

Document purpose:

This document is the result of the programme reviews EECA and MBIE conducted across EECA's programme portfolio in 2016. The reviews were in response to a requirement to reprioritise the EECA's portfolio in the context of the new NZEECS, the new EV programme, and expanded levy. The framework for the review is available [here](#).

The reviews were based on existing documentation and workshops with MBIE, PwC and EECA staff.

About Crown Loans

Crown Loans provides interest-free loans to public sector organisations for energy efficiency and renewable energy projects. Loans are repaid from the energy and maintenance cost savings.

Typical projects include lighting retrofits, heating and ventilation system upgrades, improved building management systems, pool heating upgrades and biomass boiler installations.

Total Crown Loan funding currently available is \$2 million per annum.

The key components of the programme are:

- reviewing proposals to ensure they are technically sound and meet funding criteria
- providing loans to public sector organisations

Conclusions

Crown Loans has been a low, but safe, investment to achieve the Government's objectives in the energy and climate areas; however, the role for government is unclear. The financial barrier is not well evidenced as it is Crown entities (e.g. district health boards and schools, which are able to borrow money commercially), that mainly take on Crown loans. Those that are restricted from borrowing money commercially by the *Public Finance Act 1989* (e.g. government departments) are generally not availing themselves of the loans.

Although the programme has been effective and represents good value-for-money, it has failed to achieve scale due to low awareness and low uptake. Further, the programme does not clearly identify its target market and the specific energy efficiency opportunities that could be realised – for example, the programme does not appear to distinguish between the types of expected benefits (e.g. energy efficiency versus carbon savings).

Crown Loans could act more like a tool to incentivise government leadership in energy efficiency and renewable energy. However, it is only one tool to demonstrate government leadership in the public sector. There are other ways to mandate change in the sector, such as through the use of NABERSNZ or targeting particular plant such as boilers. The programme is used as a tool in EECA's broader engagement with business through the Top 200/Next 1000 Programme (which also includes public sector organisations).

EECA has anecdotal evidence that there are policy impediments that restrict the ability of some public sector organisations to implement energy efficiency and renewable energy improvements. For example, there is a requirement for investment to be in the lowest capital expenditure option, and not be weighted for running costs (total cost of ownership) or greenhouse gas emissions. EECA has not investigated this to date.

Recommendations

It is recommended that EECA:

- consider the contribution Crown Loans can make to the opportunity for greater government leadership in the refreshed NZECS priorities
- review its understanding of the potential segmentation of the target market – to more clearly specify where the greatest potential public benefit lies
- consider “pivoting” the Crown Loans Programme to proactively target specific priorities, such as carbon-intensive heating processes, and ensure that any pivot is consistent with the broader Top 200/Next 1000 Programme (e.g. take a more direct engagement approach rather than passively receiving applications)
- recognise that programme measurement and monitoring will become more important to manage the higher risk profile from focusing on new priorities
- consider the use of case studies of the “demonstration effect” to increase diffusion across the public sector and potentially replicate interventions across the private sector

Re-targeting the programme, and increasing the profile of successful interventions, will incur additional costs to EECA – the question is whether this is worthwhile and cost-effective (noting that any funding would need to come from within baselines).

Further, EECA and the Ministry of Business, Innovation and Employment should evaluate whether there are more effective ways to stimulate energy efficiency and investment in the public sector, including whether there are any government policy impediments.

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1 The problem

1.1 The problem

EECA research ([the Customer Value Proposition – CVP – project](#)¹) suggests that the public sector is not realising high return energy efficiency opportunities despite the fact that they would result in immediate cost reductions. Based on research and experience in previous programmes, EECA estimates that businesses (including public sector organisations) could cost-effectively reduce their energy use by up to 20% per annum. Businesses and organisations are not making these reductions because:

- they do not know they could be saving more energy
- they do not know how to be more energy efficient
- they do not value or prioritise energy efficiency – other aspects of the business take priority
- there are perceptions that it is too hard and that they have to give something up to be energy efficient
- there are myths and misconceptions among businesses about how to be energy efficient
- there are limits on commercial borrowing for public service departments and non-public service departments

1.2 Why is it a problem?

The public sector uses 7% (38 PJ) of New Zealand's energy and produces 2.2% of New Zealand's total greenhouse gas emissions (and 5.9% of energy-related emissions).

