Tracking Program Performance Using Innovative Reporting Processes

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ABSTRACT

The Sustainable Energy Development Authority (SEDA) launched the Energy Smart Business Program in December 1997. The objectives of the program are to encourage investment in energy efficiency, to develop the energy services market within Australia and to deliver maximum greenhouse gas emission reductions. The program currently involves 170 Energy Smart Business 'Partners'—businesses that have signed a voluntary agreement with SEDA to implement all cost-effective energy efficiency upgrades. For each Partner, SEDA also funds a consultant energy management specialist, termed a 'Partner Support Manager' to assist in the identification and implementation of these upgrades.

A mechanism was required to allow efficient management of each of these Partner 'accounts' as well as to gather all relevant project statistics. The solution involved use of a database to record partner details plus the identified projects and to track progress towards implementation. All aspects of the Energy Smart Business Program are managed through the database, including target-setting, project tracking, monitoring, and evaluation of the Partners, Partner Support Managers, and overall program performance.

The Energy Smart Business database is now being used to track more than 650 current and prospective Partner companies, and more than 4,000 projects. Characteristics of the system which are particularly important to its effectiveness can be summarized as: efficient data gathering; the ability to track projects at different stages, from 'identified' through 'planned' to 'implemented'; and flexible reporting.

Significant financial savings are now accruing from the Energy Smart Business Program, and the environmental benefits are building. The Energy Smart Business database and its associated systems have been fundamental to this success.

Background

The Sustainable Energy Development Authority

The State Government of New South Wales (NSW) created the Sustainable Energy Development Authority (SEDA) in 1996. SEDA was established in response to escalating concern about the enhanced greenhouse effect, coupled with the prospect of reduced electricity costs as a result of deregulation of the electricity market. SEDA's mission is to "deliver greenhouse gas reductions, environmental, economic and social benefits to the NSW community by accelerating the transition to sustainable production and use of energy" (SEDA 2000).

SEDA manages a range of voluntary programs that focus on improving energy efficiency in all sectors of the community including the government, commercial, industrial, and residential sectors. SEDA also manages programs to encourage the growth of the renewable energy generation industry.

This paper focuses on the database behind SEDA's principal energy efficiency program, Energy Smart Business. The database allows SEDA staff to manage their

This paper focuses on the database behind SEDA's principal energy efficiency program, **Energy Smart Business**. The database allows SEDA staff to manage their interactions with the companies involved in the program and to monitor the performance of both the program and its participants.

The Energy Smart Business Program

The Energy Smart Business Program is a voluntary program covering energy efficiency in the commercial and industrial sectors in NSW. Operating since December 1997, it promotes awareness of energy-efficient technologies and assists NSW businesses to implement-cost effective energy efficiency projects. Figure 1 gives an overview of the program. See also Cooper et al. 1999.

Partners are businesses which commit themselves to being involved in the program. Senior management of partner companies sign a Memorandum of Understanding with SEDA in which they undertake to carry out energy efficiency projects 'wherever cost-effective,'[1] according to a particular timetable ('milestones').

Technical support

Information

Partner Support Managers are energy management specialists contracted by SEDA to provide Partners with assistance in identifying, evaluating, procuring, implementing and commissioning energy efficiency projects. Partner Support Managers are paid a retainer by SEDA as well as on the basis of their performance in achieving greenhouse gas emission savings for Partners.

