



Australian Government

Department of Resources, Energy and Tourism



# Extension of the EEO Assessment to Greenfields and Major Expansions

## Options Paper

20 February 2012

1	INTRODUCTION .....	3
2	EXECUTIVE SUMMARY .....	5
3	PROGRAM REVIEW & INDUSTRY TRIALS .....	5
4	PURPOSE OF THE OPTIONS PAPER.....	5
5	STATE REGULATION CONSIDERATION.....	6
6	REGULATION OBJECTIVE .....	7
7	DETERMINING PARTICIPATION .....	9
8	REGISTRATION.....	10
9	APPLYING THE INTENT OF THE ASSESSMENT FRAMEWORK.....	11
10	ASSESSMENT PLAN.....	17
11	CONDUCTING ASSESSMENTS .....	19
11.1	Timing of assessments.....	19
11.2	Data accuracy .....	19
11.3	Alignment with existing processes .....	20
11.4	Financial analysis method.....	20
11.5	Whole-of-business evaluations .....	21
12	BENEFITS .....	22
12.1	Sensitivity of benefits.....	23
12.2	Quantification of benefits.....	24
13	REPORTING.....	25
14	COMPLIANCE COSTS.....	26
	APPENDIX 1 .....	28

## 1 INTRODUCTION

The Energy Efficiency Opportunities (EEO) program requires the country's largest energy using companies to rigorously assess their energy use and identify energy savings opportunities across every part of their business. Around 280 corporations are currently registered with EEO, which has recently entered its second five-year cycle. From the data analysed at end 2010, corporations have assessed 85% of their total energy use and identified 141.9 PJ (petajoules) of energy savings per annum, with an estimated financial benefit for Australian companies of \$1.2 billion, or 2% of Australia's total greenhouse gas emissions.

It has now been announced in the Australian Government's Clean Energy Future package, that EEO assessments will be expanded to include the design and commissioning phase for major new development projects and expansions, which is set to come into effect on 1 July 2012. Energy efficiency programs, including EEO, that avoid or mitigate the cost impacts of the Carbon Price and assist business and the community to transition to a low carbon economy, including EEO, are considered complementary measures to the Carbon Price, due to come into effect in July 2012.

**The Australian economy is currently experiencing a major period of investment activity.**

**In 2010-11, the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) reported major projects at an advanced stage of development in the minerals and energy industry valued at \$173.5 billion, with an additional \$256 billion of projects undergoing further feasibility or subject to a final investment decision. <sup>1</sup>**

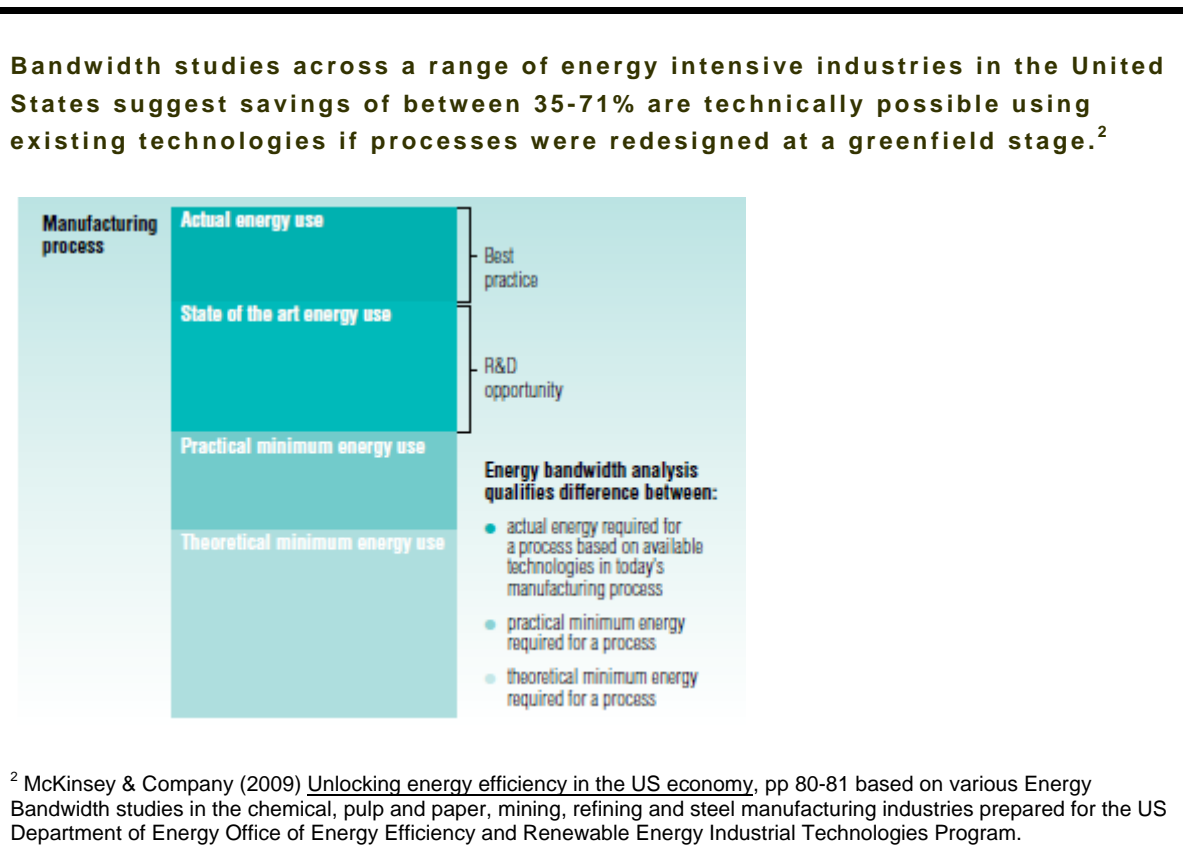
<sup>1</sup> This includes major minerals and energy projects with total capital expenditure exceeding \$40 million and projects in the gold industry with a total value of more than \$15 million. In ABARES (2011) Minerals and energy Major development projects – April 2011 listing.

The Prime Ministers Task Group on energy efficiency recommended that the EEO program be extended to major new development projects and major expansions due to the potential for more cost-effective initiatives with a greater impact on energy efficiency. The issue with an EEO assessment on an existing site is that the site has already been built and capital expenditure has already been implemented; as such, energy efficiency opportunities are limited though they still can be significant.

Conducting an assessment at the design stage of a new project allows energy efficiency to be considered before the site design and technologies have been locked in. Alternatives around plant locations, arrangements and selections, which may have significant energy savings with no additional capital expenditure, can be considered. Additionally, conducting an assessment at the design and commissioning stage allows energy efficiency to be considered in the whole-of-business cost.

The Department understands that many corporations already have good processes in place to consider energy efficiency at the design stage. This was confirmed in initial stakeholder consultation through EEO Workshops in August last year and focused one on one consultation in early 2012. It is not the Department's intention to remove these processes. Rather the Department is seeking to build on these existing processes or even use them as part of an EEO Assessment Plan and help corporations further enhance their internal methods by applying the intent of the key elements of the EEO assessment framework, to achieve greater energy productivity.

During the initial industry consultation it was also noted that not all corporations feel that their processes around energy efficiency are perfect and in some cases energy efficiency analysis is not applied to all projects. This Options Paper discusses the proposed options which will assist in building rigor and energy efficiency analysis capacity around corporations existing processes.



As noted, the Department understands that energy efficiency is already being considered by major project proponents at the design stage. This paper has been designed to address this and other aspects of the expansion of the EEO assessment to new development projects and major expansions. Further detail is provided in the body of this document.

Part of the existing EEO program is transparency. The proposed reporting option is designed to help Australia's largest energy-using corporations to demonstrate their commitment to energy efficiency by publicly reporting on the processes they undertake and to demonstrate their achievements, while minimising reporting burden. We also recognise that the approval processes for major new projects are sensitive and we have attempted to establish timelines around public reporting to allow for this sensitivity whilst maintaining transparency.