More efficient use of energy in the public sector results in energy and maintenance cost savings and reduces New Zealand's greenhouse gas emissions. These savings are public benefits.

1.3 The programme

1.3.1 Origins

EECA's Crown Loans initiative began in 1989 under the name "Energy Management Loans". It was increased from \$1 million to \$2 million in 1993/94. As an intervention, Crown Loans has not changed in any material way since then.

1.3.2 Purpose

Crown Loans provides interest-free loans to public sector organisations for energy efficiency and renewable energy projects. Loans are repaid from the energy and maintenance cost savings. The projects must pay back in five years or less and have good demonstration value.

¹ The CVP project consisted of interviews with 26 large energy users about a third of which were from the public sector (e.g. district health boards[?]).

1.3.3 Key components

The key components of the programme are:

- reviewing proposals to ensure they are technically sound and meet funding criteria (see Appendix One for further information)
- providing loans to public sector organisations.

As part of providing the loans, EECA's administration role involves:

- loan management
- service provider and client liaison
- technical and financial review of the loan application
- limited marketing and promotion
- working with the public sector to facilitate preparation of proposals

A fee covers EECA's administration costs².

Typical projects include lighting retrofits, heating and ventilation system upgrades, improved building management systems, pool heating upgrades and biomass boiler installations. Total Crown Loan funding currently available is \$2 million per annum³.

1.4 Market characteristics

1.4.1 Public sector energy users

The public sector is a major owner of assets and a large energy user. EECA estimates it spends approximately \$400 million on energy annually, with over 50% of this energy spend from around 55 large energy users. This comprises local government, central government agencies, district health boards, schools and universities⁴. Of these, public service departments (e.g. MBIE) and non-public service departments (e.g. New Zealand Police) are restricted from borrowing money commercially by the *Public Finance Act 1989*. Crown entities (e.g. district health boards and schools) and local councils can borrow money commercially.

Larger public sector organisations generally have positive attitudes towards or are willing to adopt energy efficiency and renewables investments but don't generally use a business model that allows

² Loan fees are 10% for the first \$100,000 plus 6% thereafter to cover EECA's administrative and technical costs.

³ From Vote Business, Science and Innovation, non-departmental capital expenditure ("Crown Energy Efficiency" - this capital expenditure appropriation is limited to provision of funding for the Crown Loans Programme to assist public sector agencies to implement energy efficiency projects).

⁴ See [2015 Deloitte report, p.13](#).

them to do so (annual planning cycles mean there is less flexibility to take up projects that may have a short payback period, but have not been planned for).

Local councils

Local councils are some of the larger organisations that allow only a small discretionary budget or none at all. They generally do not include energy performance in their accountabilities and key performance indicators. They also do not reward budget improvements through energy efficiency. There is a perception that if energy is saved it will simply result in a lower budget the following year with no recognition of the positive impact these savings have generated. EECA suspects that the broad range of functions in these organisations also results in siloed behaviour that is difficult for a centralised energy management function to change. s 9(2)(g)(i)

District health boards

District health boards have their own unique situations limiting their action. Clinical investments are prioritised over the operational.

1.4.2 Energy management service providers

There are a small number of energy management service providers servicing large and medium energy using businesses. Service providers include energy managers, engineers, energy auditors, and energy technology specialists. They provide technical advice and deliver on energy efficiency projects in areas including energy audits, energy management planning, monitoring and targeting, motor systems, process heat, compressed air, and lighting.

