

A GUIDE TO THE ELECTRICITY EFFICIENCY WORKSTREAM AT THE ELECTRICITY COMMISSION

1 PREAMBLE

This paper outlines the framework of the Electricity Commission's electricity efficiency workstream and specific elements of the main programmes. It identifies the technical and economic research on which the programmes are based and describes key initiatives in the industrial and commercial sectors, and for lighting technologies. It also describes outcomes achieved to date.

2 INTRODUCTION

The Electricity Commission (Commission) promotes and facilitates electricity efficiency and conservation - reflecting its objectives and responsibilities under the Electricity Act 1992 (as amended in 2003) and the Government Policy Statement (GPS) on Electricity Governance.

The Commission's brief includes developing and implementing programmes to provide incentives for cost effective electricity efficiency. Funding for the programmes is through a levy on all wholesale electricity market participants, meaning that ultimately the programmes are indirectly paid for by every electricity consumer.

The quid pro quo is that investment in cost-effective electricity efficiency programmes benefits all consumers by providing better economic return than expenditure on more expensive new generation and transmission assets as well as contributing to New Zealand's wider environmental goals.

Electricity efficiency is a fundamental component of the drive to develop an economically efficient electricity system for New Zealand. The focus is not to simply to save energy - but to save electricity with the objective of developing an electricity system with the optimal economic mix of demand, delivery and supply investment - through processes that involve increased participation of the 'demand side' of the electricity market.

Electricity efficiency investment opportunities are known to exist in all sectors of the New Zealand economy, but a variety of barriers to investment has resulted in relatively low realisation of the potential value.

3 DEVELOPMENT OF ELECTRICITY COMMISSION PROGRAMMES

The Commission has a three step approach to developing its electricity efficiency programmes. These steps are:

1. Identifying the sectors, technologies and practices across New Zealand where significant achievable electricity efficiency potential exists;
2. Examining and understanding the barriers to investment that are inhibiting action by those expected to have the most interest in the savings opportunities identified; and
3. Bringing together the information from the first two steps to develop cost effective electricity efficiency programmes that will achieve sustainable electricity savings, and that meet the Commission's economic criteria for efficiency investments.

A number of studies (see later section) have been carried out looking at the potential for electricity efficiency across the industrial and commercial sectors, and assessing the potential from lighting across-the-board. Several of these studies have also looked at the barriers to achieving the efficiency potential. A discussion of the economic criteria is included in the next section of this paper.

The programmes are developed in coordination with other government agencies. In this regard an important relationship exists between the Commission and the Electricity Efficiency

and Conservation Authority (EECA). Both agencies have within their functions a common objective to promote the efficient use and conservation of electricity, and have a joint memorandum of understanding detailing the principles and arrangements to ensure a coordinated approach. Across all programme areas, EECA actively assists with programme selection and design.

An example of this co-ordinated approach exists with respect to EECA's Energy Intensive Business (EIB) initiative, through which cash grants¹ are provided to organisations that take the lead in implementing new or underutilised renewable energy or energy efficient technologies. The scope of the projects selected by EECA under EIB is taken into consideration when the Commission is designing its commercial and industrial electricity efficiency programmes. Likewise EECA considers the scope of the Commission's programmes when deciding on what technologies to support through its EIB grants.

The Commission's electricity efficiency programmes and their providers are selected through a competitive procurement process. Care is also taken to consult well with electricity consumers and affected industries in order to ensure that the programmes are practicable and utilize (rather than compete with) existing private or public enterprises. The Efficient Lighting Group, the Compressed Air Stakeholders Group the Motor Rewind Consultation Group and the Efficient Street Lighting Stakeholder group are examples of such groups.

4 THE ECONOMIC CRITERIA FOR EFFICIENCY PROGRAMMES

From its mandate in the Electricity Act and the GPS, the Commission has developed a structured approach to identifying where and how to best utilize the levy monies collected for electricity efficiency programmes.

The GPS² effectively identifies the long run marginal cost of electricity generation and transport as the maximum price payable for cost-effective investments in electricity savings.

The long run marginal cost of generation and transport is not a single figure. Using the price outputs from the New Zealand wholesale electricity market as a proxy for long run generation costs, there are 48 x 365 marginal costs of electricity generation per annum (one for each of the ½ hours of price setting). And the long run marginal cost of transport is different for every point of electricity consumption.

