Energy Security and Efficiency

Canterbury's high country lakes provide a largely natural water storage capacity that can act as an enabler for other renewable generation technologies, such as wind, which rely on the generation from hydro storage being available on demand. Electricity generation is generally, but not always, a non-consumptive use, making it highly complementary to irrigation. Investigating hydro power options, particularly where they have additional benefits or dual use of the water (e.g. in combination with farm irrigation) is encouraged. New infrastructure options must include consideration for hydro-electric power generation and where possible, feature design that utilises the landscape to convey water under pressure. This can minimise the need for pumping and, as a result, can improve energy efficiency.

Targets

From 2010: Maintain Canterbury's existing contribution to New Zealand's security of electricity supply.

Seek opportunities, as part of design and planning for new infrastructure, to reduce electricity used in the use of water and to provide for multiple use.

By 2015: Started projects to generate electricity from existing irrigation infrastructure.

Identified and implemented opportunities to reduce electricity used in the use of water.

By 2020:

Target 1: Generate at least 40-45% of the power used by irrigation in Canterbury from irrigation infrastructure (including multi-use hydro and irrigation systems) within Canterbury and other renewable on-farm sources.

Target 2: Maintain or increase Canterbury's contribution to New Zealand's security of electricity supply.

Increased the productivity per unit of electricity – per hectare consumption for irrigation sector and equivalent measures in other sectors.

By 2040:

Target 1: Factored efficient use of electricity in all irrigation infrastructure.

Target 2: Reduced the energy used per hectare for irrigation in Canterbury compared to that used in the 2010/11 season.

Progress to 2020

Not started | Started | **Progress** | Good progress | Achieving

- New Zealand has set a target to generate 90% of its electricity from renewable energy sources by 2025. Overall, Canterbury continues to supply 54% of all hydro electricity generation while providing a 26% baseline component of the national electricity generation capacity. Canterbury's power consumption remains relatively unchanged from 2010 at approximately 14% of national demand.
- Opportunities to reduce electricity, used in the use of water, have been realised across Canterbury. Most existing large schemes are either underway or have already upgraded their infrastructure by replacing open irrigation channels with piped networks or by substituting groundwater for newly available surface water, minimising the need for pumping, see fig 16. These infrastructure developments improve energy efficiency, and have a significant impact on water use efficiency and when accompanied with improved storage, provide for improved irrigation reliability.
- Eight of the larger irrigation schemes have investigated options for hydro-electric power generation as part of their upgrade projects. Some have incorporated in their design, scope for future development options however, none have been developed beyond feasibility stage stating the inclusion of generation was not economic. This is due to seasonal demand, the low utilisation of the generation kit and the current market economics for power generation, which do not provide sufficient return for the level of investment required.
- At this stage, there are only estimates available of the on-farm power savings from the piping of irrigation networks and supplying water under pressure. Further assessment will be required to report on the productivity impact per unit of electricity per hectare.