Service providers range from large professional consulting firms to smaller companies. Most of the larger firms have an extensive commitment to energy efficiency and sustainability worldwide but struggle in New Zealand. The smaller firms face challenges to expand and extend the diversity of services provided.

The quality of consultants is variable. The CVP research showed that some consultants are viewed negatively by business due to:

- a perceived lack of independence
- a tendency to absorb in-house resources to get up to speed
- a tendency to struggle with a business' unique technical complexity
- poor engagement with in-house teams.

The market is dominated by technical specialists who can diagnose energy efficiency issues, generally engaging at an operational rather than corporate level. Engagement is also on an ad hoc basis, and energy management is often sold off the back of energy procurement and bill verification contracts. There are a small number of consultants who are adept at selling energy efficiency into senior levels of management based on strategic relationships and broader plans for improvement.

2 Strategic fit

The Crown Loans scheme is consistent with government initiatives such as the energy and climate area in the [Business Growth Agenda \(BGA\)](#). The BGA signals that New Zealand should “Improve energy efficiency and use of renewable energy to raise productivity, reduce carbon emissions and promote consumer choice” (Natural Resources Chapter, Focus Area 7).

It also fits clearly into the [New Zealand Energy Efficiency and Conservation Strategy \(NZECS\) 2011-16](#) which aims for “Greater value for money from the public sector through increased energy efficiency”.

[EECA's strategy](#) contains an objective to ensure that “government demonstrates leadership on fuel switching in government-owned facilities with high thermal energy use (e.g. hospitals, prisons, schools)”. In addition, the general business objectives of the strategy are considered to cover public sector energy use. This includes objectives related to improving industrial and commercial energy and carbon intensity.

3 Role for government

3.1 Market failures and barriers

3.1.1 Market failures

Lack of information and understanding

Market theory assumes all participants have perfect information, but this is rarely the case. Where participants lack information and understanding, there is a role for government in ensuring that they have the information they need to make informed decisions, and to assist them more directly when they lack capacity to deal with that information.

The value of government action in providing information is demonstrated by people altering their decision making and acting differently when provided with information. Since people have limited capacity to seek out information, in particular where they don't know they have information gaps (the “unknown unknowns”), government action is warranted to ensure people's choices are well-informed.

At a firm level, the information gap can be of different types:

- Actual lack of knowledge – not knowing energy efficiency represents an opportunity.
- Actual lack of understanding – not knowing how to achieve energy efficiency.
- Lack of motivation – believing energy efficiency to be too hard and/or not a priority.

3.1.2 Market barriers

Financial barrier

The main barrier addressed by Crown Loans is financial. Some public sector organisations are unable to take out commercial loans due to legislative restrictions (see Section 1.4.1). This limits their access to capital with which to invest in energy efficiency or renewable energy projects. While it is possible that funding for energy efficiency improvements could be incorporated into normal Treasury expenditure control systems, the public sector would not normally go to Treasury for an energy efficiency project as it does not necessarily constitute a major initiative consistent with key deliverables for that agency.

Risk aversion

Risk-aversion is an additional barrier. Senior management perceives high levels of risk, cost and effort to engage in energy efficiency opportunities compared with alternative priorities. The technical review of proposals (see Appendix One) as part of Crown Loans provides a level of certainty and risk-reduction that can reassure investors. Treasury would be unable to provide this as part of their normal expenditure controls.

3.2 Potential benefits

In the public sector, all costs and benefits are public.

Table 1: Potential benefits from Crown Loans

Primary public good benefits
<ul style="list-style-type: none">• Energy and maintenance cost savings• Avoided greenhouse gas emissions
Other public good benefits
<ul style="list-style-type: none">• Improved productivity and energy intensity• Reduced electricity peak load• Deferred investment in new energy generation and distribution• Improved air quality

3.3 Potential costs

When Crown Loans was first launched in 1989, public sector organisations had fewer options for funding energy efficiency improvements. Respondents interviewed during a 2015 review⁵ highlighted that “...if there is sufficient demand by a public sector organisation for funding it [the funding barrier] is no longer as significant a barrier as it was at the inception of the programme, because multiple funding sources are now available in the market. Other loans and energy efficiency products are gaining traction and market share, such as Westpac leasing arrangements, energy performance contracts and local government authorities funding their own schemes. Consequently,

⁵ [External review by Deloitte.](#)

the EECA Crown Loans Scheme is now required to compete with a wider range of alternative funding schemes.”