Commitment

Promotion and recognition

SEDA coordinates the program, recruits partner companies and matches them with Partner Support Managers. It meets regularly with Partner Support Managers to monitor progress, overcome barriers in the implementation of projects and solve problems as they arise. SEDA also promotes and publicizes Partners that have carried out successful energy efficiency projects.
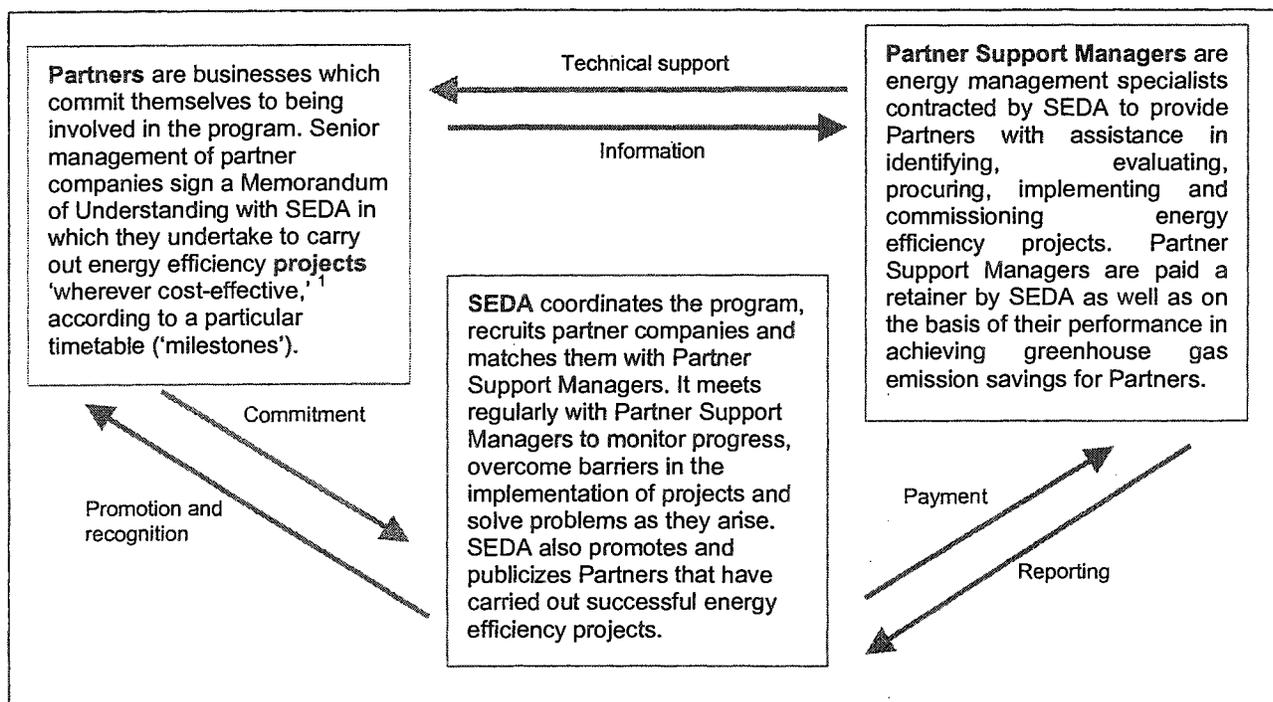
Payment

Reporting

Figure 1. Key Elements of the Energy Smart Business Program and Their Relationships with Each Other

To date the Energy Smart Business Program has achieved the following:
- implementation of more than 1,200 energy-efficiency projects
- a reduction of 184,000 tonnes (CO_2 equiv.) in annual greenhouse gas emissions
- investment of A\$23 million (US\$12.2 million) by Partners in energy efficiency upgrades
- annual energy savings of more than 1 petajoule, resulting in annual financial savings which have reached more than A\$10 million (US\$5.3 million)

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[1] 'Cost-effective' is defined in the Memorandum of Understanding as providing a minimum 20 per cent internal rate of return on investment ('internal rate of return' is a measure that companies use to decide whether or not an investment is worth the outlay; it refers to the relationship between capital investment in a project and the savings that will result from it over time).

The Problem

The Energy Smart Business Program currently involves more than 170 Energy Smart Business Partners, assisted by five Partner Support Manager contractors, with more than 4000 energy efficiency projects identified.

A mechanism was required to allow efficient management of each of these partner "accounts" as well as to gather the necessary statistics on energy efficiency projects. These statistics would be used to track the performance of the program and its participants through "key performance indicators" (see table 1).

Table 1. Selected Performance Indicators for the Energy Smart Business Program.
Shows the relevance of these indicators to monitoring of Partner companies, Partner Support Managers (PSMs) and the program as a whole.

Performance indicator	Partners	PSMs	Program
Tonnes CO_2 saved from projects (identified, implemented)	-	X	X
Total energy under partnership[2]	-	-	X
Accumulated energy savings	X	X	X
Accumulated annual dollar savings	-	X	X
Accumulated investment made by Partners in energy efficiency projects	X	X	X
Number of projects (identified, implemented)	X	X	X
Ratio of SEDA dollars invested in PSMs to lifetime tonnes[3] of CO_2 saved from implemented projects	-	X	X
Ratio of Partner dollars invested to total PSM fees paid by SEDA (leverage)	-	X	X
Ratio of Partners' annual cost savings to total PSM fees paid by SEDA	-	-	X
Milestones achieved by Partners within required timeframe	X	X	X
Status of Partners' internal energy management processes	X	X	X
Relative performance of PSMs in terms of Partners' savings in dollars, tonnes, energy etc	-	X	X

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[2] Derived by totaling the 'baseline' energy consumption for all Partners; the baseline is the amount of energy a Partner is using in its operations when it joins the program.

[3] 'Lifetime tonnes' take into account the assumed lifetime of a project or installed technology, as estimated by the Partner Support Manager; for example, a lighting upgrade of a retail store may be expected to last 6-10 years while a major chiller upgrade may last 20 or more years.

The Solution: The Energy Smart Business Database

A database was established to record Partner details plus the identified projects and to track progress towards implementation. This database started as a simple account management table, with a separate table of energy efficiency projects used for reporting on the program's overall success: energy, greenhouse gas and dollar savings and other indicators of performance.

