

THE EDUCATION UNIVERSITY OF HONG KONG
FACULTY OF LIBERAL ARTS AND SOCIAL SCIENCES

Research Output/Impact/Knowledge Transfer Prize
for the Dean's Research Fund 2019/20

Brief Introduction of Awardee's
Research/KT Publication/Study/Output and Future Research/KT Development

Awardee (Dept): Prof. Woo Chi Keung, Professor (APS)
Publication Title/KT project: A wholesale electricity market design sans missing money and price manipulation

A. *Briefly introduce your research/KT publication/study/output for which you have received the prize.*

I use reliability differentiation via tolling agreements with diverse heat rates and fuel types to implement a newly developed efficient wholesale electricity market design under demand and supply uncertainty. Mainly based on North America's market experience, this design adopts an independent system operator's (ISO's) existing practice of least-cost dispatch of heterogeneous generation units, real-time energy price determination and capacity rationing. It solves the missing money problem of inadequate incentive for thermal generation investment, preempts independent power producers' price manipulation in the ISO's real-time market for energy, and suggests two-part pricing of end-use consumption to meaningfully link the wholesale and retail markets. Applicable to countries that have implemented wholesale competition or are in the process of doing so, it should be considered in the ongoing debate of electricity reliability and market competition.

B. *How you used/will use your prize and perhaps its usefulness to your research/KT development?*

I plan to use the prize money of HK\$50K for hiring a research assistant to support my ongoing collaboration with several overseas and local academics on: (1) Covid-19's decremental suppression effects on household welfare in the US; and (2) performance-based-regulation (PBR) of MTR's reliability performance.

C. *Expected research/KT outcomes/outputs/impacts arising from this prize.*

The usefulness of (1) is underscored by the decremental policies of the US states, which resemble those of Hong Kong and China. The usefulness of (2) is a future refinement of

MTR's existing PBR to improve MTR's service reliability.