Given that the market has developed a number of new funding opportunities for the public sector, it is unlikely that Crown Loans is displacing ordinary market activity. However, as Crown Loans is competing with private funding, it is important that the programme targets and delivers the greatest potential public benefit.

4 Intervention

Crown Loans does not currently have an intervention logic diagram.⁶

4.1 Investment objectives

Crown Loans is intended to reduce public sector energy and maintenance costs, avoid greenhouse gas emissions and promote energy efficiency through demonstration projects.

EECA’s 2016/17 Statement of Performance Expectations states that the programme’s objective is to achieve expected annual energy efficiency savings worth at least 20% of the capital costs of the projects.

4.2 Options

It is unclear whether an options analysis was undertaken prior to the initiation of Crown Loans in 1989.

4.3 Potential impact

The public sector uses about 38 PJ of energy annually (7% of New Zealand’s total) which results in greenhouse gas emissions of about 1,790 ktCO₂e (2.2% of New Zealand total, including agriculture)⁷. EECA estimates that most public sector organisations can cost-effectively save 10-20% of their energy use. If all public sector organisations saved 10% it would equate to a reduction in greenhouse gas emissions of 179 ktCO₂e per year and public cost savings in the order of \$40 million per year⁸.

4.4 Market readiness

The tools and technology required to implement energy efficiency and renewable energy improvements are all proven commercially. A list of them can be found on the [EECA Business website](#); examples include LED lighting, heat recovery, and electronic building management systems. There are enough service providers that have the technical capability to implement all types of

⁶ One will be created as part of any redesign work.

⁷ [EECA analysis of the Energy End Use Database](#).

⁸ EECA estimates that the public sector spends \$400m on energy annually.

energy efficiency products. A list of service providers can also be found on the [EECA Business website](#)⁹.

4.5 Risks of failure

There is no up-to-date risk register for Crown Loans. The 2015 Deloitte review recommended establishing one.¹⁰

4.6 Interdependencies

Crown Loans is a funding mechanism delivered via the Top 200/Next 1000/SMEs Programme. The projects are delivered by industry professionals and through Top 200 energy management partnerships. Crown Loans complements other EECA tools and products such as NABERSNZ.

Crown Loans is available for [electric vehicle purchases](#), although it has not been targeted to this type of activity and there have been no applications for this purpose to date. The reasons for this are the same as the reasons for why the market has not taken up electric vehicles generally; this is explained separately in the [EV programme business case](#).

4.7 Resource allocation

Crown Loans has a Business Team FTE count of 0.25 (for administration) and an EECA Technical FTE count of 0.1 (for technical and financial review applications). These and other costs (e.g. promotion) are met by the Crown Loans administration fee (approximately \$140 per annum per loan). Current EECA resources are considered adequate and no changes are envisaged.

5 Performance

5.1 Effectiveness

5.1.1 Uptake

To date, EECA has allocated \$39.8 million in funding across 293 projects. The loans are mostly taken up by district health boards, councils, schools, universities and, to a lesser extent, central government agencies.

