Improving Industrial Energy Efficiency: how Australia is addressing barriers to change among the country's largest energy users

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ABSTRACT

The Australian Government introduced the Energy Efficiency Opportunities program in 2006 to drive change in the way the nation's largest energy users understand, manage and invest in energy efficiency projects. The 230 plus corporations registered in the program are responsible for 45 per cent of Australia's energy end use and emit 30 per cent of Australia's greenhouse gas emissions. Their energy efficiency performance is critical to improving Australia's energy productivity and reducing its carbon intensity. This paper outlines the way Energy Efficiency Opportunities is addressing organisational and information barriers to change that have persisted within the large energy-using companies. It outlines the evaluation strategy for the program and presents the findings of the Phase 1 Early Evaluation, preliminary results of the Phase 2 Mid Cycle Review, and the energy efficiency results being reported to government by the corporations. The evaluations reveal a marked improvement in the systems and processes that the corporations are using to examine their energy efficiency and show the businesses are identifying and implementing a significant level of energy savings. The paper examines aspects of the program that corporations believe are not as successful at driving change as expected and points to areas being further examined in the Mid Cycle Review to determine the success of the program in delivering its goals. The program to date is revealing the substantial energy, financial and carbon abatement benefits that can arise from improving the energy efficiency of large energy users.

Introduction

Industrial energy use makes up a significant and growing proportion of Australia's energy use and energy-related greenhouse gas emissions. As an energy and resource-rich nation, Australia faces major challenges in both meeting the growing global demand for energy and resources, while also managing its own transformation to a low-carbon economy in a new carbon-constrained international environment. The Energy Efficiency Opportunities program was announced by the Australian Government in 2004, with legislation coming into effect in 2006, as part of a package of measures to meet these twin energy and climate change challenges. It was the first time a regulatory measure had been enacted to require the industrial sector to consider the potential for, and report on, its energy use and energy efficiency. Australia's goal is to reduce unnecessary demand on energy and its energy infrastructure, constrain growth in greenhouse gas emissions, and do so in a way that enhances the growth and competitiveness of an economy that is highly resource based and export oriented.

The potential gains to be made from energy efficiency are clear: it is a low-cost means of reducing demand for energy and greenhouse emissions that offers great improvements in business productivity. The IEA predicts that energy efficiency measures have the potential to contribute to more than the 50 per cent of the reductions in energy-related emission needed by 2030 (Tanaka 2009), making accelerated progress in energy efficiency indispensable. In addition energy efficiency offers this potential in the short to medium term while strategies to reduce the carbon intensity of the world's energy supply come to fruition.

The potential offered by energy efficiency in Australia is even greater when the structure and energy profile of Australia's economy is taken into account. The 230 plus businesses covered by the Energy Efficiency Opportunities legislation account for nearly one-third (31 per cent) of Australia's total energy consumption and almost two-thirds (62 per cent) of the energy consumed by all

Australian businesses, as shown in Figure 1. The energy use of these corporations is more than the energy used to generate all of Australia's electricity. Much of the energy use of these top consumers is used in the manufacturing and mining sectors by a handful of corporations. Just 20 of the top energy using corporations participating in the program use just as much energy as that consumed by all of Australia's households, including household transport. Given the magnitude of their energy use, these corporations are critically important to energy efficiency performance and the future demand profile for Australian energy. For the company themselves, any improvement in energy productivity can deliver significant business benefits including reduced energy and other business costs and lower greenhouse gas emissions, helping them to prepare for a carbon-constrained economy.

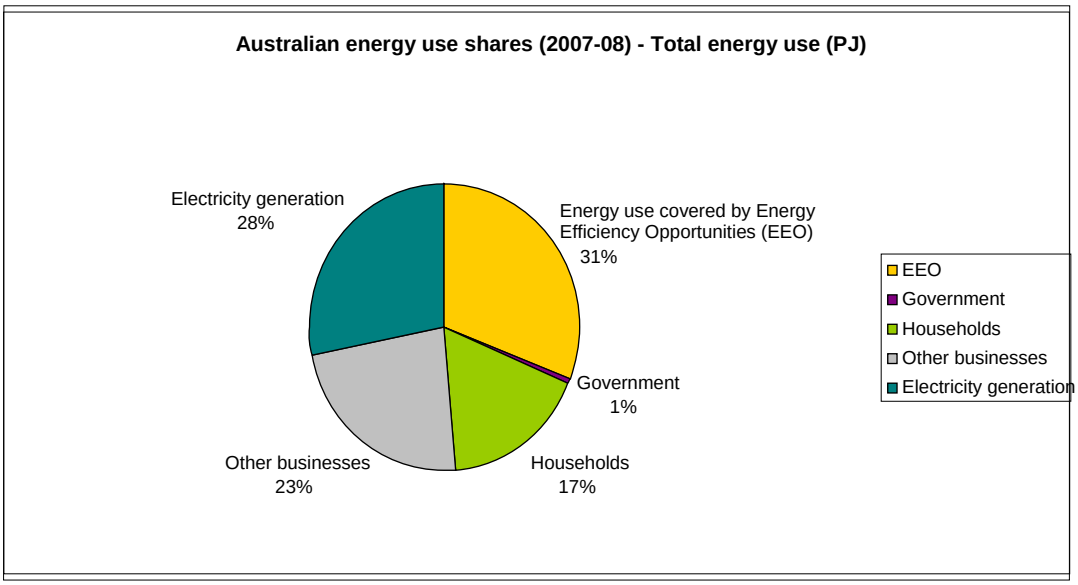


Figure 1. Energy use of EEO corporations relative to other major sectors

This paper outlines how Energy Efficiency Opportunities seeks to improve the energy efficiency performance of the major energy-using businesses. It examines the long-standing barriers that have been impeding energy efficiency improvements and looks at the way the program's framework addresses these barriers. Both qualitative and quantitative evaluation of the effectiveness of the program has been built into the program's design and timetable, with a series of evaluation milestones scheduled through the program's cycle. The three phases of evaluation are the Phase 1 Internal Evaluation, which was completed in May 2008; the Phase 2 Mid Cycle Review, an external evaluation for which the Department of Resources, Energy and Tourism has preliminary results, and the Phase 3 Full Evaluation which is to be completed after the end of the program's first five-year cycle in 2011. The first results of energy efficiency assessments reported by the corporations to government in 2008 have also been analysed and published, with the main findings presented in this paper. This paper argues the application of the Assessment Framework for Energy Efficiency Opportunities is assisting in achieving organisational change, while corporations participating in the program are identifying significant energy savings.

Barriers to change and design of the program

Energy Efficiency Opportunities aims to encourage large energy users to better identify and evaluate their cost-effective energy efficiency opportunities so as to encourage greater implementation. Energy efficiency opportunities are projects identified through an assessment that will improve energy usage either through producing a greater amount of product for the same level of energy, or the same product for reduced energy usage. All businesses that consume more than 0.5

petajoules (PJ) of energy a year are required by legislation to participate in the program (RET 2006). Half a petajoule is equivalent to an electricity bill of $A6 million to $A11 million a year or the energy needs of 10,000 Australian households. Participating companies must submit an Assessment and Reporting Schedule, undertake a rigorous and comprehensive assessment of their energy efficiency to an improved regulated standard, and report on the results of their assessments and their business response, i.e., whether they will implement the opportunities that have been identified. The final decision on whether to proceed with implementation is not mandated: it rests with the business. The participants report opportunities that have a payback period of four years or less, but may voluntarily report projects with longer payback periods. The corporations are required to report the results of their assessments internally to their board and externally to government and the public, with the aim of encouraging the businesses to implement more energy efficiency projects.