In future, the generation cost will also be increased by the effect of a carbon tax or the Emissions Trading Scheme (ETS).

In assessing the viability of a potential electricity efficiency project, the Commission normally does not include the marginal cost of transport in setting the cost threshold below which the project must deliver electricity savings. Exceptions would be where a localised project is designed, or fortuitously located, to address a specific transmission and/or distribution constraint.

The complexities that can be involved in using the long run marginal cost of electricity to determine where electricity efficiency investments should be made, require that some more general rules be used in practical project assessments.

In 2007, the Commission sought an independent assessment³ of the long run marginal cost of electricity as applicable to setting the threshold for electricity efficiency investments. The analysis conducted determined an annual average marginal cost of generation of 7.5 cents per kilowatt hour to be an appropriate figure.

Separate work undertaken jointly by the Commission and the Ministry for the Environment⁴ has developed a range a scenarios as to the effect of an ETS on the marginal cost of electricity generation. The more likely of the scenarios (as applicable to projects with a life of

¹ Under EIB, grants of up to 40% of the capital cost of the project (maximum of \$100,000 per grant) are available.

² Paragraph 33 of the Government Policy Statement on Electricity Governance, May 2008.

³ Refer Appendix B of "Interventions Analysis: Compressed Air and Electric Motors
<http://www.electricitycommission.govt.nz/pdfs/opdev/electric-efficiency/programmes/industrial/research/Interventions-analysis-v2.pdf>

⁴ Refer "Carbon abatement effects of electricity demand reductions".
http://www.med.govt.nz/templates/MultipageDocumentTOC_33805.aspx

10 years or more) indicated that an additional cost of 1.0 cents per kilowatt hour could be added to recognise the cost of carbon emissions on the marginal cost of electricity generation.

Adding these two component costs, an average annual cost of electricity of 8.5 cents per kilowatt hour provides a threshold for the Commission's electricity efficiency projects. That is, using a 10 year net present value analysis, the total cost of the project (to the economy) should be less than 8.5 cents per kilowatt hour of electricity saved, for the project to be included in the Commissions portfolio

Determining that a market failure or barrier to private investment exists and needs to be addressed by the Commission's intervention is part of the economic evaluation of a potential project. The need to do so is based on the Commission's view that for an intervention to be cost-effective (a requirement under Section 172O(1)(g) of the Electricity Act 1992) it must be in response to a market failure or barrier. Put another way, the Commission needs to be satisfied that the identified efficiency potential will not occur "naturally" within a reasonable time period. It is also necessary to ensure appropriate use of levy-payer funds.

What constitutes a legitimate barrier justifying intervention can be subject of debate – as can be what constitutes a legitimate means of addressing the barrier once it is identified. Rather than further debate that here, suffice to say that the mechanisms used by the Commission to address barriers can directly address a barrier (e.g. by education to address lack of knowledge) or indirectly address the same barrier (e.g. by short term financial incentive to provide impetus for change).

In practice, the failure or barrier needs to be confirmed to the Commission's satisfaction before the analysis is done to determine whether or not the project is capable of meeting the net present value requirements.

In addition to the criteria derived from the Electricity Act and the GPS, the Commission has internal rules that seek to prioritise projects in order to get best value from the funds appropriated.

5 THE RESEARCH BASIS FOR PROGRAMME SELECTION

All recent electricity efficiency programmes undertaken by the Commission have been based on information derived from a range of studies and pilot projects.

5.1 KEMA STUDY

The most publicised study of efficiency potential undertaken by the Electricity Commission is the KEMA Potentials Study⁵ – KEMA being the US-based consultancy company who was commissioned to compile the data and perform the technical and economic modelling required.

Across the residential, commercial and industrial sectors, the KEMA study estimated 6,437 GWh per annum of electricity savings potential and 1738 MW of demand (by 2016) that is cost-effective when compared to the cost of the supply-side investment alternatives, and that (on average) the benefits exceed the costs of intervention by 3 to 4 times. This 6,437 GWh p.a and 1738 MW figures are termed economic electricity saving potentials.