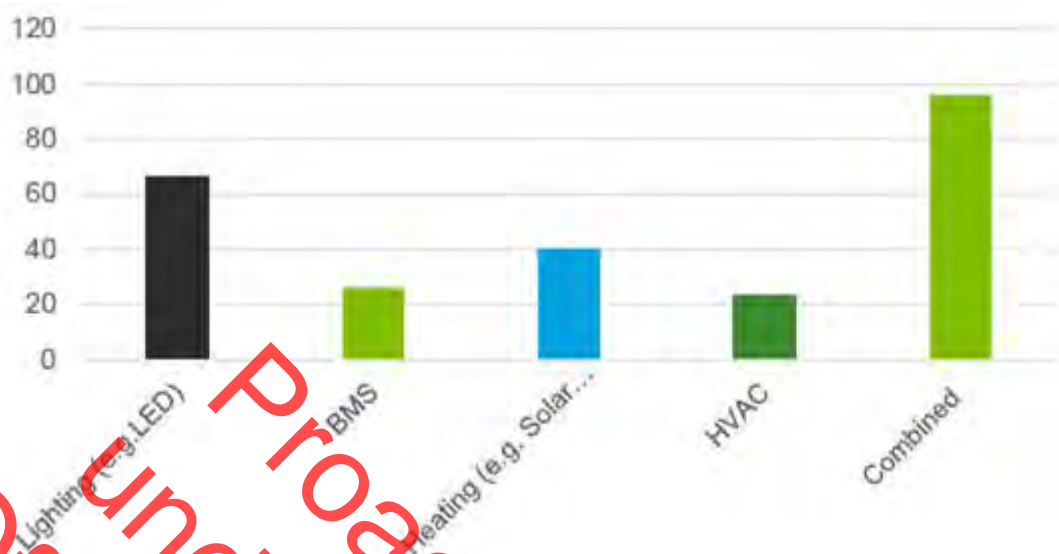
Across New Zealand, since 1999, the loans have been utilised in the main centres. Larger value loans have gone to the district health boards in Otago, Wellington, and Palmerston North.

The most common type of energy efficiency project has been classified as a “combined” type project, e.g. heating and lighting upgrades (Figure 1).

⁹ Please note the web tool in the link is in the final stages of being built and is not completely functional yet.

¹⁰ [External review by Deloitte](#).

Figure 1: Number and type of projects under Crown Loans over the last 25 years



5.1.2 Recent evaluation findings

In 2015, Deloitte undertook a review of Crown Loans¹¹. Deloitte's review included interviews with 27 end users and service providers involved in Crown Loans. The review made the following conclusions:

- Considering the size of the public sector, uptake could be better. The programme has a low profile and is not widely recognised. Identified barriers to uptake included the payback period restriction, the administration fees, and lack of awareness of the loans.
- Resource constraints have prevented EECA from monitoring project outcomes in a systematic way and this has impacted on the ability to report on benefits.
- Crown Loans has not explicitly adapted to the introduction of other loan products and services entering the market.

The review recommended that EECA:

- revisit the business case and strategic objectives to ensure Crown Loans is targeted appropriately (including an exit strategy)
- develop a business plan and update it annually
- consider additional performance measures, taking into account the benefits of different sizes of projects, project types, and whether recipients have received a loan before
- actively monitor and report on project-specific benefits and outcomes
- develop and publicise more recent case studies to help promote energy efficiency across the public sector

¹¹ [External review by Deloitte.](#)

- consider changes to the Crown Loans structure, including increasing the funding allocation, enabling longer payback periods and different funding models that will allow optimal and sustainable administration charges
- develop a stakeholder engagement plan to improve awareness of Crown Loans amongst the right audience

5.2 Achieved benefits

Benefits accrued through Crown Loans from 2013/2014 to the end of the 2015/16 financial year¹² are shown in Table 2. The greenhouse gas emissions avoided are estimated to be 0.2% of total public sector emissions¹³.