The Department is continuing to consult with industry to consider some of the proposed options. This paper provides an outline of all the proposed options for implementing the new regulations along with some background discussion on the rationale for the presented options. The paper outlines an approach for corporations to meet the intent of the assessment framework as relating to the broader EEO key elements and as applicable and applied to new development projects and major expansions. The key elements include those who will participate, what projects will trigger the requirements, what the assessment activities may be and the reporting and assessing timeframes as they apply to the design stage of these projects.

## **2 EXECUTIVE SUMMARY**

It is proposed that:

- the EEO assessment at the design and commissioning stage of new developments and major expansions is based on meeting the intent of each key element of the EEO Assessment Framework rather than preparing the specific responses to key requirements (with assisted guidance)
- one Assessment Plan (or variation to an existing Assessment Plan) to cover all new developments and major expansions
- A list of potential projects which may start design development in the next five-year cycle is to be included in the Assessment Plan
- Opportunities found through the assessment process undertaken will be detailed in the corporations existing public report
- annual operational energy consumption of the development will be reported against the predicted, annual energy consumption from each of the design-stage gates; the opportunities or design options which contributed to a decrease in the predicted energy consumption will also be reported on
- Two reporting stages are proposed during the design and commissioning stage. These reports will be government only reports and protected by commercial in confidence requirements. It is further proposed that a final government report and (first and only) public report will be required after two years of operation.

## **3 PROGRAM REVIEW & INDUSTRY TRIALS**

The proposed time period for submitting or updating assessments plans which incorporate an assessment process for new developments and major expansions is 18 months. During this time the Department is considering running industry trials which may inform a further regulation adjustment.

The Department is also considering including a review process in the regulations which, after four years of the program being in place would investigate the benefits and the results achieved compared to the additional cost of compliance.

## **4 PURPOSE OF THE OPTIONS PAPER**

This paper has been prepared to allow stakeholders to provide comments and feedback to the Department on the proposed approach and options to implementation of the extension of the EEO program to new developments and major expansion projects.

A draft of this paper was discussed with a number of stakeholders in an initial consultation process through a series of face-to-face conversations and telephone interviews. Feedback from these discussions has been incorporated into this Options Paper. In addition to the invitation for written submissions, during this public consultation period the Department is convening stakeholder forums to allow stakeholders to seek clarity on this paper.

The paper seeks input from stakeholders with the objectives of:

- developing clear and concise guidance on any changes to the Energy Efficiency Opportunities Regulation 2006, (Regulations) as required to expand the EEO program to assessments at the design and commissioning phases of major new development projects and major expansions
- implementing changes that deliver the most benefit to corporations with regard to both energy saving and financial benefits, while imposing the least compliance burden possible
- ensuring effective consultation on proposed changes to the program and regulations to expand the program to major new development projects and expansions
- addressing legitimate industry concerns that will inhibit the implementation and application of effective EEO assessments at the design stage of projects
- collecting the evidence to develop accurate estimates of the costs and benefits of the expansion
- engaging in constructive dialog with the appropriate state and territory approval authorities to determine options to streamline any interaction with existing regulatory approvals processes.

This public release options paper has been developed to seek submissions that will feed into the regulatory impact statement (RIS) and any new regulations for an EEO assessment at the design stage of a new development or major expansion. The paper includes a number of questions for stakeholders to consider in preparing their responses.

Written submissions are sought from stakeholders on this options paper. The deadline for submissions is Friday 9 March 2012. Submissions should be sent to:

[energyefficiencyopportunities@ret.gov.au](mailto:energyefficiencyopportunities@ret.gov.au)

or

Energy Efficiency Opportunities Development  
Department of Resources, Energy and Tourism  
GPO Box 1564  
CANBERRA ACT 2601

## **5 STATE REGULATION CONSIDERATION**

Regulatory approval for the implementation of projects lies with the Australian states and territories.

Generally a project proponent must put forward an application to the relevant authority before the project can proceed beyond the design stage. Some of these approval processes already contain requirements that cover the potential energy consumption and GHG emissions from the project and require proponents to identify possible opportunities to reduce energy and GHGs.

It is not the intention of the Department that states would require the completion of a compliant EEO assessment at the design stage prior to any relevant environmental approvals; this may have the unintended consequence of unnecessary regulatory delays and would raise the possibility of a requirement for verification by the Department to determine compliance. It is the intention of the Department for this to be an internal company-driven process, aspects of which can be utilised by the company in other approvals processes as they see fit.

The Department will continue to consult with approvals authorities in a number of states and territories to discuss the impact of the extension of the EEO program, and whether there is potential

for the federal and state/territory levels of government to work together to streamline any processes, including the identification of projects that will be captured by the EEO regulations.

## 6 REGULATION OBJECTIVE

The EEO program has seen promising results to date with corporations reporting the identification and implementation of significant reductions in energy and cost. Building on these achievements, the Australian Government is now expanding the EEO assessment to the design and commissioning phase of major new developments and major expansions. Additional benefits, over and above the brownfield assessments, are expected to be seen from conducting the EEO assessment at the design and commissioning stage.

This is due to the fact that whole site and process design considerations can be evaluated for optimisation at the design stage, whereas there are limited process improvement opportunities that can be considered for a brownfield site—given that the process has already been selected and capital spent. The extension to new developments and major expansions is expected to result in an increase in energy savings and associated financial and non-financial benefits (and a reduction in assessment cost for corporations).

**In mining, the study suggests that 60% savings could be achieved mainly through improvements in on site transportation, reducing what is transported or increasing the efficiency of how it is transported. The CRC for Optimising Resource Extraction has similarly highlighted ways to achieve savings of over 30% by mapping ore bodies and designing the most efficient blasting, comminution and transportation systems based on analysis at the mine design stage.<sup>3</sup>**

<sup>3</sup>Dr M Ziemiński (2011) EEO Opportunities Workshop Presentation CRC for Optimising Resource Extraction

Currently corporations can choose to undertake an energy efficiency assessment at the design phase of a major new development or major expansion. Some EEO corporations are using the above provision but the results are not currently available. To date there has been no capacity building or information material developed to encourage and assist industry to conduct energy efficiency assessments of new development sites.

The benefits associated with undertaking an energy efficiency assessment at the design stage of a greenfield site development include:

- lower capital costs for selecting and implementing major improvements
- greater ability to alter site location, configuration, production processes and equipment selection
- an ability to feed lessons learnt from EEO assessments of brownfield sites to the design engineers to better inform the design
- greater energy and financial savings and improved productivity over the entire life of the site
- reduced disruption to operations from the implementation of opportunities.

**In manufacturing, data analysis and innovation workshops conducted as part of the Energy Efficiency Best Practice Program enabled Barrett Burston Malting (BBM) to take a completely fresh look at the malting process. It allowed staff to explore the fundamental energy, mass and water flows that underpin the malt making process and identified that, for a new plant, energy costs could be at least 40% lower and greenhouse gas emissions at least 43% less than a comparable existing plant of the same production capacity.<sup>4</sup>**

***I heard more innovative ideas about how we can improve our process during this workshop than I've heard in the last 30 years.'***

**Grant Powell, Vice President, Group Production Services, BBM**

<sup>4</sup> Energy Efficiency Best Practice Program (2002) Barrett Burston Malting – Case Study Department of Resources, Energy and Tourism

By conducting assessments at the design stage, corporations are likely to be able to implement the assessments for a lower cost than a brownfield assessment. Collection of energy metering data for new sites will not be possible and instead design data and data from existing sites will be used, reducing the added data collection burden. Much of the data analysis is also likely to be available at the design stage or could easily be performed with the design data using existing design tools. The assessment process can also be built into existing project development processes, resulting in only a small increase in resource requirements during the design phase of a well planned and executed project.

The Department is considering whether a corporation that performs an assessment of a site at the design and commissioning stage may defer further EEO assessments of the operational site. Rather, energy use would be measured to determine if the new site was operating as designed.