For all sectors, lighting is identified as the sphere in which the economic potential from a change in the technology being used has the highest value. The KEMA study estimated an economic electricity savings potential of 1,883 GWh per annum from the adoption of higher efficiency lighting technologies and from improved lighting design and control.

For the commercial sector, in addition to 943 GWh per annum of savings potential from efficient lighting measures, KEMA identified 906 GWh per annum of economic electricity savings potential from opportunities related mainly to: refrigeration; office equipment management; heating, ventilation and air conditioning (HVAC) systems; and building management systems (BMS) optimization.

⁵ <http://www.electricitycommission.govt.nz/opdev/elec-efficiency/approach/potentials/index.html>

With respect to the industrial sector, the KEMA study identified economic savings potential of 1,955 GWh per annum (by 2016), with motor systems identified as offering 91% of that potential. The largest single area of industrial savings potential identified was for compressed air systems (38% of the industrial sector economic potential).

Overall, of the 6,437 GWh pa economic potential identified in the study, KEMA estimated that 819 GWh pa was achievable⁶ within 10 years through efficiency programmes that involve incentives (subsidies) averaging 33% of the cost of the incremental investment required for the more efficient solution.

While that figure of 33% incentive contribution has no direct link to the funding of efficiency programmes, it does provide the Commission with a guide as to the appropriate proportion of Commission funding in any particular programme.

5.2 SECTOR-SPECIFIC RESEARCH

COMPACT FLUORESCENT LIGHTING PILOT

Prior to completion of the KEMA potentials study, intuitively considerable savings were expected from replacing a 100W incandescent light bulb with a 20W compact fluorescent lamp (CFL). The barrier to change was the high upfront cost of the CFL relative to the incandescent bulb.

In 2005, a pilot programme was run in Christchurch to ascertain the level of subsidy required to induce a change in consumer behaviour patterns when purchasing light bulbs. The pilot was also used to understand the economics, in order to make a judgement as to whether or not a nation-wide CFL programme would be cost-effective.

The pilot results indicated that a realistic level of subsidy of CFL bulbs retail price (approx 20%) by the Commission would provide for a viable and economic nation-wide scheme. Consequently, the pilot provided the basis of the Commission's 2007-2009 CFL subsidy programmes.

ELECTRIC MOTORS EFFICIENCY STUDY

In 2006, the Commission also initiated a wide-ranging study of the efficiency of industrial motor systems⁷ in New Zealand. The study covered practices and opportunities associated with motor systems commissioning, maintenance, process optimization and the replacement versus repair decision.

In the light of the 2006 changes to the minimum energy performance standards (MEPS) for electric motors, the motor systems study focused particularly on the opportunity from accelerating the rate of replacement of the existing New Zealand in-service motor stock with motors that comply with the new MEPS specification for standard three-phase induction motors.

COMPRESSED AIR SYSTEMS STUDY

Also in 2006, the Commission funded a study into the source of electricity efficiency opportunities in compressed air systems (CAS), with the Fonterra Te Rapa plant providing a case study.

The key finding from this work was the extent to which electricity efficiency proved to be available from adoption of best practice management of the total CAS as opposed to the more common focus on the optimization of the supply-side only.

Electricity savings of 32% were achieved at the Te Rapa plant largely from changes in operating and maintenance practices, and a quarter of those savings achieved through the installation of a variable speed drive (VSD) compressor to more efficiently manage air demand variations.

In addition to the work with Fonterra, a survey was conducted of a number of compressed air using plants in the Waikato area. The information collected in that survey provided the basis

⁶ A subset of economic potential; achievable with a particular level of funding.

⁷ Refer <http://www.electricitycommission.govt.nz/opdev/elec-efficiency/programmes/industrial/electric-motors/efficiency>

for an assessment of the national CAS electricity efficiency opportunity. A figure of 200 GWh pa was estimated as the economic potential – closely matching the estimate of 230 GWh pa provided in the KEMA report.

The Commission also followed up the more technical research work on compressed air and electric motors, as described above, with a study on intervention options. The study analysed the existence of market failures, identified intervention options and assessed the extent to which each option would add economic value.

