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Energy White Paper Taskforce
Department of Industry
GPO Box 1564
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Submission to: Energy White Paper Taskforce
From: The Warren Centre for Advanced Engineering

Executive Summary

The Warren Centre for Advanced Engineering Limited (The Warren Centre) welcomes this opportunity to provide a submission to the **Energy Issues White Paper**. The Warren Centre's Energy Committee is comprised of experienced industry professionals and through The Warren Centre's collaborative process methodology works to identify and solve complex issues of relevance to society's needs.

A significant current issue recognised by The Warren Centre's Energy Committee is the challenges faced by the existing electricity infrastructure to accommodate the changing paradigm of energy delivery. Today's electricity distribution networks were designed "yesterday" incorporating assumptions and operational models relevant for the day, yet they are inappropriate and unable to cope with future needs and market opportunities presented by the changes presently sweeping the market. The Warren Centre's **Low Voltage Exchange Networks** project is exploring these issues and developing broad (industry wide) recommendations and solutions through the collaborative efforts of industry stakeholders. Whilst this project is in its early phases and will progress significant developments in the near term we would welcome the opportunity to provide details and findings from the project to the Energy White Paper Taskforce as they develop.

Low Voltage Exchange Network (LVEN) – a new paradigm

There are some five million electricity customer connections within the National Energy Market (NEM) of which more than one million have become generators of electricity in their own right. This has required a complete revision of the low voltage network from a one-way delivery of power from the transmission network, to an exchange network that allows for a two-way flow of power to a particular customer from the main supply or from a neighbour. Previously the distribution network's characteristics were well understood. However many components of the network were not designed to operate as an exchange network, and under these new operating conditions there is significant uncertainty that urgently needs clarification for all parties.

The coming exchange network presents both problems and opportunities. The Warren Centre's LVEN project aims to identify and articulate both of these, to mitigate the problems where they occur and define the many market opportunities more clearly. The project's initial activity investigates the valuable work undertaken by Standards Australia and others in resolving specific aspects of the exchange network, followed by a gap analysis to identify any unresolved issues in the network. The project deliverables will outline the complete attributes of the low voltage exchange network to identify those problems and opportunities. The

outcomes of this project will complement other areas of work, including CSIRO's Future Grid project, to provide a comprehensive view of the adjustments required to ensure Australia's future energy distribution needs.

Project structure

The LVEN project uses a proven model of engagement and analysis to develop case studies and technical data to determine strengths and weaknesses in the low voltage exchange network. The project will identify opportunities to enhance the exchange network to deliver two-way flow of power while ensuring system reliability, safety and stability.

The project will analyse:

- The current design of the network and design limitations to change
- The structural aspects of an exchange network
- Requirements for greater low voltage power distribution including avoiding congestion
- The operational differences in an exchange network
- Requirements to maintain safety and reliability.

In articulating the differences required in an exchange network the project will also provide clarity and insights regarding:

- regulatory conflicts and issues,
- economic challenges,
- new and unproven technologies and emerging technical requirements, and
- the many opportunities for participation and investment.

We would be very pleased to contribute the findings of these investigations to your Taskforce's endeavours.

About the Warren Centre

The Warren Centre is an academically independent body that uses robust, collaborative processes with its extensive networks in academia, industry and government to find solutions in an increasingly complex economic, technical and social environment. The Warren Centre's Energy Committee is comprised of experienced industry professionals and focusses on complex energy related issues. The Warren Centre was established at the University of Sydney in 1983 to foster excellence in engineering and find collaborative solutions to complex problems.

Working with industry, the Warren Centre is expert at leveraging its connections for optimum results, such as:

- Fostering excellence and innovation in advanced engineering throughout Australia.
- Stimulating the application and further development of new engineering technology.
- Encouraging the integration of innovation and engineering technology into Australia's public policy and wealth creation.
- Providing independent comment and advice to government and industry on relevant issues.
- Helping create competitive advantage for specific industries in Australia and overseas and viable opportunities for wealth creation.
- The Warren Centre owns the process – and everyone owns the benefits.