**Taking an integrated design approach when designing new commercial buildings is also critical to ensuring building performance is optimised with savings of between 50-80% possible compared to standard practice.<sup>5</sup>**

**As efficiency expert, Joseph Romm observes:**

***Although up front building and design costs may represent only a fraction of the building's life cycle costs, when just 1% of a project's upfront costs are spent, up to 70% of its life cycle costs may already be committed.***

***When 7% of the project costs are spent, up to 85% of life cycle costs have been committed.<sup>6</sup>***

<sup>5</sup> IPCC (2007) Fourth Assessment Report

<sup>6</sup> J Romm (1994) cited in Weizsacker et al (2009) Factor Five: Transforming the Global Economy through 80% Improvements in Resource Productivity p103

## 7 DETERMINING PARTICIPATION

Existing EEO corporations can, as part of the current EEO program, voluntarily choose to conduct an assessment of a major new development at the design stage, within their current five-year cycle. It is proposed that the new Regulations will require existing corporations registered with the EEO program to conduct an assessment at the design and commissioning phase of any major new development or major expansion project.

It is the intention of this expansion of the EEO program to capture significant development projects in each industry sector. It is recognised that for sectors such as commercial buildings, the incremental energy use for a single development is likely to be much less than the mandatory assessment threshold of 0.5 PJ in the current EEO program regulations; but the portfolio of new assets under development (over a five-year period) could represent a significant level of energy use. The Department proposes that multiple, similar developments under a portfolio of asset developments or upgrades, would be subject to an assessment at the design stage. Those companies with multiple similar projects might assess a smaller sample group using the representative assessment approach.

Major new development and major expansions are defined as development projects that create or upgrade a site and are expected to consume or increase operating energy consumption significantly and where the amount of energy to be consumed warrants due consideration of energy in the design phase.

The amount of increased energy use that would trigger consideration of a site under the new EEO Greenfields Framework could differ depending on the specific project and/or industry sector. Current thresholds are focusing on a possible range between 0.1 PJ and 0.5 PJ.

It should be noted that the energy consumption being targeted by this expansion is the operational energy consumption of the completed project/site/technology, not the energy used to construct the project/site/technology.

For upgrades and expansions to sites that are already being assessed under the EEO program, it is proposed that corporations will be able to apply to the Department for the discretion not to include it as a greenfield assessment if it can be demonstrated that the brownfield assessment process will deliver similar benefits. Acceptance of this approach would be subject to approval of the assessment plan by the Department.

It is proposed that conducting an assessment at the design and commissioning stage would allow a corporation to defer an assessment of the site once it becomes operational, so it is not immediately subject to the existing EEO program. It is proposed that sites subject to an assessment at the design and commissioning stage are required only to measure operational energy consumption for a period of two years, keeping six-monthly records and reporting actual energy use against proposed energy use. Opportunities in this period would include any modifications made to the site that improve energy efficiency within two years of start up. Companies would then not be required to undertake an assessment for the subsequent three years.

### Stakeholder questions: Determining participation

1. This Options Paper proposes an assessment at the design stage of significant new developments and major expansions of all corporations currently registered in the EEO program. Do you think that this is an appropriate participation criterion or should the criterion be based on some other factor; for example, expected operational energy use of the development? If so, what level of energy use do you think warrants an EEO assessment at the design and commissioning stage for your sector/business?
2. The proposed approach to assessing multiple small developments would be similar to the representative assessment method in the current EEO regulations. Do you see this method allowing your corporation to cost effectively assess several smaller developments for an assessment at the design stage?

## 8 REGISTRATION

The new Greenfields Regulations will require existing corporations registered with the EEO program to conduct an assessment at the design and commissioning phase. It is proposed that these corporations will not be required to re-register.

It is proposed that corporations who are not currently registered for EEO be required to register based on estimates of energy use at the new development once operational with the intent to capture all sites that will be assessed under the current EEO regulations, that is, are part of the portfolio of sites that contribute to a corporation consuming more than 0.5 PJ per year.

Some corporations will have a structure with separate entities for the development and operation of new developments. While the development entity is likely to have the most influence on the future energy consumption of the operational site, it is the operational entity that will realise the benefits of lowered energy consumption and possible deferral of EEO assessment. It is therefore proposed that the entity that has ultimate ownership (operational entity) is responsible for the assessment at the design stage in its Assessment Plan.

For corporations that have developments already underway at the commencement of the expansion on 1 July 2012, it is proposed that those projects that have progressed past the detailed design and equipment procurement phase by the time an Assessment Plan is required to be submitted to the Department can be excluded from the assessment at the design stage.

**Stakeholder questions: Registration**

3. This options paper proposes that the entity that has ultimate ownership of the operating asset is responsible for registering the new development or major expansion and developing and implementing the Assessment Plan. Do you consider this is appropriate allocation of responsibility?
4. Is it appropriate for the entity responsible for a new development or major expansion to exclude a project from the requirement to perform an assessment at the design stage if it has already reached the detailed design and/or equipment purchase phases of the project lifecycle? If not, which stage of the design process do you consider to be an appropriate cut-off point?

**9 APPLYING THE INTENT OF THE ASSESSMENT FRAMEWORK**

A key consideration of the implementation of the EEO assessment framework to major new developments and major expansions is how the framework may be applied in the context of a new project development in such a way that it streamlines with current processes. In order to facilitate this consideration we have adopted an approach that follows the typical stages of the project lifecycle and considers how the assessment might meet the intent of the key elements for each of these typical stages.

It is proposed that assessments at the design stage be based on the intent of the EEO key elements, thereby allowing corporations to integrate the assessments into their existing project processes, rather than having to prepare detailed process responses to the specific EEO key requirements. The Department will provide guidance on potential effective approaches companies could take in meeting these intents.

The proposed assessment framework is set out in **Error! Reference source not found.** below.

**Table 1 - EEO Key Elements**

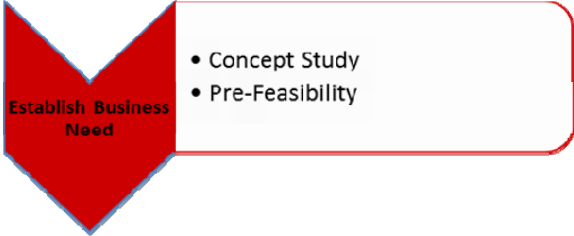
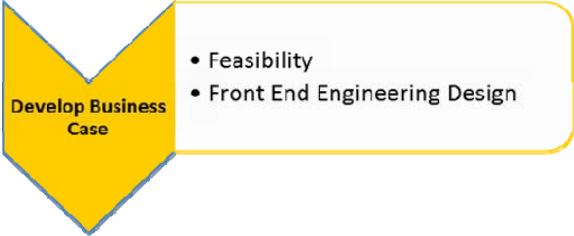
<b>Key Element</b>
<p><b>Key Element 1 - Leadership</b></p> <p>Intent:</p> <p>Visible leadership and commitment from senior management provides clear direction and purpose to the assessment by:</p> <ul style="list-style-type: none"> <li>• setting and communicating stretch energy performance objectives</li> <li>• ensuring that assessment objectives are contributing towards business priorities.</li> </ul> <p>Senior management support, motivate and value the efforts of staff and other stakeholders involved in the identification and implementation of energy efficiency opportunities.</p>


