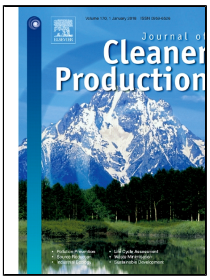
Accepted Manuscript



Multiple Competing Photovoltaic Supply Chains: Modeling, Analyses and Policies

Zhisong Chen, Shong-lee Ivan Su

PII:	S0959-6526(17)32703-8
DOI:	10.1016/j.jclepro.2017.11.045
Reference:	JCLP 11184
To appear in:	*Journal of Cleaner Production*
Received Date:	31 March 2017
Revised Date:	05 November 2017
Accepted Date:	07 November 2017

Please cite this article as: Zhisong Chen, Shong-lee Ivan Su, Multiple Competing Photovoltaic Supply Chains: Modeling, Analyses and Policies, *Journal of Cleaner Production* (2017), doi: 10.1016/j.jclepro.2017.11.045

Multiple Competing Photovoltaic Supply Chains:

Modeling, Analyses and Policies

Zhisong Chen
Business School, Nanjing Normal University, Qixia District, Nanjing 210023, China

Shong-Iee Ivan Su
Supply Chain and Logistics Management Research Lab, Department of Business Administration, School of Business, Soochow University, Taipei

Abstract: Many large-scale photovoltaic (PV) energy programs have been launched and developed in the world without a thorough sustainable thinking resulting in an on-going misalignment between the demand and supply of the PV systems. The global PV industry has encountered a serious oversupply problem causing fierce competitions among the PV supply chains and also led to the dumping accusation and anti-dumping trade battles between the PV system importing and exporting countries. It is critical to develop better policy and business insights to redirect the current business exchanges and the industry policies for the PV supply chain development. This paper attempts to examine theoretically and numerically the business dynamics in a multiple PV supply chain system to acquire better insights and propose appropriate industry policy and business strategy directions for both the governments and businesses. This study mimics the contemporary PV supply chains with three supply chain game-theoretical models examining the equilibrium conditions of the multiple PV supply chains under Cournot competition. The numerical and sensitivity analyses of the theoretical supply chain models create several valuable findings on the dynamics regarding the economic decisions of the supply chain members in a pure centralized, a pure decentralized and a hybrid multiple supply chain system. The quantitative analytical results provide a strong support to the contemporary supply chain theory advocating "the world of the business competition has altered to supply chains rather than companies". Several public and business policy directions are proposed. It is suggested that the PV supply chain members should find effective means to form partnership and build up their supply chains which would most likely strengthen their competitiveness in their current markets. For governments, there are opportunities on both the supply side and the demand side of the PV supply chains to regulate or encourage the PV industry to move toward a healthier industrial structure.

Keywords: Multiple Photovoltaic Supply Chains; Game-theoretical Modeling; Cournot Competition; Numerical Analysis; Public and Business Policy.