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POST COMBUSTION CAPTURE PROJECT

- $650,000 funding for *'Evaluation of advanced Post Combustion Capture process and equipment with two advanced liquid absorbents for application in Victorian brown coal-fired power stations'*; submitted by **Commonwealth Scientific and Industrial Research Organisation (CSIRO)** in association with **IHI Corporation**, Japan and **AGL Loy Yang Power Pty Ltd**.

This research project is targeting a 40 per cent reduction in the parasitic energy penalty of current post combustion capture (PCC) processes and will see the installation of a $1M Japanese-built PCC pilot plant at AGL Loy Yang Power station; the first in Victoria to operate around the clock. Existing PCC processes result in a significant reduction in power plant output – with today's commercial technology this could be up to 40 per cent for retro-fit to existing Australian brown coal plants. The targeted reduction of this energy penalty would lead to significant savings in the cost of energy supplied to the consumer compared to implementing carbon capture using current-generation PCC plant.

Achieving a significant reduction in capital and operational costs for large-scale carbon capture plants is arguably the greatest challenge facing global commercial deployment of PCC for coal-fired energy plants. There are about 25 PCC pilot plants currently in operation world-wide, however most are focused on validation of liquid absorbents for PCC in standard process designs. This project entails a two-year evaluation of two advanced liquid absorbents, two advanced process designs and an advanced gas/liquid contactor. The combination of these three aspects represents a significant step forward in PCC technology application for Victorian brown coal-fired power stations.

This research project is a major collaboration between internationally renowned technology provider, IHI Corporation, and Australia's world-class research organisation; CSIRO. The collaboration is a world-first evaluation of a technology provider-developed PCC process in flue gases from Victorian lignite-fired power. Successful completion of the project is expected to enable scale-up of the next technology phase; most likely a demonstration project at a scale of between 100 and 1000kton CO2 per year.

In the first year of the research program, a 0.5 tpd CO2 capture pilot plant - incorporating an advanced, low-pressure packing material - will be designed and manufactured by IHI in Japan. The plant will then be transported to Australia and re-commissioned at AGL Loy Yang Power station in Victoria's Latrobe Valley. The combination of three new technology innovations - simultaneous improvements in capture agents, equipment and process design - is expected to deliver almost a 40 per cent reduction in the absorbent energy requirement of the pilot plant compared to a standard amine process.

IHI's amine based PCC technology for brown coal-fired power stations will then be evaluated through a parametric study to determine the minimum thermal energy requirement for liquid absorbent regeneration for the two selected absorbents and two process configurations. Two year-long duration experiments totalling 5000 hours will also be undertaken to assess the robustness of the two liquid absorbents under brown coal flue gas conditions with the minimum thermal energy requirement.

The duration experiments differentiate this project from known PCC pilot plant test results and will make a significant contribution to the global body of research into amine based reactive gas/liquid absorption for CO2 capture; the leading PCC technology. The experimental campaign will provide critical knowledge about both the performance of the technology process over time and the robustness of the two liquid absorbents; the latter information is essential to enable deployment of commercial-scale PCC and is urgently required to facilitate assessment of the environmental impacts of PCC.