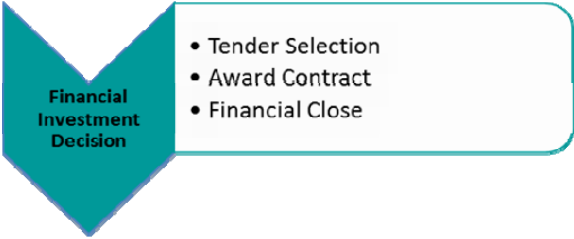

<b>Key Element</b>
<p><b>Key Element 2 – People</b></p> <p>Intent:</p> <p>Skilled and knowledgeable people, and people with direct and indirect influence on energy use, are involved in the assessment to effectively analyse energy and process data, identify and evaluate energy efficiency opportunities, provide fresh perspectives and make the business case for identified energy efficiency opportunities. The process should also involve people from the design and commissioning sections and contractors involved in building/installation.</p> <p>Responsibilities and accountabilities are suitably allocated and team diversity is encouraged.</p>
<p><b>Key Element 3 – Information, data and analysis</b></p> <p>Intent:</p> <p>Sufficient data, in suitable forms, is used to estimate and understand future energy use, identify and quantify energy saving opportunities, and provisions are made to track performance and outcomes once operational.</p> <p>Energy data is analysed from different perspectives to understand relationships between activity and consumption, and identify energy efficiency opportunities.</p>
<p><b>Key element 4 – Opportunity identification and evaluation</b></p> <p>Intent:</p> <p>An effective process is undertaken to identify all potential cost-effective energy efficiency opportunities. This process is broad, open-minded and encourages innovation.</p> <p>Ideas are filtered to identify a documented list of potential opportunities that can then be analysed to a level sufficient for informed evaluation-</p> <p>A whole of business evaluation is undertaken to enable decision-makers to make informed business decisions about energy efficiency opportunities.</p>
<p><b>Key element 5 – Decision making</b></p> <p>Intent:</p> <p>Management responsible for resource allocation for opportunities identified by the assessments make informed decisions on the assessment based on investment quality information.</p> <p>Mechanisms for reviewing, monitoring and reporting on outcomes are established to learn from experience and enable public reporting.</p>
<p><b>Key element 6 – Communicating outcomes</b></p> <p>Intent:</p> <p>Senior management and the members of the board are aware of the outcomes of the assessment in a strategic business context (including the corporation's risk management, corporate social responsibility and major investment decisions).</p> <p>The board reviews and notes the content for the corporation's public report in the context of relevant business information.</p> <p>Recognition and awareness within the corporation of the benefits of improved energy efficiency and the outcomes achieved by the assessment, including recognition and awareness of people who contributed to its success.</p>

Because projects are developed through different phases and approval levels of the project lifecycle, it is useful to consider how the EEO key elements could be met at each stage of the lifecycle.

The typical project lifecycle utilised in the table has been developed from the Victorian Department of Treasury & Finance's Gateway Review Process which is recognised across Australia as representing leading practice in this area. The process diagram is provided below. Further, the table in Appendix 1 of this paper incorporates each of the Key Elements from the EEO framework and provides guidance on how the intents from each of the Key Elements could possibly be met for each stage of the typical project lifecycle.

The ideas outlined below are intended to generate preliminary discussion and are not intended to be taken as requirements. Corporations should consider the impact of these ideas and how it aligns with current project systems.

Program step	Key activities
<b>Assessment plan</b>	<p>Identify a list of key projects coming up in the next five years.</p> <p>Identify corporate processes that will be applied or will need to be created to meet the intent of the EEO program Key Elements for major new developments and major expansions</p> <p>Identify how and when reports on opportunities are likely to be submitted and how energy use data is to be assessed and collected during the design and commissioning stage.</p>
 <p><b>Establish Business Need</b></p> <ul style="list-style-type: none"> <li>• Concept Study</li> <li>• Pre-Feasibility</li> </ul>	<p>Senior management establish, communicate and commit to clearly defined energy productivity objectives.</p> <p>Resources and people, with clearly defined accountabilities, are allocated to undertake the EEO assessments.</p> <p>Estimate the energy consumption of the site, based on existing operations, rules of thumb, other defined processes or the like.</p> <p>Identify areas of opportunity and areas of losses.</p>
 <p><b>Develop Business Case</b></p> <ul style="list-style-type: none"> <li>• Feasibility</li> <li>• Front End Engineering Design</li> </ul>	<p>Ensure the involvement of a broad range of people with relevant skills and experiences including operators, design engineers, experts and contractors.</p> <p>Determine energy data required to undertake the assessment as relevant / applicable across the design and commissioning stage.</p> <p>Assess energy use (as estimated) based on a whole of systems approach, including the conduct of a broad energy and material flows analysis.</p> <p>Investigate areas of opportunity and investigate the proposed energy consumption, as may be relevant, in reference to:</p> <ul style="list-style-type: none"> <li>- standard practice</li> <li>- best practice</li> <li>- being theoretically achievable.</li> </ul> <p>And taking into account the relationship between activity and energy consumption</p>

Program step	Key activities
<b>Assess concept and feasibility outcomes</b>	<p>Report on the site wide energy consumption noting the changes in expected energy consumption across the previous project design stage.</p> <p>Identify and document the opportunity areas, opportunities and/or design decisions that resulted in any identified energy savings or predicted energy consumption reductions.</p>
	<p>Analyse sub-contractor activities and associated energy use implications and embed energy saving objectives into procurement strategy (i.e. align procurement strategy with energy performance objectives)</p> <p>Ensure that all specification and tender documentation is examined from an energy use perspective and key energy performance objectives embedded</p> <p>Ensure that broad cross section of people are involved in the above two processes,</p> <p>Investigate and refine energy saving opportunity areas based on the procurement strategy and proposed energy consumption (taking into account the relationship between activity and energy consumption).</p>
	<p>Incorporate alignment and achievement of energy performance objectives, and documented energy savings, into evaluation of tenders.</p> <p>Investigate and refine energy saving opportunity areas, and specific opportunities based on the tender evaluation process.</p> <p>Ensure that a whole of systems approach is applied within and across contracted and self operated areas of activity, including the conduct of a refined/revised energy and material flows analysis.</p>
	<p>Ensure that detailed engineering activities include active consideration of energy efficiency as linked to energy performance objectives.</p> <p>Investigate, refine and identify energy saving opportunities based on the detailed engineering activities.</p> <p>Include a process for identifying and tracking energy efficiency opportunities, once operational including a proactive metering regime.</p> <p>Ensure that a whole of systems approach is applied within and across all activity areas, including ongoing refinement and revision of the site energy material flows analysis.</p>

Program step	Key activities
<b>Site now Operational</b>	
<b>Assess design outcomes</b>	<p>Report on the site wide energy consumption noting the changes in expected energy consumption across the various stage gates within the design and commissioning stage.</p> <p>Identify and document the opportunity areas, opportunities and/or design decisions that resulted in any identified energy savings or predicted energy consumption reductions across the various stage gates within the design and commissioning stage.</p>
<b>Measurement of operating plant</b>	<p>Check the plant is operating as intended from an energy productivity perspective and in accordance with stated energy performance objectives</p> <p>Make operating changes/adjustments, as feasible, to optimise the energy efficient operation of the plant.</p> <p>Record detailed energy data (by highest reasonable level of disaggregation – by fuel type, technology, process systems) over the two years of operation.</p>
<b>Reporting on steady state plant operation</b>	<p>Provide a report to the government two years after the plant has been operating detailing energy consumption over defined, regular intervals, including projected and actual disaggregated energy consumption data .</p> <p>Provide a public report two years after the plant has been operating detailing the energy performance objectives, how these objectives were achieved over the design and commissioning stage, including predicted energy consumption and operation energy consumption.</p> <p>Provide details in Public Report of significant opportunities that contributed to energy savings over the design and commissioning stage</p>

**Figure 1 - Project lifecycle & EEO framework**

### **Stakeholder questions: Application of the EEO framework**

5. It is proposed that intents from the existing the EEO Key Element will be refined to better suit the design stage. To what extent are the existing intents appropriate for assessments at the design stage of new developments and major expansions.
6. The Options Paper outlines a possible approach to achieving the intent of the EEO key elements at each stage of the project lifecycle. Comment on the approach outlined and whether it addresses the intent of each of the key elements of the EEO assessment framework.
7. Do you think that this approach will achieve the goal of maximising the identification and implementation of cost effective opportunities in project designs?
8. How does the proposed approach align with your current project development processes?
9. Are there any barriers to incorporation of energy efficiency assessments into the design stage of project development and how can these barriers be addressed through the regulations?

## **10 ASSESSMENT PLAN**

As the requirements for an assessment of a new development or major expansion will differ from those in place for operational site assessments, it is proposed that corporations provide a variation to their approved assessment plan (or include in a new plan submitted for approval) to detail how the assessment at the design stage will be undertaken. This variation may cover all participating corporations' new developments and expansions moving forward. It is proposed that all initial Assessment Plans or variations to approved Assessments Plans to include design stage assessments be submitted to the Department for approval by 31 December 2013. The design assessments section of the approved assessment plan may be varied as required through the five year cycle with a new plan required in line with the brownfield assessment plan (i.e. a new assessment plan is required 18 months following the start of the cycle).