COMMERCIAL BUILDINGS STUDY

The Commission has also funded a study identify the market failures resulting in lower than efficient uptake of electricity efficiency initiatives in the commercial sector, and recommend programmes to address the identified failures.

At the heart of the analysis is a range of base technologies identified by KEMA. These are the existing electricity-consuming technologies installed in the commercial sector, such as lights, air conditioning and electronic equipment. Each base technology has a more efficient alternative, and the initial analysis compares each efficient technology with the base technology it seeks to replace, with a view to identifying the most cost-effective measures and interventions.

Nine commercial sector building types are distinguished in the analysis - offices, restaurants, retail, food stores (supermarkets etc.), schools (primary and secondary), tertiary educational institutions, hospitals, hotel / motels, and miscellaneous. This is so that differences in the use of base technologies, and differences in the scope for adopting new ones, can be accommodated. For instance, new refrigeration options will be far more important to food stores than to offices.

The study identifies the 40 most promising measures across all building types. These were selected on the basis of cost-benefit ratios and net present values. The study then identifies the most material measures - those that apply to relatively high base loads and therefore have the greatest potential to deliver energy savings.

6 CURRENT COMMISSION PROGRAMMES

Currently, the Commission is running a range of programmes - focusing on efficient lighting technologies, commercial building utilities and selected industrial technologies and processes. These programmes have an electricity savings target of 450 GWh per annum by 2010, with results to-date providing confidence that the NZEECS target for 2012 (837 GWh or 3 PJ p.a.) set for the Commission will be met.

The strong commercial focus in the programmes is accompanied by a focus on net national economic benefit (discussed earlier in this paper). The savings generated from all the programmes cost significantly less than the avoided cost of new generation – the costs range from 0.7c to 4.7c per kWh.

6.1 THE EFFICIENT LIGHTING PROGRAMME

Lighting is identified as the single biggest area of potential electricity savings. Whereas to-date the Commission has been most prominent in promoting the adoption of compact fluorescent lights, the focus is now on achieving the key objectives of the New Zealand Efficient Lighting Strategy (2008).

The strategy (developed by the Efficient Lighting Stakeholder Group) takes a holistic view of lighting efficiency in New Zealand, by focussing on areas such as lighting design and controls, halogen lighting and street lighting. Consequently, the Commission's efficient lighting programme involves tendering for programmes across all sectors of the New Zealand economy.

A tender in October 2008 resulted in selection of a number of multi-sector programmes for implementing efficient lighting technologies and design, and one targeted specifically at public streetlighting. It also resulted in the decision to develop an on-line lighting education and information resource.

A brief outline of the main active lighting projects follows.

The CFL programme:

The current 2008-09 CFL programme (run from the October 2007 RFP) commenced in June 08, with key contracts continuing to run through to 31 March 09.

In total, the 2008/09 CFL Programme is expected to subsidise 1.1 million CFLs by 31 March 2009 – bringing the total CFL's subsidised by the Commission to 4.5 million (providing annualised electricity savings of approximately 400 GWh) since 2005.

In conjunction with its CFL sales campaign, Phillips, (in partnership with the Ministry of Education) developed an energy saving education and activities kit for primary schools, to educate school children on ways to achieve energy savings in their homes.

Prior to the Government's decision to not proceed with the introduction of a compulsory MEPS for lighting⁸, the Commission was of the view that the 2008 CFL programme would be the Commission's last⁹. The elimination of incandescent bulbs from the market through the MEPS, would have raised the efficiency 'floor' and effectively removed the economic basis for a subsidy programme.

However, due to the decision to not proceed with the MEPS and the fall in the New Zealand dollar (the increasing cost of CFL's making them a less-attractive purchase for consumers on constrained budgets) the Commission has revisited its position, and has recently initiated a further 2009 CFL subsidy programme.

Lighting Efficiency Audit and Works Programme

The Commission has entered into an agreement with an electrical engineering company in Hamilton to carry out lighting audits of industrial sites in the North Island, followed by implementation of the cost-effective measures identified in the process.

The programme has targeted electricity savings of 9.6 GWh per annum, through measures that will include the installation of lighting sensors, controls and more efficient luminaires and fittings.