The program operates on a five-year cycle, with the first running from 2006 to 2011. As of May 2010, over 230 corporations covering more than 1,000 business entities operating in the manufacturing, mining, transport and services sectors have registered with the program. The first tranche of 199 corporations that registered in the first trigger year of 2005-06 have completed their assessments and they reported to government and the public at the end of 2008 and 2009. A verification program started in early 2010, which involves desk-top verifications of all corporations followed by 20 site visits a year of both randomly selected corporations and those at high and medium risk of non-compliance. The verification will assess whether the businesses have met the key requirements of the Assessment Framework and reported accurately on their findings and business response.

The department undertook extensive consultations with industry members to identify why their businesses might not be managing energy effectively or implementing projects. The department found that while energy was *important*, it was not *urgent*. With the exception of the most energy-intensive of businesses, many of the corporations focused resources and capital on growing their business not on managing energy. For them, energy was often poorly understood and considered to be a lower priority, particularly during periods of high economic growth. The consultations highlighted a wide range of barriers persisted in constraining companies from taking action on energy efficiency. The barriers comprised poor data and associated information on energy issues within the company, limited knowledge and skills of staff which prevented proper analysis of often-complex energy issues, lack of leadership and senior management attention on energy as a company priority, and a narrow approach to energy as an operational, cost issue rather than an area that could have an impact on overall business performance.

Many of the barriers to change combined to keep energy off the company agenda and restrict project implementation. For instance, low-quality or limited data collection meant it was difficult to establish a business case for improved energy efficiency, so that projects were unlikely to be implemented or even presented to company decision makers. An old-fashioned audit mentality also surrounded energy efficiency, so that people perceived energy efficiency as an exercise in getting equipment to run properly, rather than looking at energy as part of a broader system. The industry feedback and government experience of earlier programs to improve business energy efficiency highlighted that Energy Efficiency Opportunities needed to tackle energy efficiency as an information and organisational challenge, one that required capacity building and long-term cultural change as much as mandated steps on energy management. Put simply, the program needed to achieve fundamental change in the way large energy users understood and managed their energy.

The program's Assessment Framework was subsequently developed to address these barriers and achieve a change in the way corporations approached energy efficiency. The framework, which corporations must use to assess their energy use and identify energy savings opportunities, has six Key Elements. Each of these elements has specific Key Requirements that the corporations must meet as part of their participation in the program (RET 2006: 42-50). The Key Elements comprise:

- **Leadership** – managers must set and communicate energy use objectives and allocate the necessary people, time and money,

- **People** – staff with the necessary authority and energy expertise need to be assigned from across the business, and given defined roles and responsibilities,
- **Information, data and analysis** – data measurement systems and analytical techniques must be used so that energy use can be properly understood,
- **Identification and evaluation** – effective processes must be used to analyse the costs and benefits of opportunities from a whole-of-business perspective,
- **Decision making** – the results of energy assessments must be considered by senior decision makers, with timing and implementation clearly defined, and
- **Communicating outcomes –** results must also be communicated to the corporation's board, employees and the wider community.

Evaluation strategy for the program

A strategy for evaluating the success of Energy Efficiency Opportunities in achieving its outcomes was developed as part of the program's management plan. The "object" of the Energy Efficiency Opportunities Act (2006) is "to improve the identification and evaluation of energy efficiency opportunities by large energy using businesses and as a result to encourage implementation of cost effective energy efficiency opportunities." In evaluating that outcome, several questions need to be answered: What has been the impact of the legislation on the knowledge, processes and systems corporations have in place to minimise and manage energy use? What barriers have been addressed and which ones remain? And what has been the subsequent impact of energy assessments and reporting on improved identification and adoption of cost-effective energy efficiency opportunities?

The two components of the evaluation strategy are measuring first, the effectiveness and second, the efficiency of the program; both of these have performance indicators developed to measure them. *Effectiveness* is a measure of how well the program outcomes are achieving the program objectives. The areas of program effectiveness are:

- Level of participation in the program by qualifying corporations,
- Improvement in the way energy is used;
- Improvement in the identification of energy efficiency opportunities,
- Improvement in the implementation of energy efficiency opportunities, and
- Savings in energy (and related greenhouse gas emissions) and achievement of net financial benefits as a result of actions introduced as part of participation in the program.

Efficiency is a measure of the extent to which the program outputs are maximised for a given level of inputs. Outputs for the program include items such as program guidelines and procedures, stakeholder communications such as website, newsletter and information sessions, capacity building for participants including workshops, training and guides. The areas for evaluating the efficiency of these outputs are:

- Achievement of project milestones,
- Key stakeholder satisfaction, and
- Effective communication of program goals and results.

The evaluation of the program is divided into three phases; these have been built into the steps that corporations must follow over the program's five-year cycle, as shown in Figure 2. The corporations are required to provide government with detailed data three times during the assessment cycle: at the time they submit their Assessment Reporting Schedule, half-way through the cycle, and at the end of the cycle. The data is aggregated and analysed during the course of the five years. This enables the department to collect, track and measure the change in energy use, energy efficiency, energy assessment processes and systems and the resulting energy savings driven through the program. The three phases of evaluation are listed below.

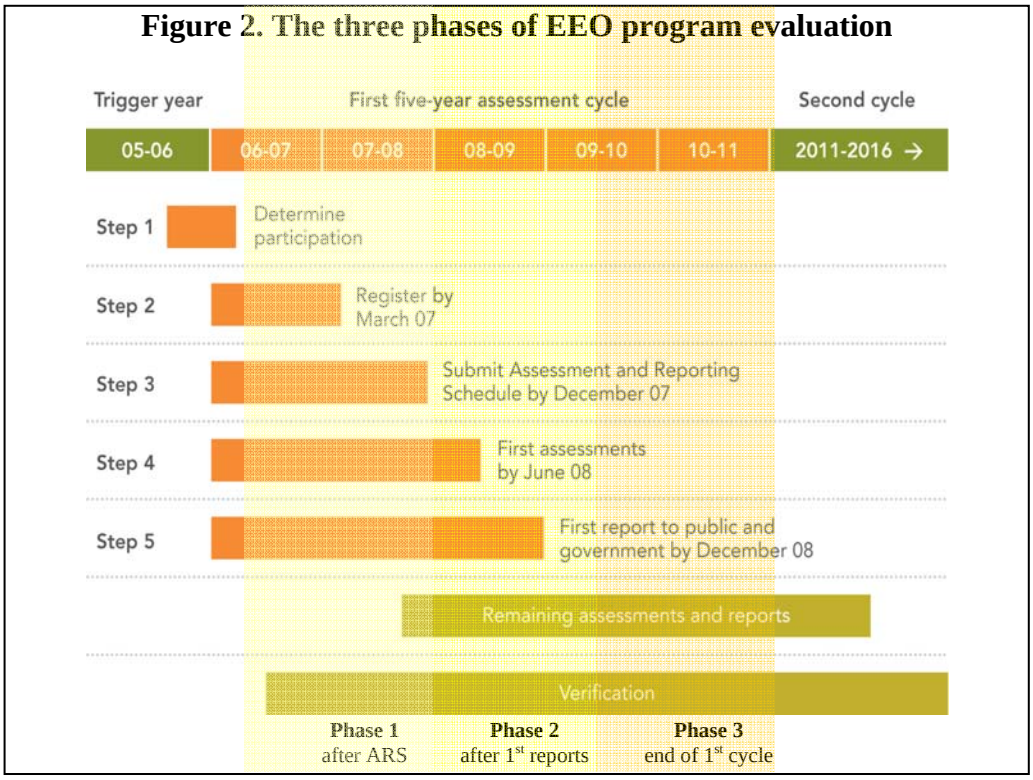
Phase 1. Early Evaluation. This phase measures participation in the program by qualifying corporations, early engagement in the five steps of the program cycle, and early signs of