It is proposed that the Assessment Plan for new developments and major expansions consist of:

1. the process that the corporation is proposing to use that will allow them to meet the intent of the EEO assessment framework at each stage of the project lifecycle. It is proposed that this cover the period from concept through to two years after commissioning
2. a schedule of projects that are under consideration for development over the next 5 year reporting cycle, and the likely completion and reporting date for each project (noting that commercial considerations may limit the nature of the information provided)
3. the broad expected/estimated operational energy use of each project.

As part of the assessment process outlined in the Assessment Plan, it is proposed that corporations specify the method or process they will use to select which opportunities will be evaluated during each phase of the project lifecycle. For example, during the concept phase, a corporation may elect to evaluate all opportunities that are NPV positive using their internal discount rate.

It is recognised that a significant proportion of studies do not progress any further through the project lifecycle than the prefeasibility phase and many other projects do not proceed to FID. It is not the intention to place additional reporting burden on corporations by requiring the update of an Assessment Plan for every project investigation that may or may not proceed. However, it may be appropriate that the Assessment Plan contains a process that includes assessment of energy efficiency at the prefeasibility and business case phases to ensure that the large scale, site-wide, energy efficiency opportunities are not overlooked. The table in Appendix 1 contains suggestions on how the EEO key elements could be achieved, consistent with the level of project maturity at each of these phases of the project lifecycle.

The corporation may delegate actions of the Assessment Plan to other entities within the corporation or contractors but overall, it is proposed that responsibility for the assessment at the various phases of the project lifecycle will remain with the corporation. The Assessment Plan will need to consider the execution strategy to ensure that any procurement process incorporates the intent of the EEO key elements. For example, detailed design as part a design and construct contract would need to incorporate processes and procedures to ensure these phases are compliant with the key elements.

#### **Stakeholder questions: Assessment Plan**

10. It is proposed that the assessment at the design stage of new developments and major expansions is included as a variation to the current EEO Assessment Plan. Is this practical and appropriate for your corporation?
11. The options identified for implementing assessments at the design stage of new development and major expansions allows corporations to propose the specifics of their process to meet the intents of the EEO key elements. Will this flexibility in the assessment process allow your corporation to utilise current project development processes in the EEO assessment?
12. Is it appropriate to provide a list of potential projects in the Assessment Plan that covers the next 5 year cycle?
13. Is 12 months change in the original Assessment Plan timing appropriate for requiring a revision to the Assessment Plan?
14. How will your corporation manage the responsibilities of the assessment at the design stage if the project development is performed by another entity, including contractors?

## 11 CONDUCTING ASSESSMENTS

In applying the EEO assessment framework at the design stage of new developments and major expansions, corporations should consider how their current project processes are undertaken, and what new process may be required, to deliver the intent of the Key Elements.

### 11.1 Timing of assessments

New development and major expansion projects proceed along a pathway of design and cost detail development as described in Figure 1 - Project lifecycle & EEO framework. Assessments will need to be reflective of the level of detail and investment certainty at the stage of the project development lifecycle that occurs with new development projects.

Assessments will need to be initiated at the start of a project development phase to enable the identification of energy efficiency opportunities that exist at that stage of the project lifecycle. This recognises that as the project moves from concept through to implementation, the energy efficiency opportunities that exist will change in their nature and level of detail. It is proposed that corporations will initiate the assessment process at the pre-feasibility stage when there is a range of possible scenarios, site-wide opportunities, broad opportunity areas, that may be possible, and where some level of energy estimation is available.

The duration of assessments will span multiple design phases of a project. Opportunities or opportunity areas may be identified during pre-feasibility, initiating an assessment that can only be conducted in the following feasibility phase, and then potentially in subsequent stages.

It is expected that the number of potential energy efficiency opportunities and/or opportunity areas for assessment will be less well refined early in the project development process, increasing in detail as the amount of information increases.

The assessments themselves will likely involve a process of narrowing the number of options to be assessed within each opportunity during the development of the project as some options are dismissed due to technical, financial, environmental, social or other considerations. However, additional opportunities will arise as you progress through the various design stages.

Assessments are likely to be based on energy flows and infrastructure scenarios at concept and early feasibility, moving to more detailed energy consumption engineering based evaluations in detailed design phases. As described in the **Error! Reference source not found.** section above, the requirements of the assessment framework will be structured to account for this variability in data type.

### 11.2 Data accuracy

It is recognised that data can be very preliminary at the pre-feasibility and concept stages of a project, and that accuracy and availability of relevant data improves throughout the project lifecycle. Data is expected to move from broad energy flow estimations through to more detailed engineering determined data. It is proposed the accuracy levels be determined by the corporation and supplied to the Department in the assessment plan with an explanation of the accuracy of data to be used in the analysis.

### **11.3 Alignment with existing processes**

The assessment process should align wherever practicable to existing project development processes. Through concept to feasibility phases of a project, a number of drivers are used to determine the final design of a project. The addition of energy efficiency, energy productivity, energy costs and minimisation as a key driver in the development of project concepts and options and the design basis enables a seamless inclusion of the energy efficiency considerations early in project development. Appendix 1 contains a detailed table of how the intent of the EEO framework could possibly be met at each stage of the design process.

In the evaluation of project options, the adoption of the intent of the EEO key elements, as defined in this options paper, aligns with many existing processes employed by industry. This extends into detailed improvement processes on projects. Value improvement process (VIP) is a common practice across many industries and typically incorporates energy efficiency. The extension and alignment of this process with EEO is a key mechanism for achieving the intent of the assessment while minimising the assessment burden.

It has been recognised that a significant number of projects are executed using turnkey or engineer, procure, construct (EPC) mechanisms. These contract types outsource the detailed design, procurement of materials and construction of the development for a lump sum. In these contracts it can often be difficult to vary any part of the specification to include a contract outcome linked to enhanced energy efficiency.

One mechanism that is currently in use on EPC contracts is to require the contractor to perform an assessment to identify and evaluate opportunities for enhanced efficiency as part of the detailed design phase, with agreement that the project buyer will, at their discretion, fund the implementation of attractive opportunities. In these contract types it is vitally important that the evaluation of opportunities includes such costs as changes to long lead time items, potential schedule delay and increased risk where appropriate. This requirement is not unlike the requirement for the designer to conduct HAZOP studies and incorporate results as part of the detailed design process.

In some cases it may be feasible to involve the contractor early in the design process to provide input from an additional view point.

### **11.4 Financial analysis method**

Payback periods will vary according to the opportunities identified and the operational life of a project. It may be appropriate for Corporations to nominate payback periods that are suited to their project in alignment with the expected internal rate of return (IRR) and other financial drivers for the project. It is proposed that the requirement to evaluate and report energy efficiency opportunities be dependent on these internal metrics rather than mandatory evaluation and reporting of all opportunities with an expected payback of less than 4 years. Under the proposed assessment method it is anticipated that the project proponent will use its own assessment criteria (Payback, NPV, IRR etc) to determine which projects will be evaluated and included in the reporting requirement for the assessment.

## 11.5 Whole-of-business evaluations

As is required for the current EEO assessment framework, opportunity evaluations for a new development project should incorporate whole of business costs and benefits which should be quantified where possible and practical. There are many indirect drivers that impact the viability of an energy efficiency opportunity; these can include:

- reduced or increased capital cost
- energy price and availability
- operational and maintenance costs
- various commercial drivers
- expectation of wider stakeholders including investors and the community (license to operate).

When including these drivers in the assessment of a new development, it would be important to incorporate sensitivity analysis in the assessment. This would help to accommodate the level of detail and extended time frames that apply to the project development. Options identified could incorporate the expected direct benefits and a range of energy price variations and other external variables (i.e. Carbon Price) that will provide an estimate of the maximum benefit available.

At the early stages of the design of a new development, the baselines used and benefits estimated would be based on predicted throughput and use profiles. These may alter in the commissioning and operation phases of the project reinforcing the need to integrate sensitivity analysis into the assessment process.