Individual projects are submitted for approval by the Commission at its discretion. For approved projects the Commission funds the cost of the audit and contributes up to 50% of the technology and implementation costs where the value of the measures is expected to meet the Commission's relevant investment criteria.

The contractor guarantees a minimum level of electricity savings which, if not met, may result in the Commission requiring repayment of all or part of its funding.

Commercial/Industrial Premises Lighting Programme

From the 2008 tender, the Commission has entered into an agreement under which the Commission will provide a subsidy for replacement of mercury vapour and metal halide lamps with high performance linear fluorescent luminaires, in commercial buildings.

The contract is for a 2 year period and the project is expected to deliver 11 GWh of annualised electricity savings.

In addition, negotiations are currently in progress with several other parties to undertake similar programmes with an emphasis on efficient halogen lighting technology.

⁸ A Minimum Energy Performance Standards (MEPS) for lighting which was previously scheduled to be introduced in October 2009

⁹ This was specified in the October 2008 Efficient Lighting RFP. The Commission stated that they would not be undertaking any subsidy programmes for any efficient alternatives to bulbs that would be removed under the upcoming MEPS

Online Lighting Education and Information Resource

The high up-front cost of many efficient lighting alternatives is undoubtedly a key barrier to uptake – and the Commission's programmes to date have been successful in delivering a significant chunk of savings at an economic cost. However, it is becoming clear that a lack of accurate, reliable, complete and timely information also represents a significant barrier to uptake.

Recently the Minister of Energy has also publicly commented on the need for good credible information about the choice of lighting options available to consumers, which would allow them to make more informed choices on lighting for their homes and businesses.

The Commission is currently in the process of developing an online education and information resource on efficient lighting - with 8 parties expected to provide significant (information technology, marketing and technical) input into the development and operation of the resource.

The online resource is aimed at residential, commercial and industrial lighting consumers, and the trades' people servicing those consumers. It will be an authoritative independent source for information on efficient technologies and design, and will offer interactive tools for visitors to calculate how to best maximise their savings through the use of efficient lighting.

The launch of the online resource will be accompanied by:

- a print and television media campaign to draw key markets to the site; and
- training and education programs.

The training material will support retail staff responsible for the sale of lighting technologies, as well as provide more in-depth education on efficient use and design of lighting run through accredited educational institutions and industry bodies.

Efficient Streetlighting Programme

The purpose of this programme is to increase the electricity efficiency of street lighting installations by:

- educating district and city councils on the features and benefits of new, more efficient streetlighting technologies; and
- equipping those councils with the tools they need to improve the efficiency of their existing networks and achieve best practice for all new developments.

The programme is designed to address some specific barriers to the uptake of efficient street lighting installations - including those relating to poor information, split incentives, procurement/regulatory policies and the focus on up-front capital cost.

Stage one involves the development of a comprehensive Street Lighting Resource Kit and a universal Infrastructure Design Standard (IDS).

The Resource Kit is intended to provide the councils with:

- information on available street lighting technologies; and
- resources to:
 - assess benefits of alternative technology options; and
 - develop street lighting policies that incorporate relevant electricity efficiency considerations, and
 - present robust business cases for network upgrades.

The IDS, which will set universal, standard specifications for new installations, will help ensure new installations deliver high quality light output while minimising electricity consumption.

The Resource Kit and IDS will ultimately be rolled out to councils across New Zealand by way of a structured promotion, education and training programme.

6.2 THE COMMERCIAL PROGRAMME

This programme (consisting of a number of sub-programmes) targets electricity efficiencies from equipment such as HVAC systems, refrigeration equipment, commercial lighting, and building management systems in office buildings, hospitals, tertiary institutions and food stores. The focus of the commercial programme is on the efficiency of the equipment and systems that influence the environment within the building, as distinct from the industrial programme which focuses on the (industrial) processes operating within that environment. However, the above does not represent a firm line of demarcation.

The commercial programme operates by contracting a number of service providers to undertake efficiency projects within Commission economic and budget criteria.

Commercial Audit and Works Programme

Under this programme, several service providers have been contracted by the Commission to work with larger commercial businesses to conduct energy and operational audits works to identify measures that will generate electricity savings and to oversee the implementation of the recommended measures.