organisational change. The Early Evaluation was conducted internally in early 2008, 18 months after the start of the program. At this stage corporations were required to report on their existing systems and processes to manage energy use and identify energy efficiency opportunities and the actions they intended to take to meet the program's assessment requirements.

Phase 2. Mid Cycle Review and Corporation Results. The review provides a provisional assessment and reporting on the program with a focus on potential for energy savings, and the organisational change and development of capability that is starting to occur within industry. Conducted by external consultants, the review involves the collection and analysis of both qualitative and quantitative data. The review started in early 2010, three and a half years after program commencement, and is close to completion. The mid cycle information includes the results of assessments reported by the corporations in 2008 and 2009, providing an early indication of their progress in achieving program outcomes. Case studies of company performance, evaluations of workshops, and views of industry members on the program also contribute mid cycle to provide a picture of program performance.

Phase 3. **Full Evaluation.** The final evaluation presents an evaluation of the program together with completed reporting of results by corporations, enabling an estimate of actual energy savings made as a result of program participation. This encompasses the verification of the program under which all corporations complete a verification checklist by 2011 and then 60 businesses are subject to an independent verification. The full evaluation will be completed by 2012, after the program's first cycle ends.

Figure 2. The three phases of EEO program evaluation



Evaluation Findings: Phase 1 Early Evaluation

The early evaluation was conducted internally by the Department of Resources, Energy and Tourism using the information and data provided to government by the first tranche of 199 corporations in their Assessment and Reporting Schedules. The department measured the participation of the corporations in the program and their level of energy use. The energy use figures and numbers of businesses were found to correlate with the estimates of energy use that had been provided by the large energy users in earlier national statistical surveys (ABS 2001). The energy

consumption also confirmed that those that had registered with the program were required to participate under the legislation i.e., their energy use was above 0.5 PJ per year.

The early evaluation also measured the corporations' intentions to improve their existing systems and processes, or introduce new policies or practices, to meet the requirements of the Assessment Framework. Most recognised they needed to make major or moderate changes, as seen in Figure 3. Almost half (46 per cent) expected a major level of change and 33 per cent moderate change. Only 20 per cent believed they would only require minor change. The highest expectation for change was recorded in communications, where 60 per cent predicted major change would occur. Moderate change was also forecast in the leadership and information requirements, and data and analysis. The latter finding on data, however, conflicted with anecdotal evidence and earlier government program experience. This led to the department placing a stronger focus on data and analysis requirements in subsequent capacity-building workshops and program information materials.

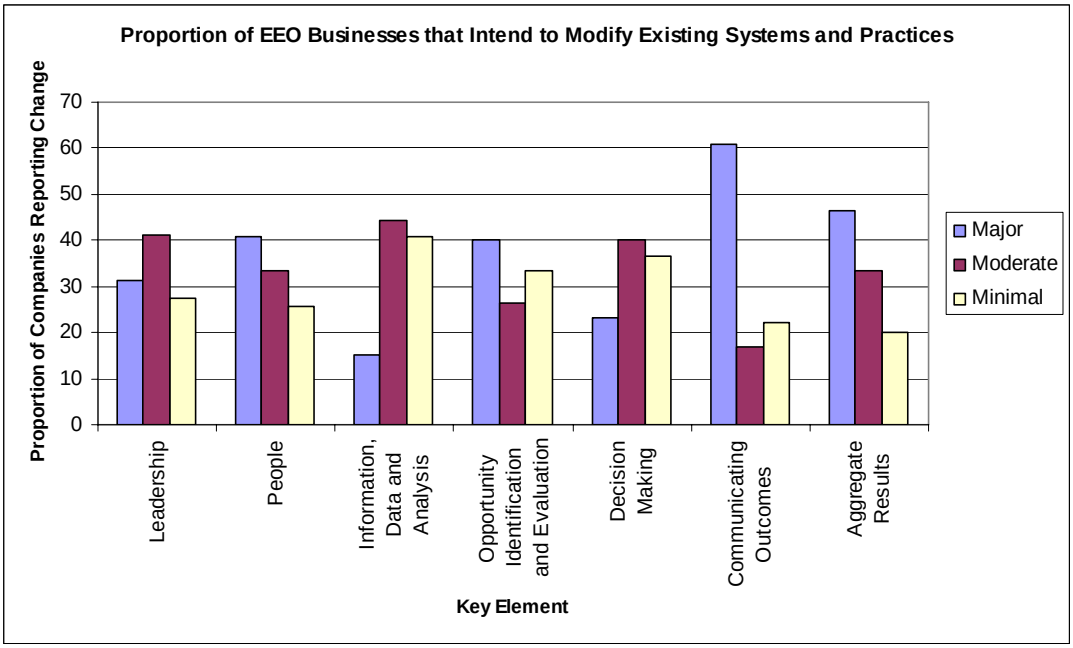


Figure 3. Proportion of corporations intending to change systems and practices

Evaluation Findings: Phase 2 Mid Cycle Review

The Mid Cycle Review has been conducted by external consultants to measure the impact of the program's assessment and reporting requirements, the effectiveness of the communication and capacity-building activities, and provide an update on the perceptions of barriers to improved energy efficiency. The consultants gathered quantitative data through an online survey of 211 corporations and qualitative data through 37 interviews with coordinating managers within 25 corporations and relevant people in the energy services and finance sectors. The survey attracted responses from 104 corporations, representing around half (49 per cent) of participants who accounted for 46 per cent of program energy use. The respondents broadly represented the profile of the corporations registered with the program.

The consultants' review has been supplemented by information gathered in workshops with participants, workshop evaluations, case studies and feedback from industry members (RET 2008). Comments by participants in the online surveys, interviews and departmental work are used below to illustrate the data findings. The findings are described below according to the Key Elements in the Assessment Framework.

Leadership and Accountability

The key element of Leadership requires senior and operational managers to provide direction and resources for the conduct of energy assessments. Almost half (46 per cent) of respondents said their energy efficiency objectives had changed through leadership direction, with 77 per cent of corporations indicating they now had clear objectives to improve energy efficiency. The relative priority given to energy management, and the level of accountability given within the organisation, had also changed. Nearly a third of respondents indicated there was no leadership or accountability for energy management prior to their registration, with half assigning energy management as a part-time function (see Figure 4).

