

**Annex:**

***Selected Project Milestones of  
“Smart Solar Energy Harvesting, Storage, and Utilization”***

<b>Researchers</b>	<b>Subjects</b>	<b>Achievements / breakthroughs</b>
<b>I. Energy Harvesting</b>		
Prof. Jianbin Xu and Keyou Yan, Department of Electronic Engineering, CUHK and his team	Developed highly crystalline large-grain size (5x5 cm <sup>2</sup> ) perovskite thin film crystals. Humidity and heat stability was significantly boosted from 1 week to two months, substantially fostering requirements for widespread commercial applications.	Published in the journal <a href="#"><i>“Advanced Energy Materials”</i></a> under the Wiley series, and <a href="#"><i>“Nano Energy”</i></a> .
Prof. Jimmy Yu, Department of Chemistry, CUHK and his team	Using micro-fibrous red phosphorus to produce clean fuel (hydrogen) from water with high efficiency. Red phosphorous is abundant in the earth’s crust and can be extracted fairly easily. The process of conversion leaves only water as a by-product, without any toxic gas.	Published in the international journal <a href="#"><i>“Angewandte Chemie”</i></a> .
Prof. Jianfang Wang, Department of Physics, CUHK and his team	Invented an innovative lanthanide-sensitized oxide for capturing infrared light for solar harvesting by solar cells, reaching a maximal efficiency of 16%, which is at least double the efficiency of traditional nano-upconversion materials.	Published in <a href="#"><i>“Nature Communications”</i></a> under the Nature publishing group.
<b>II. Energy Storage</b>		
Prof. Ching-ping Wang, Dean of Engineering and Prof. Ni Zhao, Department of Electronic Engineering, CUHK and their team	Developed 3D porous carbon foam based composites for high performance supercapacitors, giving some of the highest reported values for asymmetric supercapacitors.	Published in the journal <a href="#"><i>“Nano Energy”</i></a> .
Prof. Yi-Chun Lu, Department of Mechanical and Automation Engineering, CUHK and her team	Developed a new high-energy-density and low-cost zinc/iodine-bromide redox flow battery (ZIBB) achieving the highest reported energy density to-date.	Published in the journal <a href="#"><i>“Energy &amp; Environmental Science”</i></a> , and was featured by the magazine <a href="#"><i>“Chemistry World”</i></a> , published by The Royal Society of Chemistry, United Kingdom.
<b>III. Electricity Utilization</b>		
Prof. Minghua Chen, Department of Information Engineering, CUHK and his team	Via intelligent tracking of the behaviors of perfect dispatch, the online energy generation scheduling algorithm CHASE (Competitive Heuristic Algorithms for Scheduling Energy-generation) was able to bring about a remarkable 20% cost saving. Generation cost was close to that of the lowest value reached by perfect	Published in the conference <i>ACM SIGMETRICS</i> . The follow-up work was published in the renowned journal <a href="#"><i>“IEEE Transactions on Smart Grid”</i></a> .

	dispatch, off by less than 10%, given little or no generation/load forecast information.	
Prof. Zhao Xu, Department of Electrical Engineering, The Hong Kong Polytechnic University and his team	<ul style="list-style-type: none"> <li>• A first of its kind microgrid platform in Hong Kong dedicated for scientific experiment and practical implementation of advanced microgrids control algorithms</li> <li>• A novel optimization based probabilistic interval prognosis method for solar and other renewable energies in MG (in collaboration with Hong Kong Observatory)</li> <li>• A first of its kind smart demand controller in HK (both theoretical design and hardware implementation) enabling frequency/voltage response from various home appliances.</li> </ul>	Published in the journal " <a href="#"><i>IEEE Transactions on Power Systems</i></a> ".
Prof. Dah Ming Chiu, Department of Information Engineering, CUHK and his team	Built a smart online energy management platform "Woo Sing Power" which provides instantaneous feedback to more than 600 users in CUHK LWS College to encourage energy conservation, and to administrators to find opportunities and policies to save energy.	Published in the e-Energy Proceedings of the " <a href="#"><i>2015 ACM Sixth International Conference on Future Energy Systems</i></a> ".