Individual projects are submitted by service providers for approval by the Commission at its discretion. For approved projects the Commission funds the cost of the audit and contributes a portion of the technology and implementation costs (generally up to 50%), where the value of the measures planned for implementation meet the Commission's relevant investment criteria.

For each approved project, the service provider guarantees a set level (and minimum period) of electricity savings. If the guaranteed savings are not achieved, the service provider will be required to repay a pro-rata proportion of the Commission's financial contribution based on the extent of the shortfall in electricity savings. In this way the Commission has a high level of confidence that its contribution will achieve real electricity savings.

Projects approved so far cover measures such as chiller system upgrades, building management system optimisation, lighting replacements in office buildings and car parks, retrofitting of efficient technology into refrigeration systems, and upgrades to heating, ventilation and air conditioning systems.

Continual Commissioning Programme

This programme involves a service provider developing and implementing a continual commissioning management system in commercial buildings, to enhance the electricity efficiency of the building services and provided sustained electricity savings.

As with the 'audit and works' programme, the provider guarantees a minimum level of electricity savings on each project approved by the Commission.

Projects have been approved and implemented for several sites across New Zealand.

Monitoring and Targeting Project

A monitoring and targeting project has been initiated with a major banking organisation, to assist with identification of electricity efficiency opportunities on 170 bank sites nationwide.

The project involves the Commission funding the installation of electricity metering and monitoring equipment to identify the electricity efficiency opportunities, and assisting with the implementation of measures to achieve the savings target agreed as a result. The bank guarantees achievement (and maintenance for 3 years) of the savings target - with failure resulting in repayment of a proportion of the Commission's funding (based on the extent of the electricity savings shortfall).

Depending on the outcome of this project, a broader monitoring and targeting programme may be initiated.

EcoSmart Electricians programme

The Commission is providing funding to support the Electrical Contractor Association of New Zealand (ECANZ) EcoSmart Electricians Scheme.

The scheme involves training and accreditation of commercial electricians in energy efficient technologies and technology applications, thereby supporting the Commission's commercial electricity efficiency programmes. Refer: <http://www.ecosmartelectricians.org.nz/default.aspx>

6.3 THE INDUSTRIAL PROGRAMME

Information derived from the various studies and pilot projects has resulted in the industrial efficiency programme focussing on motors and motorized systems opportunities.

In particular, the electric motors efficiency study identified significant economic potential from increasing the rate of replacement of the existing (in-service) stock of three-phase induction motors, with ones that meet the 2006 minimum energy performance standard (MEPS 2006). And the KEMA study confirmed that compressed air systems should be 'first cab off the rank' in relation to improving motorised industrial processes.

A broad programme has been developed around improving the inherent efficiency of the New Zealand 3-phase motor stock. This includes a motor bounty scheme, a (one-off) MEPS-compliance testing study on new motors, a guide to assist businesses develop policies on motor replacement versus repair, and a quality scheme for motor rewind workshops. In total this package has a target of achieving 130 GWh pa electricity savings within 10 years.

In addition, the Compressed Air Systems Efficiency programme focuses on installing 'best practice design and operation' across New Zealand industry.

For the 2008-09 year it is expected that \$2.4 million will be spent on initiatives within the industrial programme.

Electric Motors Bounty Scheme

The findings from the motor systems study, lead the Commission to the conclusion that promotion of motor replacement over motor rewinding would be an economically-sound initiative.

The Electric Motors Bounty Scheme provides a mechanism to overcome the barriers that result in the uneconomic decision of favouring motor repair over replacement. The scheme was rolled-out to motor users nationally in early September 2008, and is expected to run for approximately two years.

In addition to subsidising the replacement of 120 MW¹⁰ of older low-efficiency motors with MEPS 2006-compliant motors by December 2009, a key objective of the bounty scheme is to raise awareness of the economics of motor repair/replacement decision.

Under the bounty scheme, motor users are paid a direct incentive (bounty payment) for the removal of lower-efficiency three-phase motors and their replacement in service with MEPS 2006 compliant motors. Full details of the scheme are available on the website www.motorbounty.co.nz

Baseline MEPS-compliance Testing

One of the risks to sustained savings from the motor bounty scheme is the prospect that new imported motors might not be compliant with the MEPS 2006 standard.

