Mitigating the industrial energy efficiency problem in China

Investigating the acceptance of energy services companies using the Theory of Reasoned Action

A thesis submitted in fulfillment of the requirements for the award of the degree of

DOCTOR OF BUSINESS ADMINISTRATION

from

UNIVERSITY OF NEWCASTLE

by

LI CHUN FUNG
B. Eng. (Hons), M.Sc., MCF, MBS

NEWCASTLE BUSINESS SCHOOL
May 2012

Declaration

I hereby certify that the work embodied in this Dissertation Project is the result of original research and has not been submitted for a higher degree to any other University or Institution.

_____

LI CHUN FUNG

24th May, 2012

Acknowledgements

I would like to acknowledge with deep appreciation the guidance of my supervisor, Dr. Gian Casimir. I consider myself fortunate to have has such a dedicated and helpful supervisor. Without his generous encouragement and support, this dissertation could never have been completed.

I also wish to express my thanks to staff of the Energy Research Institute, China and the Energy Management Company Association, China for invaluable input and suggestions. Particular thanks go to Mr. Dai Yande, Deputy Director-General of ERI, for his inspiring comments.

Table of Contents

List of Figures

List of Tables

Abstract

The rapid growth of the Chinese heavy-industry sector has presented both opportunities and challenges to the country. While the heavy industrial sector contributes significantly to the growth of China's GDP, the energy-intensive nature of this sector has led to unprecedented problems in resource sustainability, pollution, and climate change.

Encouraging firms in the heavy industrial sector to use energy services companies (ESCOs) to improve energy efficiency has been a high-priority of the Chinese Government. According to the traditional view, regulations and incentives are believed to be important drivers for ESCO adoption. It is also believed that energy performance contracting (EPC) is an effective tool for ESCO deployment based on its economic viability. Thus, many policies and incentive schemes in China focus on promoting EPC. However, while there are some successful cases, the current level of adoption of ESCOs in the sector remains generally low.

This research uses the TRA framework to provide a quantitative investigation into how tangible factors such as government incentives and intangible factors such as the perceived capability of and trust in ESCOs are related to the adoption of ESCO services by firms in Chinese heavy industries. A proposed model incorporating the existing views about EPC has been developed and tested.

The results indicate that government incentives significantly predict intention to use ESCOs and the actual use of ESCOs, which is consistent with the traditional view. However, although preference for EPC is a significant predictor of the intention to use ESCOs, it has been demonstrated that attitude to use ESCOs is an even stronger predictor. The attitude is, in turn, strongly affected by the perceived capability of ESCOs and, to a lesser extent, Trust in ESCO. On the other hand, trust directly affects the intention to use ESCOs at a magnitude comparable to preference for EPC. Based on the research findings, we have recommended to develop an ESCO accreditation system and a sector-based collective guarantee scheme.