ELECTRICITY INDUSTRY REFORMS IN THAILAND: A COMPREHENSIVE REVIEW

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CERTIFICATE OF AUTHORSHIP

I certify that the work in this thesis has not previously been submitted for a degree, nor has it been submitted as part of the requirements for a degree, except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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ABSTRACT

Prompted by the concerns about the poor performance of the Thai electricity industry, the Thai government initiated, in the year 1992, a process of reform of the electricity industry. The reform, argued its proponents, would improve industry performance and provide economy-wide benefits. A comprehensive analysis developed in this research – employing a combination of analytical methodologies, including historical analysis, Data Envelopment Analysis (DEA), input–output analysis, and inferential analysis – has demonstrated that electricity reform has largely failed to achieve its objectives. For example, electricity reform has neither noticeably improved industry performance nor provided any appreciable benefits to the wider economy. This is because the reform program has tended to focus almost exclusively on industry privatization; the accompanying structural and regulatory changes have been limited to the extent that they support privatization. Further, it appears that only financial dimension of reform has received attention and that other dimensions (i.e., social and environmental) have largely been ignored. This narrow focus, this research argues, has its roots in several internal and external developments and influences, for example, pressures from the international financial institutions, major economic crises, political factors, institutions, and other interests. This narrowly-focused reform program, therefore, could not produce desirable outcomes as was expected.

This research identifies some remedies that might be needed in order to improve the efficacy of the present reform program. For this purpose, three alternative reform models (PDP, IPP, and GE) are proposed and their consequences analyzed, through the application of DEA and input–output analysis, for the period 2010–2020. These analyses suggest that the GE scenario, which promotes Small Power Producers (SPPs) generating electricity from renewable sources and envisages import of hydroelectricity from the neighbouring countries, would be an attractive option for Thailand. This is due mainly to its ability to provide a balanced redress for energy, environmental, economic, social, and industry performance objectives. Whether or not such redress will eventuate will however depend – to a large extent – on the efficacy of the 'new' institutional arrangements including industry structure, ownership and regulation. This argument is based on the premise that the existing institutional arrangements are deficient and hence unsuitable to provide a balanced redress referred to above.

Against this backdrop, this research proposes a modified reform approach for the Thai electricity industry. The key features of the proposed reform approach include a full

unbundling of the generation and transmission functions of Electricity Generating Authority of Thailand (EGAT), allowing the Independent Power Producers (IPPs) to also establish small-scale power plants, promoting increased participation by SPPs and Very Small Power Producers (VSPPs), disaggregating the Provincial Electricity Authority (PEA) into four regional distributors, and ensuring transparency and autonomy of the regulatory body. This research also proposes some strategies that could be adopted in order to overcome the challenges that are likely to emerge when the proposed reform model is implemented. The proposed reform approach, this research contends, will provide a robust pathway to meet the future electricity needs of Thailand. This is due to the fact that it accords with the economic, environmental, social, and political realities in Thailand. Further, it is contended that this research has made a valuable contribution in terms of developing policy insights that should provide a sound basis for furthering the reform of the Thai electricity industry – an issue of immense contemporary policy significance for Thailand.

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1. Wattana, S. and Sharma, D., 'Electricity Industry Reforms in Thailand: An Analysis of Productivity', submitted for publication in the *International Journal of Energy Sector Management*, (under review).

2. Wattana, S. and Sharma, D. (2008), 'Electricity Industry Reforms in Thailand: An Analysis of Productivity', Proceedings of the ESCC International Conference, Bangkok, Thailand, 06-08 August.

3. Wattana, S. (2008), 'Electricity Industry Reform in Thailand: A Comprehensive Review', UTS: Engineering Research Showcase, 4th June, Sydney, Australia.

4. Wattana, S., Sharma D. & Vaiyavuth, R. (2008), 'Electricity Industry Reforms in Thailand: A Historical Review', *GMSARN International Journal*, vol.2 no. 2, p. 41-52.

5. Wattana, S., Sharma D. & Vaiyavuth, R. (2007), 'Electricity Industry Reforms in Thailand: A Historical Review', Proceedings of the Second GMSARN International Conference, Pattaya, Thailand, 12-14 December.

ABBREVIATIONS

ADB	Asian Development Bank
AIT	Asian Institute of Technology
APEC	Asia Pacific Economic Co-operation
APERC	Asia Pacific Energy Research Centre
ASEAN	Association of Southeast Asian Nation
BCG	Boston Consulting Group
BOT	Bank of Thailand
BTU	British Thermal Unit
CDM	Clean Development Mechanism
CEPA	Centre of Efficiency and Productivity Analysis
CGE	Computable General Equilibrium
CPI	Consumer Price Index
CRS	Constant Returns to Scale
DEA	Data Envelopment Analysis
DEAP	Data Envelopment Analysis Program
DEB	Department of Energy Business
DEDE	Department of Alternative Energy Development and Efficiency
DMF	Department of Mineral Fuels
EENS	Expected Energy Not Served
EGAT	Electricity Generating Authority of Thailand
EGCO	Electricity Generating Company
EIA	Energy Industry Act
EPPO	Energy Policy and Planning Office
ERC	Energy Regulatory Commission
ESI	Electricity Supply Industry
ESMAP	Energy Sector Management Assistance Programme
FGD	Flue Gas Desulphurization
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GMS	Greater Mekong Sub-region
IEA	International Energy Agency
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producer
ISO	Independent System Operator
LA	Lignite Authority
LOI	Letter of Intent
LOLP	Loss of Load Probability
MEA	Metropolitan Electricity Authority
MOE	Ministry of Energy
MOU	Memorandum of Understanding
NEDB	National Economic Development Board
NEEA	North-East Electricity Authority
NEPC	National Energy Policy Council
NEPO	National Energy Policy Office
NESA	New Electricity Supply Arrangement
NESDB	National Economic and Social Development Board
NETA	New Electricity Trading Arrangement
NSO	National Statistical Office
OECD	Organization for Economic Co-operation and Development
OERC	Office of Energy Regulatory Commission

PDP	Power Development Plan
PEA	Provincial Electricity Authority
PFP	Partial Factor Productivity
PPA	Power Purchase Agreement
PPF	Production Possibility Frontier
PTT	Petroleum Authority of Thailand
RD	Regional Distributor
SAGE	System Agent
SAL	Structural Adjustment Loan
SEPC	State Enterprise Policy Commission
SFA	Stochastic Frontier Analysis
SPP	Small Power Producer
TFP	Total Factor Productivity
TOD	Time of Day
TOE	Ton of Oil Equivalent
TOU	Time of Use
USAID	United States Agency for International Development
VIM	Vertically-Integrated Monopoly
VOC	Volatile Organic Compounds
VRS	Variable Returns to Scale
VSPP	Very Small Power Producer
YEA	Yanhee Electricity Authority