To better understand the extent the non-compliance risk, the Commission and EECA completed a 'baseline motor efficiency testing programme'¹¹ in which motors sampled from the warehouses of the main suppliers of new motors in New Zealand, were tested for MEPS compliance. EECA was contracted by the Commission to manage this project.

The results (and the message sent to the motor supply industry) were sufficiently encouraging for the Commission to proceed with the Motors Bounty Scheme.

¹⁰ This 120 MW is expected to contribute approximately 20 GWh pa electricity savings toward the 130 GWh pa target for the total motors programme.

¹¹ Refer <http://www.electricitycommission.govt.nz/opdev/elec-efficiency/programmes/industrial/electric-motors/MEPS>

Motor Rewind Workshop Quality Scheme

The largest perceived risk to the investment of accelerating the deployment of new MEPS-compliant motors is that when eventually the motor fails and requires rewinding, the rewind can result in excessive (unnecessarily high) loss of motor efficiency.

The lack of widely-accepted and practised rewind workshop quality system is considered to represent a threat to the value of MEPS for motors and the bounty scheme.

Consequently, the Commission has initiated the development of a Motor Rewind Workshop Quality scheme -to assist the rewind industry maintain the efficiency of repaired motors and give motor users confidence in those motor rewind workshops accredited under the scheme.

A Rewind Consultation Group has been formed to engage the rewind industry in the process and Telarc SAI Limited has been appointed to lead the development of the scheme.

Compressed Air Systems Efficiency Programme

The compressed air systems efficiency programme is intent on capturing electricity savings potential by:

- assisting the development of specialist CAS auditing skills to identify opportunities and solutions at a site-by-site level; and
- funding CAS audits on larger sites in return for commitments to action agreed cost-effective recommendations that emerge from the audits.

The development of 'total-system' CAS auditing skills within and beyond compressed air equipment supply industry is considered essential to improving the efficiency of compressed air systems in New Zealand. The current concentration of auditing skills in the compressor supply industry has resulted in a supply-side bias to corrective actions and sub-optimal electricity efficiency outcomes.

Under this programme, the Commission has facilitated the development of a CAS Auditor Accreditation Scheme, which involves each accredited auditor having his/her CAS auditing competency subjected to an independent assessment. A prerequisite to having a competency assessment is for the auditor to have satisfactorily completed a course in compressed air technology offered by the University of Waikato, and the assessment process is being managed by the Energy Management Association of New Zealand (EMANZ).

A further key aspect of the programme is that the Commission will fund in-depth CAS audits of larger industrial sites, in return for a commitment to action from the CAS user. On a case-by-case basis, the Commission may then also contribute to funding of CAS plant investments that implement identified cost-effective electricity efficiency investments.

Other Motor Systems Programmes

Motor replacement and compressed air systems optimization constitute approximately 43% of the electricity efficiency potential in the industrial sector (KEMA). Of the other 57%, over half is estimated to exist within technologies and processes relating to drives, pumps and fans.

A request for proposals (RFP) was issued by the Commission in November 2008, for programmes to identify and assist delivery of electricity savings from those other industrial motor systems.

Consequently, contracts have been signed with:

- Energy NZ Limited to case studies covering 13 different motor systems technology and/or process improvements. The importance of the case studies is to provide industrial consumers and their service providers with the confidence to embark on similar electricity efficiency projects – without Commission funding; and
- Demand Response Limited, for a programme of site motor systems studies linked to efficiency implementations. This programme has a target of 50 GWh annualised savings by March 2011.

7 OUTCOMES ACHIEVED

To date (December 2008) the Commission's programmes have realised around 430 GWh of electricity savings per annum. This is roughly equivalent to the annual electricity usage of 52,000 New Zealand homes, or a city of around the size of Rotorua. Also important is the reduction in demand at peak times – 190MW to date.

Valuing savings at the long run marginal cost of new generation (LRMC)¹², or put more simply, the estimation of the cost of building a new power station, the electricity savings realised by the Commission represent a \$250 million net present value to the New Zealand economy.

The cost of savings to the Commission is around 0.6c per kwh – well below LRMC.

¹² LRMC of 8.5c per kwh plus an allowance for reduction in peak demand.