Table 2: Estimated benefits for expenditure from 2014

Benefit	Beneficiary	Public or private goods	Value
Energy/maintenance cost savings	New Zealanders	Public	\$18.2 million since 2014, assuming an average 15 year life of savings
Avoided greenhouse gas emissions	New Zealanders	Public	76.4 ktCO ₂ e since 2014, assuming an average 15 year life of savings

5.3 Value-for-money

A cost-benefit analysis¹⁴ was conducted to assess the quantifiable outcomes of EECA's Crown Loans from 2013/2014 to the end of the 2015/16 financial year¹⁵. The net present value of the programme is \$5.8 million for loans granted in 2013/14 to 2015/16 based on the fuel savings and costs contained in the applicants' proposals. This corresponds to a benefit to cost ratio of 2.5:1. A summary is provided in Table 3. Note that resource constraints have prevented EECA from monitoring project outcomes in a systematic way, restricting the ability to report on actual benefits.

This analysis assumes a 15 year average life for fuel savings, which is considered appropriately conservative as some projects, such as solar heating, may provide benefits for up to 30 years. The rest of the assumptions used in this analysis are included in Appendix Two.

Table 3: Summary outcome of cost-benefit analysis

Metric	Description	Value	Comment
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¹² This timeframe is consistent with the Top 200 and Next 1000 CBAs.

¹³ Assuming total emissions are 1,790 ktCO₂e p.a. and Crown Loans saves an average of 3.5 kt CO₂e annually.

¹⁴ Full CBA spreadsheet available [here](#).

¹⁵ This timeframe is consistent with the Top 200 and Next 1000 CBAs.

Net Present Value (2016 value)		\$5.8m	Based on the fuel savings and costs contained in the applicants' proposals
Benefit-cost ratio	Present value (PV) all benefits/PV all costs	2.5:1	
ROI-Government	PV public (government) benefits/PV public (government) costs	2.5:1	As all costs and benefits fall within the public sector, the public benefit to public cost ratio will be the same

Despite no ex-post determination of the energy savings arising from the programme, a relatively high level of confidence can be placed on the outcome of this analysis. This is because the costs and benefits were extracted from detailed loan proposals for specific projects, providing a good degree of data granularity. Further, each loan project, prior to approval, has been subjected to a detailed review by EECA's technical staff and a preliminary financial and economic analysis.

5.4 Programme future

Crown Loans is planned to continue with similar performance expected.

EECA has taken, or is planning to take, the below actions following the Deloitte review¹⁶:

- Increase promotion of the scheme through case studies targeting specific opportunities within the public sector.
- Consider an incentive-based scheme for reporting actual energy savings; e.g. rebate of administration fees based on case studies being completed.
- Increase alignment of the scheme with other EECA business engagements, e.g. partnerships with the Top 200 energy users, NABERSNZ, and the uptake of electric vehicles within the public sector.
- Increase alignment of Crown Loans with other funding models, such as 'lease' arrangements for energy equipment and energy performance contracts that guarantee the energy performance of equipment.
- Consider potential areas for changing the funding structure of the scheme, including a larger funding allocation (Cabinet approval would be required), longer payback periods for larger energy efficiency projects, and revising the administration fee.

6 Lead organisation

¹⁶ [Agenda Item 19 Crown Loans Review December 2015.docx](#)

The power of EECA to administer Crown Loans is directly provided in the *Energy Efficiency and Conservation Act 2000*. Section 22 provides EECA with the power to “make grants, awards, or loans of money” “enter into agreements for the administration of grants.”

EECA has proven performance in Crown Loans administration. It has excellent sector connections with its account manager function, it is the government centre of excellence for energy efficiency services, and with its other programmes it offers a ‘one stop shop’ for public agencies wanting to invest in energy efficiency.

7 Conclusions

Crown Loans has been a low, but safe, investment to achieve the Government’s objectives in the energy and climate areas; however, the role for government is unclear. The financial barrier is not well evidenced as it is Crown entities (e.g. district health boards and schools, which are able to borrow money commercially), that mainly take on Crown loans. Those that are restricted from borrowing money commercially by the *Public Finance Act 1989* (e.g. government departments) are generally not availing themselves of the loans.