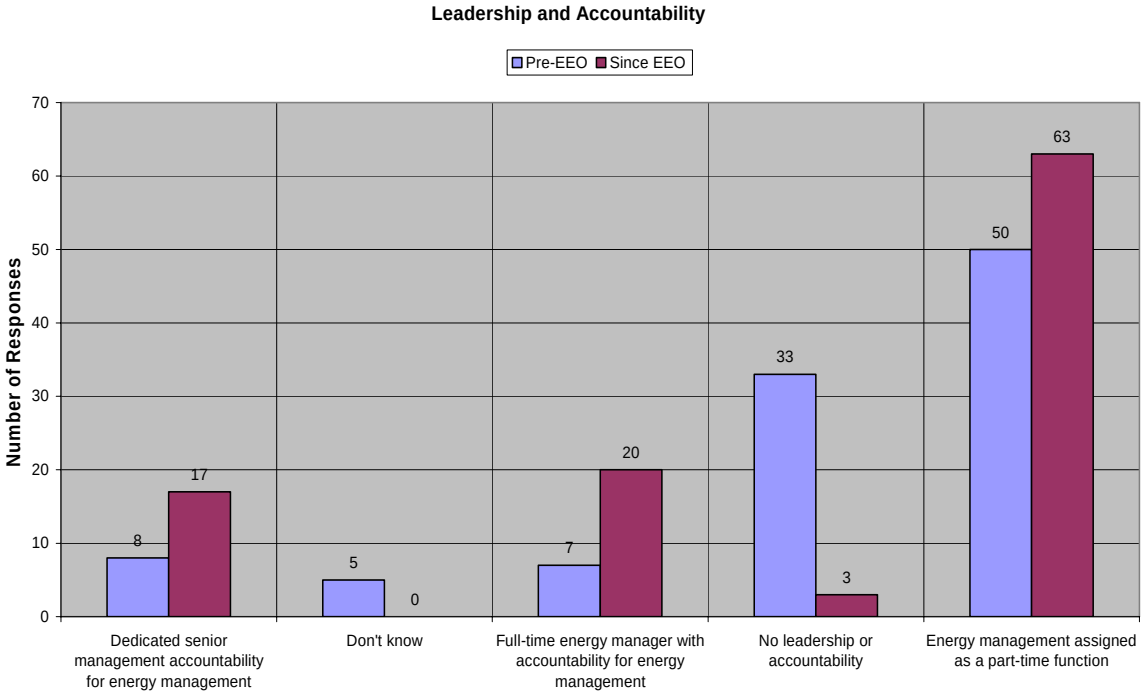


Figure 4. Leadership and accountability impact of participation in EEO

Prior to participation, only 6.8 per cent had a full-time energy manager and 7.8 per cent senior management accountability. However, the number of corporations with senior management accountability has doubled since participation, and those with full-time energy managers tripled. Only three corporations indicated they did not have any leadership or accountability for energy management. Most respondents reported they now had energy management assigned as a part-time function.

The importance of leadership in conducting rigorous energy efficiency assessments was also highlighted by respondents when around a third initially indicated that lack of interest or support from senior management was a barrier to the identification of opportunities, and 24 per cent said it was a barrier to implementation of opportunities. Following participation in the program, 12 per cent thought this was a barrier to identification and less than 5 per cent to implementation. Nine out of 10 respondents nominated leadership support as important or somewhat important in the Assessment Framework.

People and Opportunity Identification

The People element requires a mix of skilled and influential people to be involved in identifying and implementing the energy efficiency opportunities. Prior to the program, 52

respondents said their business had no single point for energy management and 15 had no energy staff or support (Figure 5). After participation, the corporations either allocated responsibility for energy issues in a single department's broader responsibilities – from 27 to 47 corporations; or they had a dedicated energy team across the organisation with the right mix of technical and management skills. Only 7 corporations said they had this sophisticated approach prior to program involvement, compared with 28 once they registered.

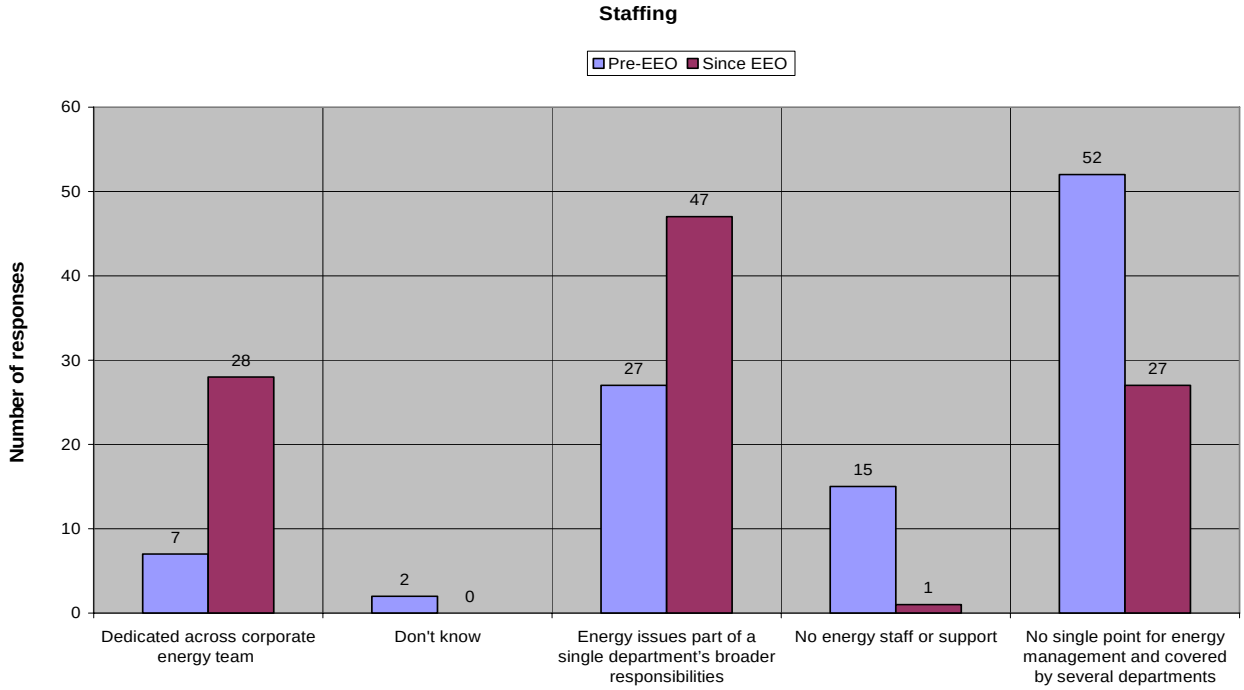


Figure 5. Staffing to identify and implement EEO before and after program participation

Processes for opportunity identification and evaluation

The survey indicated that the corporations had significantly shifted their approach to assessment processes during their participation. Companies are required to develop effective processes to identify and evaluate the whole-of-business costs and the benefits of opportunities with a four year payback or less, and prepare a business case for implementation. Two-thirds of respondents said savings opportunities had been identified on an ad hoc basis prior to the program (Figure 6). The introduction of a more formalised process led to 26 per cent using an energy assessment team and 52 per cent saying they had a well-documented and communicated process involving a cross-section of people supported by management. One company nominated "having a fairly stringent assessment process requirement" as the most effective program requirement.

