

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

Research Output/Impact Prize for the Dean's Research Fund 2017-18

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

Awardee (Dept): Prof. Woo Chi Keung, Professor (APS)

Publication Title: Energy Policy

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

Electricity market reform has engendered competitive wholesale trading in various parts of the world. Wholesale electricity prices are inherently volatile, moving with fundamental drivers that can fluctuate wildly, including the natural gas price, renewable generation's intermittent output, weather-sensitive demands, nuclear capacity available, hydro conditions, and the CO₂ price of a cap-and-trade (C&T) program. Energy policy initiatives can have a significant impact on electricity market prices. For example, programs for renewable energy development and demand-side-manage tend to reduce electricity prices, whereas CO₂'s C&T, retirement of nuclear power and coal generation tend to increase them.

Recognizing the information needs of private companies and government agencies, I have been working with researchers in Hong Kong, Canada, Israel and the U.S. to address the following substantive policy questions:

- What are the price effects of energy policy programs on wholesale electricity prices in California and other states in the Western Interconnection (WI) of the U.S.? The answer is of real-world importance because it immediately impacts the energy policies of the jurisdictions in the WI, and by extension, the rest of the U.S. and other countries.
- Do these price effects vary by price formation process (centralized determination vs. bilateral negotiation)? If a C&T program is found to have differential price effects, it may require modifications to fully achieve CO₂'s full price internalization in the WI.
- Do these price effects vary across space and time? If "yes", integrated resource planning and procurement should use marginal costs that are area- and time-specific.
- Do the policies of one jurisdiction have "spillover" effects to neighboring jurisdictions? If "yes", even jurisdictions not currently considering their own clean energy policies must pay attention to policies set by their neighbors. A case in point is Hong Kong, a special administrative region of China established under the "one country, two systems" principle.

In connection to the above questions, my research output in 2017 is the following A* papers with their impact factors in []:

- [1] Gal, N., I. Milstein, A. Tishler and C.K. Woo (2017) "Fuel cost uncertainty, capacity investment and price in a competitive electricity market," *Energy Economics* [4.4], 61, 233-240.
- [2] Woo, C.K., A. Olson, Y. Chen, J. Moore, N. Schlag, A. Ong, T. Ho (2017) "Does California's CO₂ price affect wholesale electricity prices in the Western U.S.A.?" *Energy Policy* [4.6], 110, 9-19.
- [3] Woo, C.K., Y. Chen, A. Olson, J. Moore, N. Schlag, A. Ong and T. Ho (2017) "Electricity price behavior and carbon trading: new evidence from California," *Applied Energy* [7.5], 204, 531-543.
- [4] Cheng, Y.S., K.H. Cao, C.K. Woo and A. Yatchew (2017) "Residential willingness to pay for deep decarbonization of electricity supply: contingent valuation evidence from Hong Kong," *Energy Policy* [4.6], 109, 218-227.

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

I will use the prize money to augment the funding from other sources (e.g., TDG and private donation) for my on-going projects:

- (1) An online assessment system for individual scores (OASIS) that now has 10+ committed users in Hong Kong, China and India.
- (2) Public transportation demand analysis for Hong Kong.
- (3) Demand side management of vehicular fuel consumption in Hong Kong.

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

Based on the three projects listed above, I plan to submit three papers to A* (SSCI) journals with impact factors > 2. If or when these papers will be accepted, however, is presently unknown.