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8 Recommendations

It is recommended that EECA:

- consider the contribution Crown Loans can make to the opportunity for greater government leadership in the refreshed NZECS priorities

- review its understanding of the potential segmentation of the target market – to more clearly specify where the greatest potential public benefit lies
- consider “pivoting” the Crown Loans Programme to proactively target specific priorities, such as carbon-intensive heating processes, and ensure that any pivot is consistent with the broader Top 200/Next 1000 Programme (e.g. take a more direct engagement approach rather than passively receiving applications)
- recognise that programme measurement and monitoring will become more important to manage the higher risk profile from focusing on new priorities
- consider the use of case studies or the “demonstration effect” to increase diffusion across the public sector and potentially replicate interventions across the private sector

Re-targeting the programme, and increasing the profile of successful interventions, will incur additional costs to EECA – the question is whether this is worthwhile and cost-effective (noting that any funding would need to come from within baselines).

Further, EECA and the Ministry of Business, Innovation and Employment should evaluate whether there are more effective ways to stimulate energy efficiency and investment in the public sector, including whether there are any government policy impediments.

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9 Appendices

9.1 Appendix One – Crown Loans application process

The following steps occur for a Crown Loan application:

1. Individual projects are developed by energy management service providers working in conjunction with public sector agencies. EECA may or may not have a role in facilitating these projects.
2. Crown Loan proposals are submitted to EECA for approval. There are two to three funding rounds per year.
3. EECA reviews the proposals and, where required, works with the energy management service provider and public sector agency to ensure a project meets our financial thresholds and technical standards (not all projects advance). The following factors are considered by EECA:
 - Simple payback, i.e. the project's cost effectiveness (this can include other cost savings such as maintenance).
 - CO₂ emission reductions.
 - Contribution of renewable energy, i.e. energy saved or displaced with renewable energy over the project life.
 - The ability of the project to be an exemplar for replication within both the public and private sectors.
 - Co-benefits (such as improved working environment, health, and industry development).
 - Whether the project could be funded from other sources.
4. EECA approves proposals that meet funding criteria
5. EECA enters into a contractual relationship with the public sector organisation

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9.2 Appendix Two – Assumptions for cost-benefit analysis

The general assumptions applied were:

- EECA costs include all direct internal costs but not the general EECA overheads allocated to the programme.
- All third party capital and operating costs, whether actual or estimated, are included. These costs include the capital expenditure covered by the Crown loan and any associated operating cost savings.
- Future benefits accruing from loans granted up to year end 2015/16 are included.
- As all the parties under the Crown loan are by definition public sector agencies, all costs and benefits associated with the programme are deemed to be public.
- Fees charged by EECA for processing the loans are excluded as these are internal transfers.
- Cash flows are expressed in NZ\$2016 discounted at the default Treasury rate of 7%.

Specific inputs used in the review of Crown Loans:

- EECA direct costs are taken from EECA's financial records.
- Third party costs, including project capital and operating costs, are taken from the proposals submitted to EECA by the loan recipient. These contain a detailed technical description and are subject to detailed scrutiny by EECA. Whilst EECA does not follow up with an ex-post review of the projects, the level of detail contained in the proposals provides a relatively high level of confidence in the projects costs.
- The principal quantifiable benefit is the reduction in fuel consumption by the client companies. As with project costs, estimated energy savings are subject to scrutiny by EECA prior to loan approval but not audited ex-post. Each project proposal is subjected to a routine cost-benefit analysis.
- Reduced carbon dioxide emissions can be directly associated with the fuel savings. This is a public benefit.
- Fuel savings arising from the programme are assumed to continue for fifteen years as this information is generally not contained in the loan proposals. Whilst the programme includes a range of project activities, all involve capital expenditure which usually results in an extended period of benefits
- MBIE's price monitors have been used for deriving economic prices for fuels. Market prices have been used for fuels not included in the monitors and all future prices are maintained at the 2016 level. Carbon dioxide prices are set at the average value of a NZU in each year of the programme and valued at \$25 per tonne thereafter.