ROYAL ACADEMY OF ENGINEERING

Industry-Academia Partnership Programme

CHINA

Under its remit as a delivery partner of the Newton Fund, the Royal Academy of Engineering has partnered with the Chinese Academy of Engineering to build bilateral industry-academia links that aim to support Chinese universities in improving their engineering research and innovation output.

One of the projects supported through the scheme aims to decrease pollution in northeast China by improving combustion mode and security control strategies in power plants. It brings together five international partners including Jilin University, University of Nottingham, Jilin Province Electric Power Research Institute Co., Changchun Hecheng Xingye Energy Technology Co., and China Guodian Corporation Jilin Longhua Changchun No.1 Cogeneration Plant.

Newton Fund

BUILDING COLLABORATIVE PARTNERSHIPS

For several years, academics at Jilin University in China and the University of Nottingham in the UK had steadily built collaborative research partnerships through work on several projects aimed at reducing energy consumption. The Industry-Academia Partnership (IAP) Programme enabled researchers at these institutions to build on their existing relationships and engage with industry to investigate ways to improve combustion efficiency in power plants by analysing air distribution in coal-fired plants. Access to power plants was essential to meet this aim and the collaborators engaged three companies who provided on-site access for support with testing, simulation and analysis.

IMPACT AND INNOVATION

Developing more efficient combustion processes in coal-fired power plants will help to reduce air pollution in northeast China. Through a series of visits to power plants in both China and the UK, the partnership collected data to improve their models for air distribution and boiler combustion. This enabled the partnership to develop a platform consisting of precision measuring instrumentation and software that can acquire, process and analyse data from industrial power plants in real-time. It allows control strategies to be developed to ensure that combustion processes are more efficient, driving reductions in air pollution.

MODELS OF ENGAGEMENT

A strength of this partnership lies in having three industry partners, including two state-owned power plants and an SME. From hosting students to on-site access for experiments, each company makes a unique contribution. Combined, they have supported the level of analysis and testing needed to speed up the innovation process.

"So far, the collaboration has helped our industry collaborators to improve their ability for theoretical analysis," says Professor Yingai Jin from Jilin University. "At the same time our universities have been able to study and solve specific engineering problems."

An important aim has been to support student education and learning. Along with workshops and seminars, the collaborators also created mentoring opportunities for academics and industry. Professor Yuying Yan, University of Nottingham, also gave a set of lectures at Jilin University.

FUTURE PLANS

To ensure the partnership has a longer-term impact, there are plans to introduce the project and share outcomes with other universities and power plants. Additional funding has also been secured from Jilin province for the partners to continue research into power plant boiler combustion and energy efficiency.

"The enhanced access to academic networks has supported our company's research and development in areas relating to power plant combustion, heat transfer, energy-saving and emission-reduction."
Jiatong Guo, General Manager, Changchun Hecheng Xingye Energy Technology Co.

"The IAPP programme has strengthened international links between our company, the University of Nottingham and the Royal Academy of Engineering in areas relating to power plant combustion operation and control, power plant unit efficiency," Chunguang Tian, Vice-President, Jilin Province Electric Power Research Institute Co.

PROJECT HIGHLIGHTS

11 Undergraduate students trained

3 Postgraduate researchers trained

7 Publications

2 Patents granted for utility models

2 Software copyrights registered

UK-CHINA INDUSTRY-ACADEMIA PARTNERSHIP PROGRAMME

As a Newton Fund delivery partner, the Royal Academy of Engineering has partnered with the Chinese Academy of Engineering to co-fund awards that strengthen the capacity of Chinese universities to contribute to disruptive technological innovation through strategic partnership with industry, specifically SMEs, and UK stakeholders.

NEWTON FUND

This project is supported by the Newton Fund, which is part of the UK's official development assistance (ODA) and promotes economic development and social welfare by strengthening science and innovation capacity.

For more information

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Front image: Collaborators from academia and industry visit a power plant in North East China.

Above image: Academic and Industrial Collaborators from China attend an event hosted by the Royal Academy of Engineering.