### Stakeholder questions: Conducting assessments

15. Is it appropriate to relate the timing of assessments to the project lifecycle, or should the regulations identify fixed timeframes?
16. The options paper recognises that the availability and accuracy of project energy use and opportunity evaluation data develops throughout the project lifecycle. Is it appropriate to allow corporations to nominate their own accuracy criteria, or should the regulations specify accuracy requirements at each stage of the project lifecycle?
17. How do the requirements for evaluating and reporting opportunities on new development and major expansion projects relate to current business decision processes?
18. Comment on the approach to assessments and its compatibility with current project development processes for evaluation, design, procurement and commissioning.
19. This Options Paper proposes that corporations nominate their own decision making criteria for the selection and evaluation of opportunities. Is this appropriate or should the regulations specify evaluation of all opportunities with a <four-year payback criteria as is the case with the current EEO program for brownfield sites?
20. Is it common practice in your corporation or industry to include whole of business costs and benefits in opportunity evaluations, if so what types of costs and benefits are included?

## 12 BENEFITS

The benefits in undertaking an assessment during the implementation of a new development project or major expansion are expected to exceed the potential benefits that a corporation would expect from energy efficient measures during brownfield operations.

Conducting the EEO assessment at the design and commissioning phases is predicted to have a lower assessment cost while leading to the consideration/development of more attractive opportunities. Given the benefits of conducting an assessment at the design and commissioning phase it is likely to be cost effective to conduct assessments for sites at the design stage rather than the operational brownfield asset.

Design options that maximise energy efficiency and minimise the overall energy demand of a project will be most significant when identified early in a project due to the scale of the design modification being considered. During concept and early feasibility development, project options being considered are at a macro scale, incorporating designs related to energy supply options, transportation and overall facility configuration. Energy options identified during these early phases are expected to offer corporations the most significant direct (capital and energy cost savings) and indirect benefits..

Energy efficiency measures that are identified and assessed during the detailed design stage will be reflective of that stage of the project, where there is less scope to alter whole processes. The design options at this detailed stage are expected to be smaller scale and focused on components of the project with consequently smaller benefits for the corporation. In particular, during this stage of the design development, the capital costs, direct benefits and indirect benefits will generally be of a smaller scale for the corporation, but are likely to still be attractive from a capital investment perspective.

For corporations, the assessment of energy efficiency measures and calculation of benefits at the concept, feasibility and design stages will be reliant on theoretical design methods and comparison with similar projects. Determination of actual benefits will only be available at the commissioning and operational stages.

Assessments are expected to cover a wide range of potential design options and resultant benefits, including:

- selection of power supply/generation technology (transmission connection, diesel, gas turbine etc)
- conveyer or rail transport
- pipe design and associated pump sizes
- waste heat capture.

The above examples of efficiency measures are typically considered as part of standard design development on new development projects. This enables the assessments to be integrated into the standard engineering development process and minimise the disruption for corporations. In this sense, new development assessments are expected to be relatively cheaper than for brownfield assessments due to the assessment being part of a broader process rather than a stand-alone initiative.

## **12.1 Sensitivity of benefits**

As a means of establishing the benefits to a corporation and informing an assessment, design options would be assessed with consideration of a range of potential benefits. This would incorporate the minimum expected and maximum potential benefits associated with the design option. This provides corporations with assurance of the minimum benefits to establish an overall value determination against the capital investment and EEO assessment costs to be borne by the corporation. For assessments initiated early in the design development, this will enable a refinement of the benefit sensitivity as the project develops in alignment with the project lifecycle.

## 12.2 Quantification of benefits

Corporations undertaking an EEO assessment are likely to realise a multitude of direct and indirect benefits. Energy efficiency measures are often inter-related with a whole of business or project efficiency outcome and a broad range of efficiency benefits.

As an example, an efficiency measure related to a slurry pipeline design will culminate in a number of benefits for a corporation if identified and assessed early in the project development cycle. A more efficient design for the pipeline and pumping stations will result in a direct energy use benefit for the corporation and, in addition, there would be an expected range of indirect secondary benefits, including:

- a reduction in carbon emissions and potential liabilities
- reduction in water use required for the slurry due to the efficiency of the pipeline
- reduction in the size of pumps required, reducing capital spend and noise generation.

The direct benefits from an assessment are critical to ascertain the broader overall benefit for the corporation when compared with the capital investment required. Previous assessments undertaken in brownfield EEO assessments can provide an example of the range of benefits that can accrue from EEO. These are expected to be an absolute minimum for corporations undertaking assessments at the design stage due to the relative scale of benefits as outlined previously.

**Error! Reference source not found.** below provides an indication of the scale of benefits that has been realised through brownfield EEO assessments in Australia, showing the range of benefits achieved by the corporations in each sector. The variation in benefits is indicative of the scale and type of benefits that can be realised in efficiency measures on existing sites.

**Table 2: Brownfield Assessment Benefits Summary**

Sector	Maximum % energy savings	Minimum % energy savings
Coal mining	3.93%	2.93%
Beverage and tobacco product Manufacturing	24.31%	12.78%
Basic chemical and chemical product manufacturing	9.75%	5.80%
Rail transport	2.09%	0.69%
Metal ore mining	6.86%	3.92%
Oil and gas extraction	16.82%	9.74%

Assessments at the design stage are expected to generate higher potential maximum energy savings based on the decisions being made during their development. Particularly in relation to the incremental design and investment cost for implementing opportunities at the design stage, but also for the greater freedom to make significant changes to site layouts and process configurations to maximise efficiency. Literature reviews indicate considerable potential benefit of identifying and assessing energy efficiency options as part of the design development. For example, McKinsey & Company, *Unlocking energy efficiency in the US economy*, 2009.

### Stakeholder questions: Benefits

21. Are there opportunities within your industry sector to improve efficiency at the design stage and what level of improvement is likely to be achieved?
22. Please comment on the level of benefits expected through a greenfield assessment relative to a brownfield assessment.

## 13 REPORTING

The existence and details of many new development projects and major expansions are not released into the public domain at the early stages of development. Issues such as competitive advantage and availability of appropriate sites often require corporations to keep developments confidential.

Although the EEO assessment will progress through the lifecycle of the project, the Department proposes only requiring corporations to publicly report the developments they are assessing once the project is complete and operational. This is intended to remove any sensitivity around confidential information and reduce the reporting burden for corporations.

It is proposed that results will be reported three times to the government during different stages and once to the public.

It is proposed that the first reporting stage would be required at the end of feasibility / front end engineering design and be a separate report for each project or could be a combination of projects, all passing the feasibility stage gate within six months.

The second stage of reporting is proposed to be required after the project has been commissioned and would be included in the next government report within the corporation's standard EEO cycle. This phase of reporting would cover results up to the initial commissioning phase.

The third reporting stage would be required to be included in the next Government Report and would cover data on how the plant had been operating for the last two years. The Public Report would also be required at this stage.

Public Reports at the completion of the assessment of each new development or major expansion project are likely to be required to contain the following information:

1. name and description of the project assessed
2. description of how the assessment was conducted
3. details of the energy performance objectives, how these objectives were achieved over the design and commissioning stage, including predicted energy consumption and operation energy consumption
4. a chart indicating the estimated annual energy consumption of the development along the design process and two years past commissioning. Data points are likely to be located at the design stage gates, starting at the initial concept stage and ending two years into the operation

5. Description of at least three significant opportunities identified during the assessment that contributed to energy savings over the design and commissioning stage

Similarly, information would be required in the Government Reports; however these reports are likely to contain information on which opportunities/design changes corresponded to the reduction in expected energy consumption. The final Government Report is also likely to contain energy consumption data for each six-month period over the two years of operation. This information, inline with current operations, would remain confidential.

#### **Stakeholder questions: Reporting**

23. It is proposed that corporations delay public reporting until project is complete and operational. Is this an acceptable delay to public reporting and will the timing of public reports have any impacts on the quality of the assessment?
24. This Options Paper proposes that corporations report information on completed assessments in a similar format to that currently required for brownfield sites. What information do you think should be included in the public report?
25. Is a two-year period of operation adequate to capture a steady state result?