Data and analysis

The information data and analysis key requirements aim to improve rigour with which energy data is collected and analysed and to place it in the context of core business data. Respondents rated data and analysis as the most important of all assessment requirements. Prior to the program nearly 70 per cent of respondents said data of different standards was collected but not analysed and six respondents indicated they had no data collection system in place. Since the program, 61 per cent of respondents now have a well-documented process for data collection and analysis for energy use patterns and potential savings. Significantly nearly 40 per cent indicated that data of different standards was collected but no analysis conducted. It is important to note that other policy measures in Australia also would have contributed to corporations improving their methods for collecting energy data.

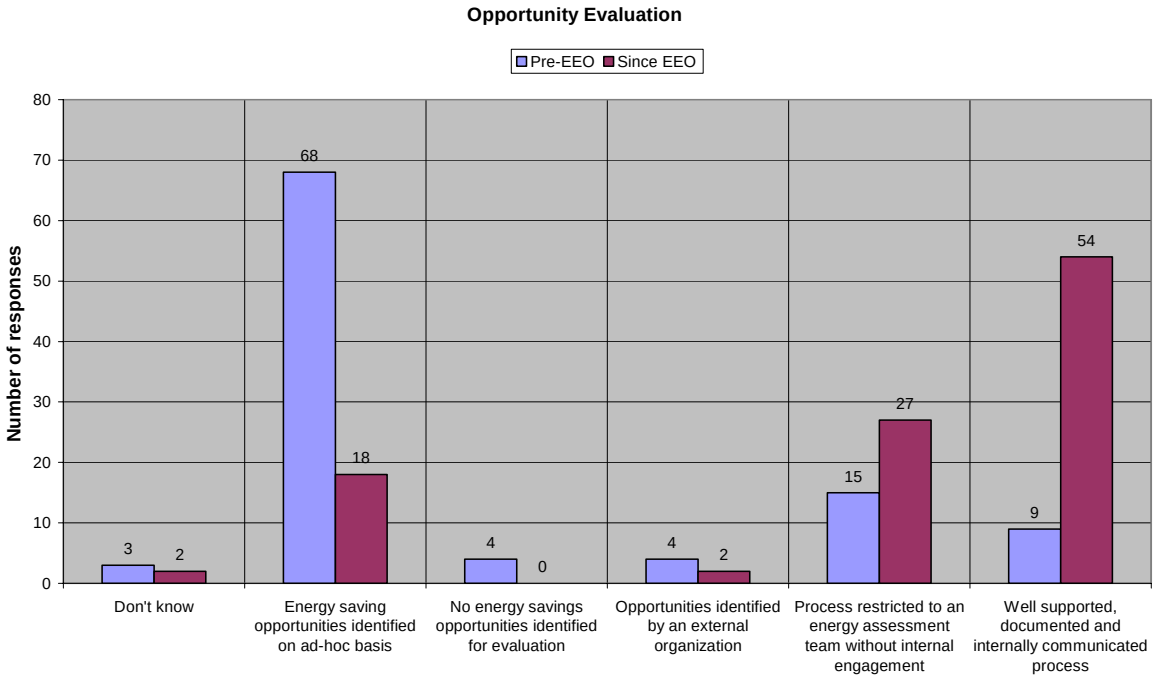


Figure 6. Process for identifying and evaluating opportunities

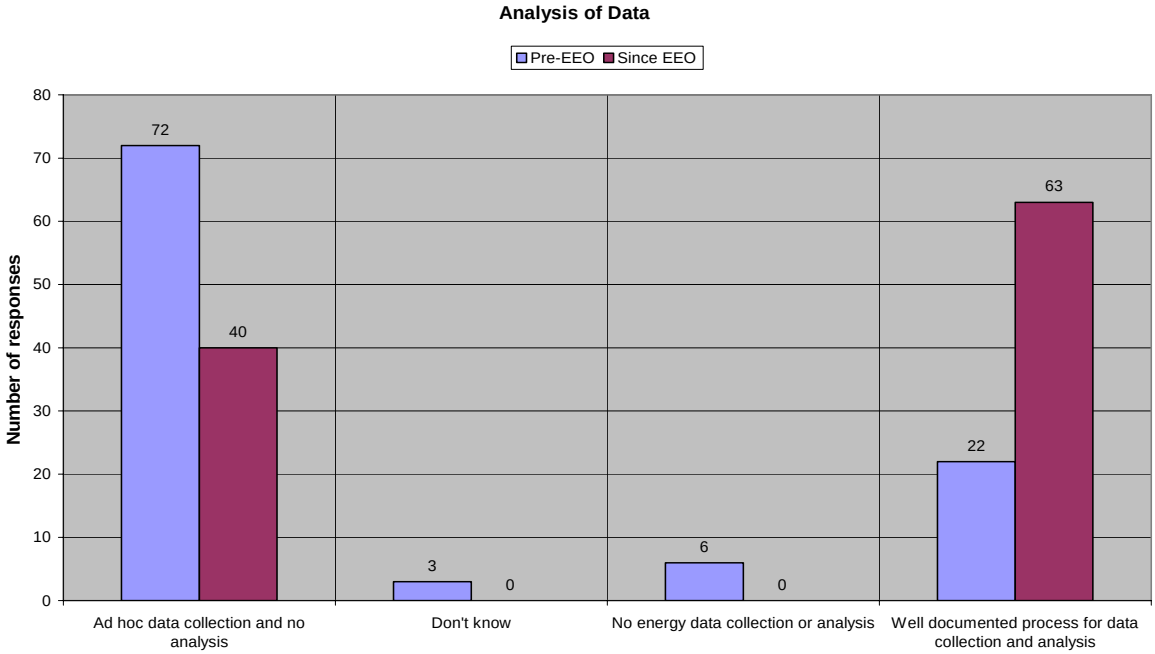


Figure 7. Analysis of energy usage data

Corporations are encouraged to take a range of approaches to analysing their energy data, from the traditional methods of benchmarking and tracking performance to more innovative approaches such as energy material flows and theoretical benchmarking. The approaches will vary in their usefulness depending on the sector and type of business. The survey showed all of the approaches were found to be effective by at least some corporations. Tracking energy use over time and relative to operating and production parameters was found to be the most effective, with 86 of 100 respondents rating this approach as effective or very effective. Energy efficiency indicators and benchmarking was the second most useful approach, followed by project tracking, as shown in Figure 8. Interestingly 30 corporations found the innovative approach of comparing energy use to

theoretical or thermodynamic limits useful; however, 25 disagreed, 20 did not know and 27 found it not applicable to their business.

