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# Energy and Carbon Modeling with Multi-Criteria Decision-Making towards Sustainable Industrial Sector Development in Thailand

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Author(s)
Aumnad Phdungsilp, Teeradej Wuttipornpun

ABSTRACT
This paper develops some policy options for Thailand ' s industrial sector. The energy simulation model, the Long-range Energy Alternatives Planning (LEAP) system, has been used to simulate how energy might develop from 2005-2030. Five policy interventions are selected, and how these would change energy development is examined, and compared to a reference case. Further, the industrial policy options are assessed using a multi-criteria decision-making framework. Results of this study can increase the knowledge and understanding to make an explicit consideration of the transition from high carbon intensive energy system to one which is substantially decarbonized. The most significant energy-savings are improvement of energy efficiency and process integration. These policy options also have the large potential to reduce $CO_2$ emissions.

KEYWORDS
$CO_2$ Emissions, Energy Modeling, Industrial Sector, Multi-Criteria Decision-Making

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References

[1] S. C. Bhattacharyya and A. Ussanarassamee, " Decomposition of Energy and CO2 Intensities of Thai Industry between 1981 and 2000, " Energy Economics, Vol. 26, NO.5, 2004, pp. 765-781. doi:10.1016/j.eneco.2004.04.035

[2] Department of Alternative Energy and Efficiency (DEDE), " Thailand Energy Situation 2005, " Ministry of Energy, Bangkok, 2005.

[3] Stockholm Environment Institute (SEI). " LEAP, Long- Range Energy Alternative Planning system, " http://forum.seib.org/leap

[4] A. Phdungsilp, " Integrated Energy and Carbon Modeling with a Decision Support System: Policy Scenarios for Low-Carbon City Development in Bangkok, " Energy Policy, Vol. 38, No. 9, 2010, pp. 4808-4817. doi:10.1016/j.enpol.2009.10.026

[5] R. P. H?m?l?inen and H. Lauri, " HIPRE 3+ User ' s Guide, " System Analysis Laboratory, Helsinki University of Technology. http://www.sal.hut.fi/Downloadables/ hpdemo.html

[6] R. L. Keeney and H. Raiffa, " Decisions with Multiple Objectives: Preference and Value Tradeoffs, " John Wiley & Sons, Inc, New York, 1976.

[7] T. L. Saaty, " The Analytic Hierarchy Process, " McGraw-Hill Inc, New York, 1980.

[8] T. L. Saaty, " Highlights and Critical Points in the Theory and Application of the Analytic Hierarchy Process, " European Journal of Operational Research, Vol. 74, No. 3, 1994, pp. 426-447. doi:10.1016/0377-2217(94)90222-4

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[9] A. Salo and R. P. H?m?l?inen, "On the Measurement of Preferences in the Analytic Hierarchy Process," Journal of Multi-Criteria Decision Analysis, Vol. 6, 1997, pp. 309-343. doi:10.1002/(SICI)1099-1360(199711)6:6<309::AID-MCDA163>3.0.CO;2-2

[10] Department of Alternative Energy Development and Efficiency (DEDE), "Energy Potentials," Ministry of Energy, Bangkok, 2006.

[11] Department of Industrial Works (DIW), "Thailand Factory Databases," 2008. http://www.diw.go.th/diw

[12] Department of Industries and Mines (DPIM), "Thailand Mine Databases," 2008. http://www.dpim.go.th

[13] National Economic and Social Development Board (NESDB), "National Income of Thailand, 1980-2001 ed.," Bangkok, 2003.

[14] National Institute of Development Administration (NIDA), "Thailand Long-Term Load Forecasts," Bangkok, 2006. http://www.eppo.go.th/load/nida/eng/contents. html

[15] S. Tanatvanit, B. Limmeechokchai and S. Chungpaibulpatana, "Sustainable Energy Development Strategies: Implications of Energy Demand Management and Renewable Energy in Thailand," Renewable and Sustainable Energy Reviews, Vol. 7, No. 5, 2003, pp. 367-395. doi:10.1016/S1364-0321(03)00066-2

[16] B. Sajjakulnukit and P. Verapong, "Sustainable Biomass Production for Energy in Thailand," Biomass and Bioenergy, Vol. 25, No. 5, 2003, pp. 557-570. doi:10.1016/S0961-9534(03)00091-6

[17] R. M. Shrestha, S. Malla and M. H. Liyanage, "Scenario- Based Analyses of Energy System Development and its environmental Implications in Thailand," Energy Policy, Vol. 35, No. 6, 2007, pp. 3179-3193. doi:10.1016/j.enpol.2006.11.007