## **14 COMPLIANCE COSTS**

Much of the extra cost to implement an assessment at the design stage will be the cost to look at an issue in more depth or to study an additional aspect or opportunity—significantly less than the amount of re-engineering and design that would have been required for a similar opportunity on a brownfield development. Further costs are likely due to government and public reporting.

A whole range of information is available for the assessment during the design stage that is not easy to access during a brownfield assessment, such as process and financial models. Metering data and the associated costs for equipment and collection will not be required as there is no physical plant to monitor or data to measure

To initiate the assessment of energy efficiency at the design stage will incur some costs, but it is expected that the conducting of assessments at the design stage will be significantly less costly than a brownfield assessment. From industry experience in conducting sustainability assessments at the design stage, the additional design cost is not expected to exceed 5% of the total design cost for the project. For large developments or those that involve development of new technology in the design, significantly less than 5% would be expected.

### **Stakeholder questions: Compliance costs**

26. Comment on the expected costs for an assessment at the design stage compared to those for an assessment of a comparable brownfield site.
27. How can the compliance cost for assessments at the design stage be minimised by using existing EEO and project development processes?
28. How much do you expect it will cost over the project lifecycle to develop and implement the Assessment Plan and report publically for assessments at the design stage? Will the costs for assessments at the design stage be reduced significantly for corporations already registered for EEO?
29. Are there other programs that have reporting requirements that could be integrated/streamlined with EEO assessments at the design stage of new developments and major expansions?

## **Appendix 1**

### **Guidance on the application of the EEO Assessment Framework to the design phase**

Key element	Establish business need (concept study/ pre-feasibility)	Business case (feasibility study/ FEED)	Competitive procurement (specification & tender)	Financial investment decision (tenderer selection, award contract, financial close)	Project implementation (detailed engineering/ construction management/ commissioning)
<p><b>Key element 1 - Leadership</b></p> <p>Intent:</p> <p>Visible leadership and commitment from senior management provides clear direction and purpose to the assessment by:</p> <ul style="list-style-type: none"> <li>• setting and communicating energy performance objectives</li> <li>• ensuring that assessment objectives are aligned with business priorities.</li> </ul> <p>Senior management support, motivate and value the efforts of staff and other stakeholders involved in the identification and implementation of energy efficiency opportunities.</p>	<p>EEO process requirements should be established for all new development projects and major expansions as part of standard corporate practices.</p> <p>Management to clearly articulate the value and importance of energy savings and EEO process.</p> <p>A project lifecycle management process adopting relevant elements of the best practice 'Gateway Review' process should be established with management review of key process elements (incorporating appropriate EEO considerations) reviewed by management at each stage.</p> <p>Concept studies should be specified by management to include the quantification of overall lifecycle energy use and costs and to identify energy efficiency benchmarking opportunities.</p>	<p>At this stage management should require that business cases:</p> <ul style="list-style-type: none"> <li>• quantify a breakdown of energy use and costs by major process element</li> <li>• undertake initial benchmarking or other baseline technique of overall process energy use</li> <li>• identify energy efficiency improvement opportunities based on benchmarking, site wide review or new technology</li> <li>• establish energy efficiency strategies and objectives</li> <li>• identify each of these aspects in the business case report.</li> </ul> <p>Management to demonstrate the priority of addressing energy efficiency with viable and cost effective potential improvement options, taking into account the wider business benefits, as part of the process of developing the recommended option.</p>	<p>Management to support the inclusion of project energy efficiency strategies and objectives and the requirements of the Assessment Plan in the specified requirements for the project.</p> <p>Management to encourage input from process efficiency experts and O&amp;M personnel in the review of the specification and tender analysis.</p> <p>The value and importance of energy efficiency for the project and compliance with the EEO process shall be reiterated to tenderers in any briefings prior to tender submissions.</p>	<p>The financial investment decision is the key opportunity for senior management/board to review the project and confirm support for energy efficiency initiatives and confirm selection of a project that has been assessed in accordance with energy efficiency strategies and objectives.</p> <p>Management to support tender analysis and evaluation criteria that target process efficiency improvements.</p> <p>Recognition by senior management of the importance of selecting the optimal plant/project process at this stage as opposed to dealing with efficiency issues on a brownfield site is a vital part of the leadership requirement.</p>	<p>Key leadership support of a process that allows energy efficiency opportunities to be incorporated into the final detailed design.</p> <p>Senior management to support, motivate and value the efforts of personnel involved in the identification of energy efficiency opportunities as part of the detailed design process.</p>

Key element	Establish business need (concept study/ pre-feasibility)	Business case (feasibility study/ FEED)	Competitive procurement (specification & tender)	Financial investment decision (tenderer selection, award contract, financial close)	Project implementation (detailed engineering/ construction management/ commissioning)
<p><b>Key element 2 – People</b></p> <p>Intent:</p> <p>Skilled and knowledgeable people, and people with direct and indirect influence on energy use, are involved in the assessment to effectively analyse energy and process data, identify and evaluate energy efficiency opportunities, provide fresh perspectives and make the business case for identified energy efficiency opportunities.</p> <p>Responsibilities and accountabilities are suitably allocated and team diversity is encouraged.</p>	<p>Appropriately skilled personnel with a knowledge of current industry benchmarks for energy use to evaluate and quantify lifecycle energy use and cost.</p>	<p>Appropriately skilled personnel with a knowledge of current industry benchmarks for energy use to evaluate and quantify lifecycle energy use and cost.</p> <p>Inclusion of operations and maintenance personnel from similar projects to assist in the development of O&amp;M strategies to optimise energy efficiency.</p>	<p>Appropriately skilled personnel with an understanding of the energy efficiency strategies and objectives, the plant options selected, the EEO assessment process for the detailed project design and construction requirements.</p> <p>Input from personnel involved with tender analysis and O&amp;M staff from similar projects.</p>	<p>Personnel capable of assessing the lifecycle energy use and cost need to be allocated to the evaluation task.</p> <p>Contract negotiations with suppliers need to be supported by personnel with appropriate knowledge of EEO requirements and an understanding of how efficiency strategies and objectives will be implemented.</p>	<p>The successful tenderer or other personnel involved with the detailed design process must be capable of identifying and assessing the lifecycle energy use and cost of various options being proposed.</p> <p>There will be a necessary involvement of process experts in this review process.</p>

Key element	Establish business need (concept study/ pre-feasibility)	Business case (feasibility study/ FEED)	Competitive procurement (specification & tender)	Financial investment decision (tenderer selection, award contract, financial close)	Project implementation (detailed engineering/ construction management/ commissioning)
<p><b>Key element 3 – Information, data and analysis</b></p> <p>Intent:</p> <p>Sufficient data, in suitable forms, is used to estimate and understand future energy use, identify and quantify energy saving opportunities, and provisions are made to track performance and outcomes once operational.</p> <p>Energy data is analysed from different perspectives to understand relationships between activity and consumption, and identify energy efficiency opportunities.</p>	<p>Overall expected process energy use data from modelling and benchmarking will be required at this stage as well as broad energy costs to enable lifecycle energy costs to be calculated.</p> <p>A broad review of similar projects should be undertaken to identify potential benchmarking partners.</p>	<p>Expected energy use should be identified from design data and benchmarking for the overall process and for all major process components to the extent necessary to quantify overall process efficiencies, major process contributions to energy use and overall energy costs for the project lifecycle.</p> <p>Similar data should be included for benchmark projects and details of available energy supply/use options collected as part of the benchmarking analysis.</p> <p>The costs and benefits of energy efficiency improvements due to selection of a particular process option should include all business costs and benefits beyond simply the fuel or energy saving.</p>	<p>All information necessary for preparation of the specification requirements relating to energy efficiency objectives will need to be available:</p> <ul style="list-style-type: none"> <li>• process efficiency strategies and objectives</li> <li>• requirements for the inclusion of an efficiency opportunities review as part of the detailed design process</li> <li>• minimum efficiency standards to be adopted</li> <li>• operating and maintenance philosophies to optimise energy efficiency, etc</li> </ul>	<p>All information necessary for comparison and evaluation of tenders in relation to energy efficiency objectives will need to be collected from each tenderer:</p> <ul style="list-style-type: none"> <li>• process efficiencies, energy use and energy costs</li> <li>• minimum efficiency standards applicable to major process component</li> <li>• operating and maintenance philosophies to optimise energy efficiency, etc.</li> </ul>	<p>All design data necessary to evaluate current process efficiencies should be available as well as the data that was used for benchmarking of similar processes as part of the business case development.</p> <p>The costs and benefits of energy efficiency improvements due to redesign of a particular process should include all business costs and benefits beyond simply the fuel or energy saving.</p>