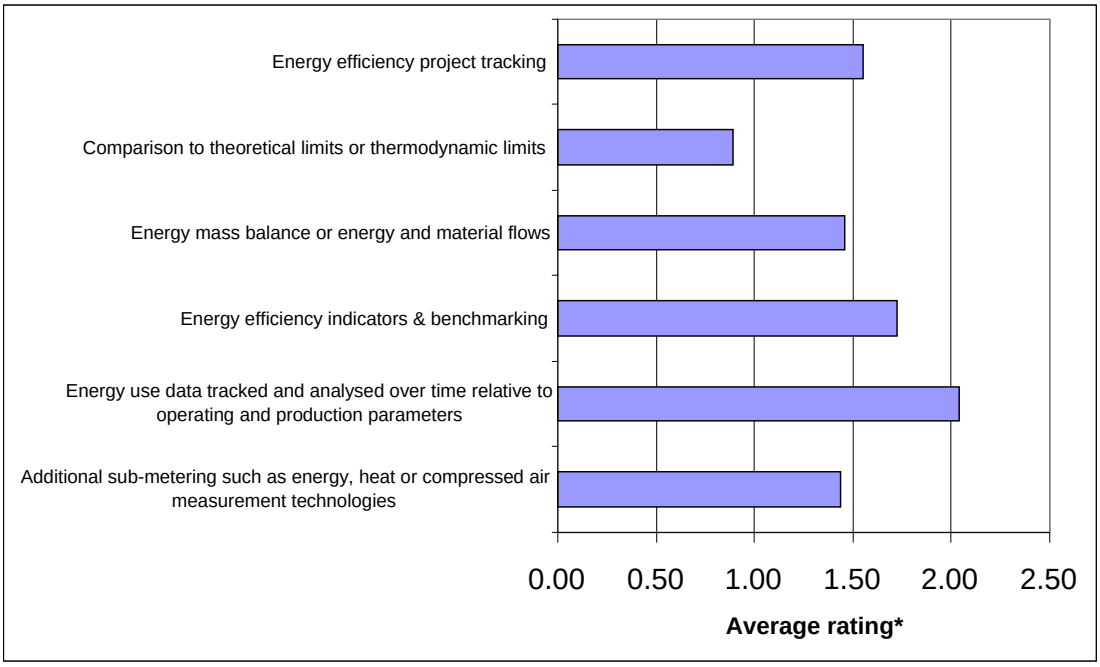


**Figure 8. Effectiveness of data collection and analysis approaches. ***Average rating (responses are given a score and divided by number of respondents - not effective -1, effective - 2 and very effective – 3)

Evaluation Findings: Phase 2. Corporations' Results 2006 – 08

A second major component of program evaluation mid cycle is the reporting of the results of the corporations' first energy efficiency assessments. The companies report to government in detail on their assessments halfway and at the end of the five-year cycle to align with the mid cycle and end-of-cycle program evaluations. The corporations report on their total energy use, the energy savings opportunities they identified, their business response and the potential financial and greenhouse gas benefits that could be gained from implementation of projects. The department has aggregated and analysed the results submitted in December 2008 in *First Opportunities: A look at results from 2006-08 for the Energy Efficiency Opportunities Program;* the highlights of the report are described below.

The first 199 corporations had assessed 1,019 PJ, or 57 per cent, of their total energy use by 2008, identifying more than 7,000 opportunities to improve energy efficiency with a payback period of four years or less. These opportunities had the potential to save 62 PJ, which is equivalent to reducing Australia's total greenhouse gas emissions by 1.1 per cent or 6 million tonnes of carbon dioxide-equivalent ($MtCO_2$-e). The corporations estimated the energy savings opportunities could generate net financial savings of $A736 million if implemented.

The corporations had implemented or were planning to implement more than 3,100 of the opportunities, representing 63 per cent of the energy savings that were identified. These opportunities were projected to save 39 PJ per year, which is equivalent to nearly 1 per cent of Australia's total energy end use in 2007-8. Such a saving would yield a reduction of 4 $MtCO_2$-e emissions per year, and net annual financial savings of $A503 million.

A significant achievement was that the 7,000 energy savings opportunities identified by the corporations represented an aggregate 6.1 per cent of the energy use assessed (Figure 9). More than 30 corporations also identified savings greater than 20 per cent of assessed energy, reducing their energy consumption by 24.1 PJ. Most corporations conducting assessments were relatively energy intensive, with energy constituting a significant proportion of their operating costs. Historically,

improvements in the energy efficiency of Australia's energy-intensive industrial sector aggregated to 0.4 per cent a year between 1990 and 2007. This cannot easily be compared with the 6.1 per cent achieved by the corporations because of wide sector variations, from 4 per cent a year for aviation to a negative 3 per cent for mining, and the 17-year time period. However, the results being reported from the first assessments are significant. The Phase 3 Full Evaluation will provide a better indication of the impact of identified savings on overall efficiency improvement.

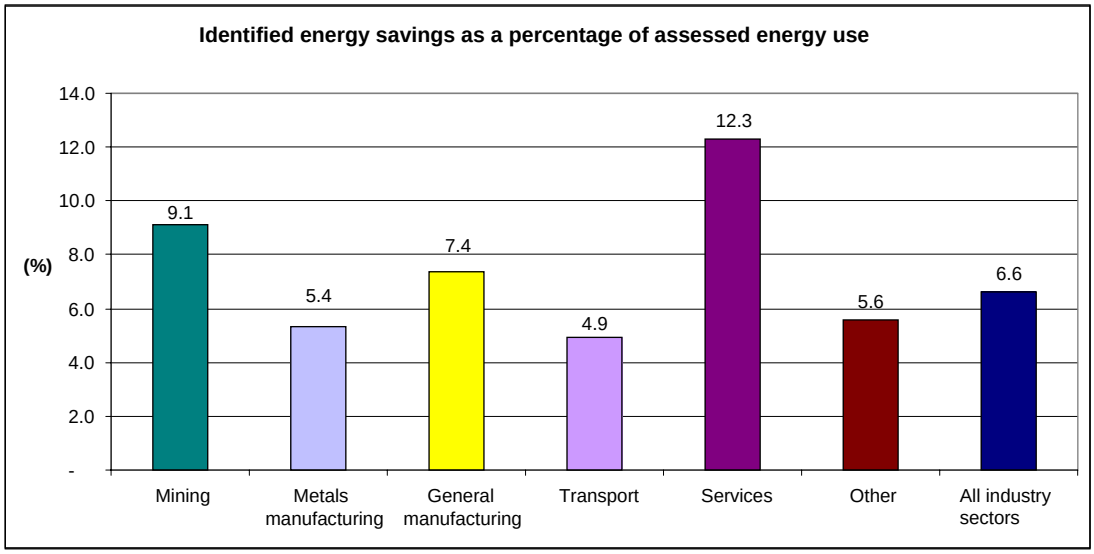


Figure 9. Identified energy savings as a percentage of assessed energy use

Two-thirds of the energy savings (41.8 of 62.5 PJ) identified had less than 2 year paybacks, whereas one-third of the energy saving identified had two to four year paybacks. This varied by sector. More than 87 per cent of the savings identified in the mining industry and 62 per cent in metals manufacturing were in projects that had a less than two year payback. By contrast, the services industry reported 71 per cent – in the greater than 2 year payback category. The savings in the remaining industries of transport and other were spread in roughly equal portions across the two categories.

In December 2009, 193 of the 199 corporations that reported in 2008 reported publicly on further assessments and updated their original assessments. Note the coverage figures and energy use are lower in 2009 as six corporations deregistered from the program in the intervening year and potentially due to lower economic activity as a result of the global financial crisis. The 193 corporations reported they had assessed 82 per cent of their total energy use, up from 57 per cent in 2008. Given that corporations are required under the legislation to assess 80 per cent of their total energy use and all sites using greater than 0.5 PJ by the end of the first five-year cycle in 2011, the corporations are well progressed in fulfilling their coverage requirements.

