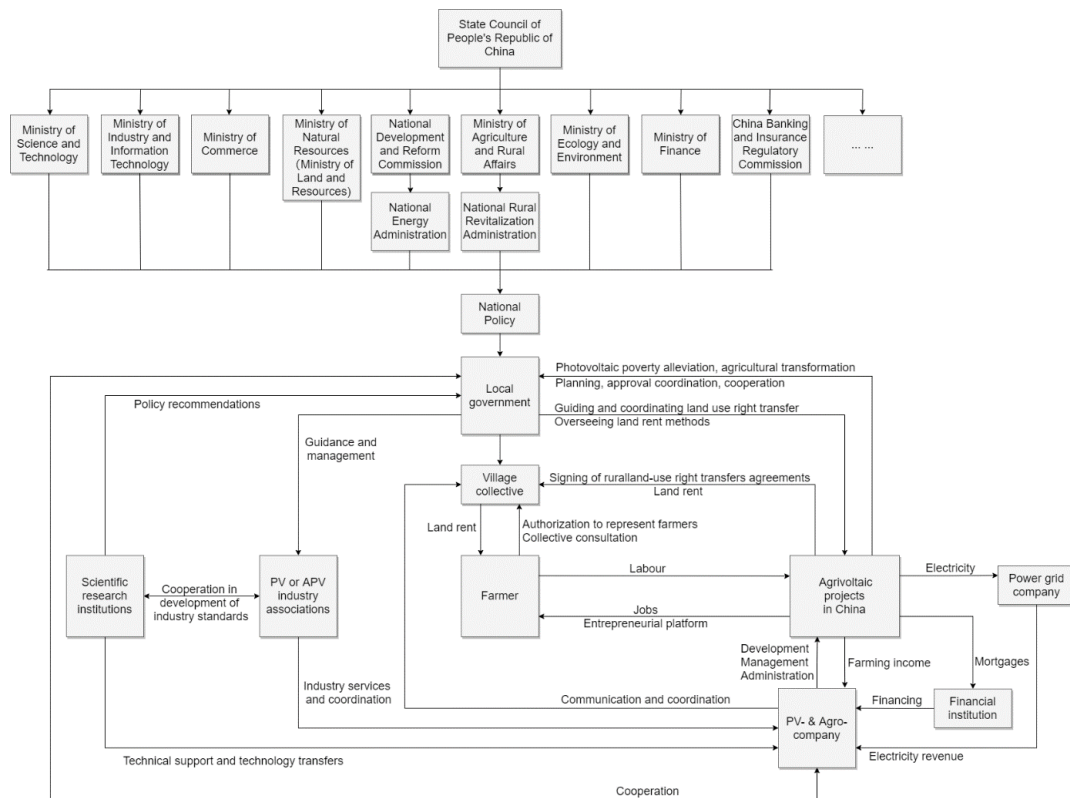


Figure 1: Stakeholder relationship diagram for APV projects in China, Source: Tienan Fan, 2022

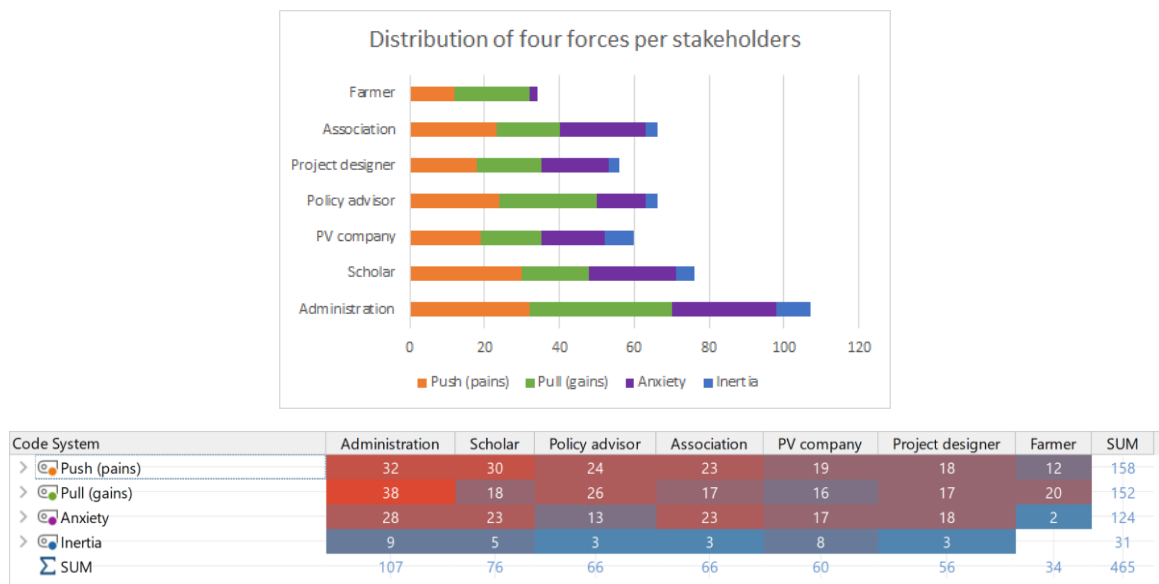


Figure 2: Distribution and number of the four forces coding per stakeholder (total number of the codes for the four forces is 465, the color shade is proportional to the size of the number), Source: Tienan Fan, 2022

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