Key element	Establish business need (concept study/ pre-feasibility)	Business case (feasibility study/ FEED)	Competitive procurement (specification & tender)	Financial investment decision (tenderer selection, award contract, financial close)	Project implementation (detailed engineering/ construction management/ commissioning)
<p><b>Key element 4 – Opportunity identification and evaluation</b></p> <p>Intent:</p> <p>An effective process is undertaken to identify all potential cost-effective energy efficiency opportunities This process is broad, open-minded and encourages innovation.</p> <p>Ideas are filtered to identify a documented list of potential opportunities that can then be analysed to a level sufficient for informed evaluation-</p> <p>A whole-of-business evaluation is undertaken to enable decision-makers to make informed business decisions about energy efficiency opportunities.</p>	<p>Evaluation at this stage of a new development project or major expansion should include the quantification of overall project lifecycle energy use and costs and identification of energy efficiency benchmarking opportunities with similar projects.</p> <p>Identification of potential configurations for energy supply, use, reuse that should be considered in the next stage of project development.</p>	<p>Evaluation at this stage of a new development project or major expansion should include a breakdown of energy use, energy mass balances process models and costs by major process element.</p> <p>A benchmarking of overall process energy use should be developed and comparisons made to current global practices for similar processes.</p> <p>Process options and design improvement opportunities should be developed and analysed based on benchmarking data or process models in order to evaluate and make a recommendation on a final project design.</p> <p>Overall energy efficiency strategies and objectives should be established and identified in the Business Case report for inclusion in the procurement documentation. (e.g. efficiency measurement and monitoring strategies).</p>	<p>The specification to clearly set out requirements to meet energy efficiency strategies and objectives identified and approved in the business case as well as tender evaluation criteria that support those strategies and objectives.</p> <p>Compliance with the requirements of the Assessment Plan for the remaining phases of the project particularly the detailed design phase must be specified.</p> <p>The specification should recognise that there needs to be a mechanism in the contract such that cost effective opportunities identified as part of the detailed design review phase can be implemented under the contract.</p>	<p>Tenderer evaluation is to include the specific consideration of the energy use and cost impact of the tenderers proposed process, plant selection and design and energy efficiency options.</p> <p>This evaluation process should incorporate an effective analysis to identify and quantify energy usage and costs for proposals being compared in order to identify the optimal proposal from an energy efficiency perspective.</p>	<p><b>Key element 4 – Opportunity identification and evaluation</b></p> <p>Intent:</p> <p>An effective process is undertaken to identify all potential cost-effective energy efficiency opportunities This process is broad, open-minded and encourages innovation.</p> <p>Ideas are filtered to identify a documented list of potential opportunities that can then be analysed to a level sufficient for informed evaluation-</p> <p>A whole-of-business evaluation is undertaken to enable decision-makers to make informed business decisions about energy efficiency opportunities.</p>

Key element	Establish business need (concept study/ pre-feasibility)	Business case (feasibility study/ FEED)	Competitive procurement (specification & tender)	Financial investment decision (tenderer selection, award contract, financial close)	Project implementation (detailed engineering/ construction management/ commissioning)
<p><b>Key element 5 – Decision making</b></p> <p>Intent:</p> <p>Management responsible for resource allocation for opportunities identified by the assessments make informed decisions on the assessment based on investment quality information.</p> <p>Mechanisms for reviewing, monitoring and reporting on outcomes are established to learn from experience and enable public reporting.</p>	<p>There are no specific EEO decisions expected at this stage other than the high level approval of the concept level study and approval to proceed to develop the Business case given the knowledge of expected lifecycle energy use and cost.</p>	<p>At this stage of the project management process decisions will include the selection of process elements and energy efficiency improvement options that will be specified and incorporated into the procurement process.</p> <p>Energy efficiency strategies and objectives will also be selected for incorporation into the specification and tender to establish the requirements for the detailed engineering design.</p>	<p>Specification preparation, tender analysis and tenderer selection are the prime opportunities for decision-making to influence the energy efficiency of the selected process and design.</p> <p>The evaluation criteria targeting energy efficiency optimisation will have been established as part of the specification and must be included as part of the evaluation and selection process.</p>	<p>The financial investment decision for a new development project or major expansion is the key opportunity for management to decide on a process and project design to satisfy the project requirement. The energy efficiency opportunity is maximised at this point in time.</p> <p>The recommendation for selection should take into account:</p> <ul style="list-style-type: none"> <li>• the overall project energy use and cost</li> <li>• the efficient energy use of major process elements and the opportunity for improving that energy use in the future</li> <li>• the fit with the energy efficiency strategies set out in the specification</li> <li>• the extent to which the proposed solution meets the energy efficiency objectives set out in the specification.</li> </ul>	<p><b>Key element 5 – Decision making</b></p> <p>Intent:</p> <p>Management responsible for resource allocation for opportunities identified by the assessments make informed decisions on the assessment based on investment quality information.</p> <p>Mechanisms for reviewing, monitoring and reporting on outcomes are established to learn from experience and enable public reporting.</p>

Key element	Establish business need (concept study/ pre-feasibility)	Business case (feasibility study/ FEED)	Competitive procurement (specification & tender)	Financial investment decision (tenderer selection, award contract, financial close)	Project implementation (detailed engineering/ construction management/ commissioning)
<p><b>Key element 6 – Communicating outcomes</b></p> <p>Intent:</p> <p>Senior management and the members of the board are aware of the outcomes of the assessment in a strategic business context (including the corporation's risk management, corporate social responsibility and major investment decisions).</p> <p>The board reviews and notes the content for the corporation's public report in the context of relevant business information.</p> <p>Recognition and awareness within the corporation of the benefits of improved energy efficiency and the outcomes achieved by the assessment, including recognition and awareness of people who contributed to its success.</p>	<p>The concept study report will document the overall project lifecycle energy use and cost as well as identifying the benchmarking opportunities that will be incorporated in the business case development stage of the project.</p> <p>Senior project management (often the project steering committee) will review and approve the concept study.</p>	<p>The business case report will document the overall project lifecycle energy use and cost as well as major system energy use and costs.</p> <p>Benchmarking of these energy uses and costs will be documented and options recommended detailed for comparative purposes.</p> <p>Senior project management will review and approve the business case and progress through to the procurement stage of the project.</p> <p>All energy efficiency improvement process options that are selected for consideration and analysis shall be communicated in the public report.</p>	<p>Inclusion of the relevant energy efficiency strategies, objectives and relevant evaluation criteria must be communicated to tender evaluation team members including the requirement for the way these criteria have been evaluated for each tenderer to be documented as part of the evaluation and selection report.</p> <p>The formal arrangements with the selected tenderer shall confirm the requirements to comply with relevant energy efficiency criteria set out in the specification.</p>	<p>The recommended selection will be reviewed by senior management and communicated to the board as part of the approval of the Financial investment decision.</p> <p>Award of the contract and announcement of the Financial Investment Decision is an opportunity for the board/ senior management to identify the energy efficiency considerations that were adopted as part of the contract selection and investment decision. These should be communicated in the Public Report.</p>	<p>Optimisation of the detailed design process will be reported as part of the project management process and this will be the primary source for communicating outcomes of detailed design.</p> <p>All energy efficiency improvement projects that are selected for consideration and analysis as part of the detailed design review shall be communicated in the Public Report.</p>