Significantly the 193 corporations reported they had identified 93 PJ in energy efficiency opportunities with less than 4 year paybacks. This is 6.8 per cent of assessed energy and 2.4 per cent of Australian energy end use. This is 30 PJ in energy savings on top of the 62.5 PJ identified by the 199 corporations in 2008, about a 50 per cent improvement on savings identified in 2008. The results reflect the outcomes of additional assessments, with a third more energy use assessed by 2009. It might also reflect that the first assessments were not fully completed in 2008 and that subsequent completion of analysis on opportunities has resulted in greater numbers and amounts of energy savings now being ready to report.

Implementation rates as a percentage of identified opportunities have remained static. Corporations reported in 2009 that they had either implemented or would implement 56.3 PJ of savings, which is 60 per cent of energy savings identified by the assessments. In 2008 corporations reported they would be implementing 63 per cent. However, the amount of energy savings reported

as implemented or implementation commenced (47.7 PJ) was almost double (178 per cent) that reported in these categories in 2008 (26.7 PJ), so corporations have increased their implementation of opportunities between 2008 and 2009. The amount of energy savings reported as "not to be implemented" has also increased from a small 1.4 PJ in 2008 to 10 PJ in 2009. The energy savings committed to be implemented are 4.1 per cent of energy use covered by assessments.

Mid Cycle Review– Further Evaluation Issues

The Evaluation Findings for the Mid Cycle Review described earlier for the main Key Requirements of the program indicate that change is occurring in the systems and processes being used by the corporations to assess, identify and evaluate their opportunities. The Mid Cycle Evaluation now has to consider whether those changes are leading to the *implementation* of energy savings opportunities. As the evaluation is not yet complete, this issue is still being investigated, with the main areas for consideration discussed below.

The first issue is whether the barriers to identifying and implementing opportunities are being removed, as the program is aiming to achieve. The evaluation shows that barriers to *identification* are being reduced substantially. Prior to conducting assessments, 36 per cent nominated lack of suitable data as a barrier, 32 per cent lack of senior management support, and 46 per cent the absence of a responsible manager. The respondents identifying these factors as barriers dropped substantially following their participation in the program, with the proportion naming each barrier dropping to 14 per cent, 12 per cent and 3 per cent respectively. The lack of available budget, time and resources also declined from 57 per cent to 41 per cent. However, when asked about the barriers to *implementation* the respondents believed the barriers had increased – in particular, "lack of capital budget to implement opportunities" increased from 37 per cent to 41 per cent; "investment in energy efficiency opportunities is low priority relative to core business licence to operate" went from 25 per cent to 41 per cent and "lack of available time and resources to implement" went from 37 per cent to 50 per cent.

Given that corporations have reported a substantial level of identified energy savings through the program, it is unclear why interviewees and respondents thought implementation barriers had increased. The implementation data suggest that the conversion of identified opportunities into implemented opportunities increased between 2007-08 and 2008-09. Figure 10 illustrates that there is a possible time lag in the implementation of opportunities as projects pass along a delivery "pipeline".

The influence that other factors – both internal and external - might be having on the implementation of opportunities is a second issue to consider closely. During the last four years, the boom in demand for Australia's natural resources combined with the global financial crisis would have had a significant impact on the labour and capital resources available to companies to implement projects. For many, the GFC decreased the availability of capital and resources to investigate and implement energy savings requiring capital.

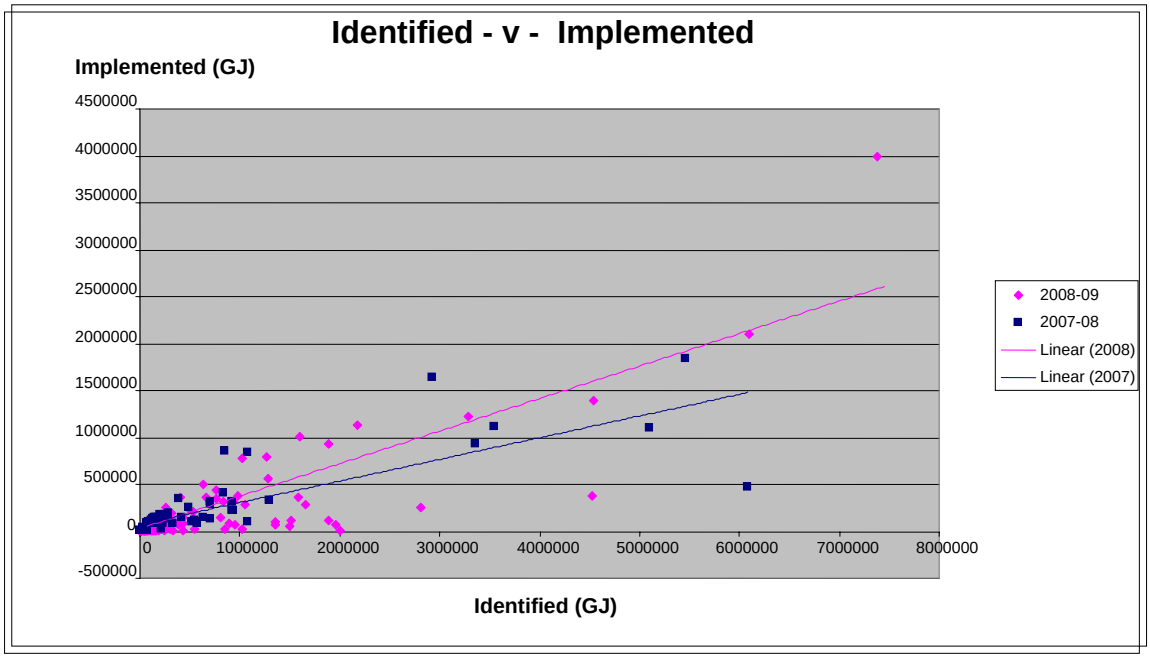


Figure 10. Distribution of identified to implemented opportunities

On the other hand, however, it gave a greater focus to energy cost reduction. During this time, the Australian Government's proposed introduction of an emissions trading scheme, the Carbon Pollution Reduction Scheme (CPRS), and the subsequent introduction of the National Greenhouse Energy Reporting scheme (NGERs) also tied up resources in additional data gathering and verification. However, these would have also provided greater impetus to energy efficiency opportunities, as corporations used them to prepare their marginal cost abatement curves with a price on carbon. In addition some corporations during this period developed highly public corporate greenhouse reduction goals. Figure 11 lists the positive and negative impact of these factors on the corporations' approach to energy efficiency opportunities.

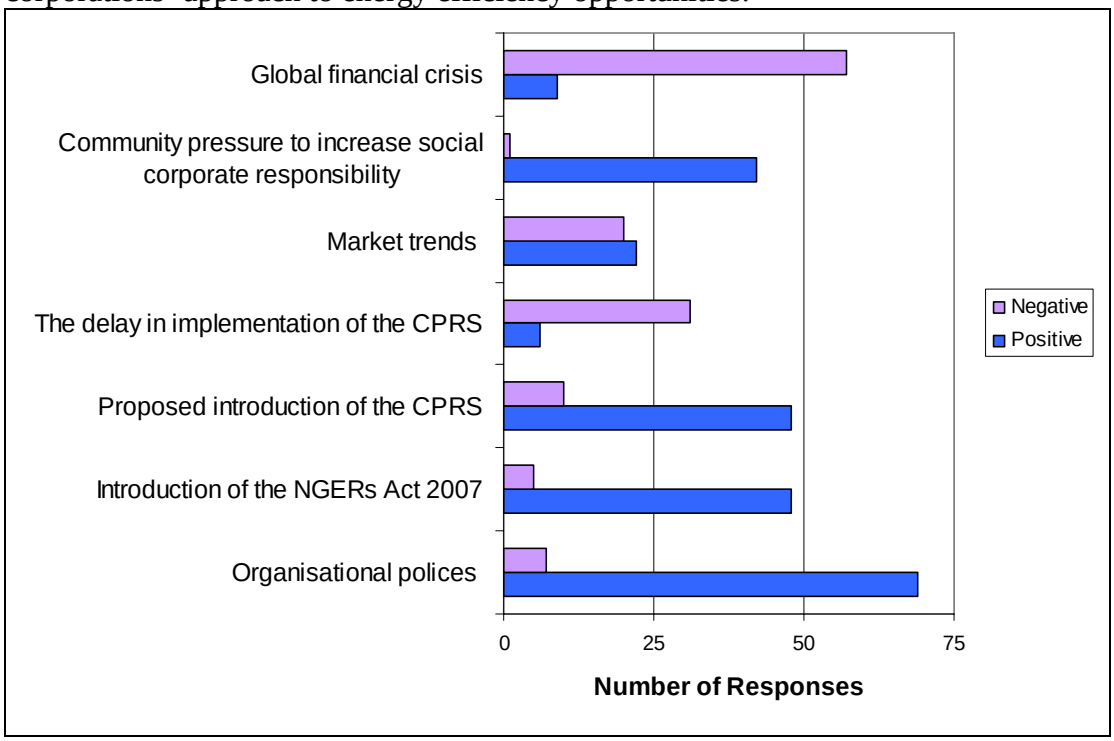


Figure 11. Other factors impacting on implementation of energy efficiency opportunities

The third area to examine in finalising the Mid Cycle Evaluation is the effectiveness of elements of the Assessment Framework and the Key Requirements in motivating change. When asked about the most useful assessment and reporting requirements, the respondents nominated the Assessment and Reporting Schedule as the most useful, followed by reporting to the board and CEO and the Assessment Framework. Public and government reporting was seen as the least useful requirement. There was also a significant band of corporations – almost 30 per cent - indicating that no aspects of the assessment and reporting frameworks had been helpful in the process of identifying and implementing energy efficiency opportunities.

The impact of reporting to the board was identified by the corporations as effective in building leadership support, especially for those that had no board reporting. While nearly half of respondents said their business already reported energy consumption and spending to the board, only 20 per cent had reported on their potential for energy efficiency opportunities. Of the 46 corporations that responded to questions about the impact of board reporting, seven indicated that it had had little or no impact. In part this was because the business already had board reporting or the nature of the business meant there was little interest in energy at board level. Others made neutral statements such as "too early to tell" or the board was "already supportive" of energy efficiency. However, half of respondents said the requirement had increased awareness of energy costs and energy savings opportunities, which had led in some cases to improved support for capital expenditure. Respondents' comments included: *"Better support for initiatives and understanding of energy use"; "Gained much better high-level support for the EEO project"; "Capital money available"; "Greater understanding of the importance of energy consumption within the business and scrutiny of energy consumption by the board"; and "With each positive improvement the board is taking on the relevance of the EEO. Projects are easier to get approval."*

The poor rating of public and government reporting was most surprising as consultations with industry members showed this was expected to provide extra impetus for decision makers to consider implementing their opportunities. In practice, however, most interviewees saw the public reporting as a compliance exercise that duplicated other reporting requirements without providing the expected leverage for change. The finance sector had shown limited interest in the reporting, partly due to the way results are reported on a gigajoule basis, which had limited meaning for many analysts. Only about a third of the 199 reporting corporations in 2008 were among Australia's top 200 publicly listed companies, which reduced their likely response to public attitudes to energy and environmental management. Corporations that had strong links to their customer and shareholder base viewed public reporting as useful; however, they were a minority. These consumer-oriented businesses already reported their energy usage results in different forms of environment or greenhouse gas emissions reporting.

Conclusion

The Energy Efficiency Opportunities program was established in 2006 primarily to address the organisational and information failures preventing the optimal take-up of cost-effective energy efficiency by large energy users. The underlying thinking was that if energy users and the market could be made aware of the size and value of energy savings there would be greater implementation of those opportunities.

The Department of Resources, Energy and Tourism collects detailed energy use, efficiency and opportunities data at three points in the five-year cycle of the program to coincide with and provide data to the three phases of evaluation. The Phase 1 and Mid Cycle evaluations aimed to measure the initial impact of the program and its assessment requirements on the systems and processes corporations had in place to understand, manage and minimise their energy use. Where possible, it also sought to measure the initial impact on the improved identification and implementation of energy efficiency savings. The Final Evaluation will be able to better examine the

impact of the assessments on overall energy efficiency performance along with the savings opportunities reported.

Early findings from the Mid Cycle Review indicate that while experience of the program varied corporation by corporation, overall there had been a marked improvement in the systems, processes and levels of accountability for energy management within many corporations. Improved data and analysis, and reporting results to the board, seem to have been the most valued and effective elements of the assessment process. While some believed aspects of the process were not driving change, they also acknowledged the importance of all the elements in achieving some benefits. The requirement for public reporting seemed to be the least valued and effective of the program, partly due to the perceived duplication with other reporting schemes, and partly because it had not been seen to provide the leverage expected to improve the implementation of opportunities and, therefore, the effectiveness of the energy efficiency assessment.

Since the introduction of Energy Efficiency Opportunities there has been a reduction in the perceived barriers to the identification of energy efficiency opportunities, such as the quality of data, and the skills and seniority of people involved. However, there has also been an increase in the perceived barriers to implementation such as access to capital.

The energy savings results being reported from the program are significant. In December 2009, 193 corporations reported 90 PJ in identified energy savings with less than a four year payback. This is 6.8 per cent of corporations' total assessed energy, 2.9 per cent of Australia's energy end use and an estimated 1.5 per cent of Australia's greenhouse gas emissions. It is difficult to draw a direct correlation between assessments and energy savings results at this time. However, case studies and responses to surveys and interviews indicate that assessments by corporations with either weak pre-existing systems or an attitude of making the most of the assessment are resulting in improved identification of opportunities. In some cases this was improving implementation, particularly of the low-cost, less than 2 year payback opportunities. However, there were also many organisations that perceived they already had adequate systems in place and that the assessment requirements while improving the rigour of those systems had not necessarily identified a greater level of savings. In addition implementation remained an ongoing barrier for many firms, particularly projects with longer paybacks or requiring large capital. This has been exacerbated by the global financial crisis.

The true impact of Energy Efficiency Opportunities on the identification and implementation of additional energy savings opportunities over the long term will require individual assessments of companies that believe they already had the existing systems in place. In addition the Stage 3 Final Evaluation of the program will examine the energy efficiency data against three data points - 2006-2007, 2007-2008 and 2010-2011 - enabling a better indication of energy efficiency improvement over time.

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