As the number of Partners grew, so did the need for a more integrated database which linked company and contact details with information about the projects being carried out. The solution was to establish a relational database in Microsoft Access. Key features of the current system are:

- efficient information gathering—in terms of where the data comes from and how it is entered into the database
- flexible reporting—how the information is accessed and used.

Efficient Information Gathering

Two main kinds of information are used to manage and monitor the Energy Smart Business Program:

- information about projects
- information about Partners.

Information about Projects

The ability to gather comprehensive information about energy efficiency projects planned and implemented by Partner companies was seen as essential to the effectiveness of the Energy Smart Business Program. However, SEDA recognized that collecting and compiling this information could involve a significant amount of work for Partner companies, who may lack the technical expertise to carry out the required calculations. It was decided, therefore, that project reporting would be carried out by the consultant Partner Support Manager (funded by SEDA), reducing the load on the Partner and also, hopefully, resulting in more consistent and reliable information.

As a prerequisite to monthly progress payments, Partner Support Managers must quantify and provide various kinds of data for each project in the database, including:

- capital cost and financial savings of each project (with 'confidence level'),
- reductions in energy and greenhouse gases (with 'confidence level'),
- expected lifetime, and
- stage of progress towards implementation ('go-ahead' factor).

The confidence level reflects how likely the figures are to be correct (this would depend on the source of the data and the stage of the project; for example, a 100 per cent confidence level is only applied once the project is implemented and savings are actually being metered). The go-ahead factor is a percentage value determined by the project's stage of implementation:

- 100% 'go-ahead' means the project is fully implemented

- 90% means the project is confirmed and 95% that it is committed (both categorized as 'planned')
- 75% means the project has verbal approval
- 50% means the project has been identified but there are minor issues to be overcome
- 25% means the project has been identified but there are major issues to be overcome
- 0% means the project has been identified but is either not yet happening or is 'dead'.

Including these factors in the database enables SEDA to track projects in various stages of implementation, which allows more reliable forecasting and target setting.

To streamline the process and ensure the data is submitted in a consistent format, SEDA provides each Partner Support Manager with a preformatted database table in which they record all project details. They then email this updated table to SEDA on a nominated reporting day each month and SEDA staff use it to update the master table. In this way, a consolidated database of more than 4,000 projects can be updated by SEDA staff in a matter of minutes.

Information about Partners

Contact details and administrative information for each partner are maintained directly by the SEDA staff person responsible for that Partner. This information includes:
- company details—background information such as industry sector, and the Partner's status, for example, potential, rejected, removed or current
- addresses—postal and street address, specific to individuals in the organization
- contacts—individual contact names, titles and phone numbers, including the ability to indicate a person's role with respect to program (for example, 'main contact') and to specify contacts for particular purposes (such as receiving an invitation to an awards ceremony)
- the assigned Partner Support Manager
- the assigned SEDA staff person
- baseline energy consumption—the Partner's annual energy consumption before joining the program (provided by the Partner Support Manager)
- which milestone has been reached.

Information about interactions with the Partner includes correspondence, meetings held and notes from meetings. Specific information can be entered for each different contact person within the Partner company. Again, this is maintained directly by the SEDA staff person responsible for the account.

A third type of information gathered about Partner companies is not yet included in the database. It relates to the status of the company's internal energy management processes—such issues as the adoption of energy efficiency policies, staff awareness and training in energy efficiency practices, and the level of responsibility for energy management. This information is difficult to quantify through monthly project reporting but is drawn from surveys sent annually to Partners in the program and set out in the form of an 'energy management matrix' (see Figure 2).

			Characteristic		
Level	Energy Policy	Investment	Monitoring/ Reporting	Awareness/ Training	Responsibility/ Organization
5	A written policy which is regularly reviewed by senior management	Energy efficiency investments are given priority	Energy consumption targets are set as the basis of a comprehensive system of reporting, monitoring, quantifying savings and budget tracking for each functional area	Benefits of energy efficiency are widely promoted both internally and externally	Responsibility for energy management has been allocated and included in the job specification of a senior manager
4	A written policy which is not actively promoted by senior management	Energy efficiency investments are made on the same basis as other investments	Energy consumption is reported against targets annually	A program of staff training is in place, along with regular publicity campaigns	Responsibility for energy management has been allocated to a staff member and included in their job specification
3	A written policy which is yet to be adopted	Energy efficiency investments are expected to have shorter paybacks than other investments	Energy consumption reported on the basis of monthly cost	Staff awareness and training programs are run from time to time	Responsibility for energy management has been allocated to a staff member, but not as part of their job specification
2	A set of unwritten guidelines	Investment only occurs if there is money available in an existing budget	Energy consumption reported on the basis of annual cost	Promotion of energy efficiency is on an informal basis	An interested staff member has adopted informal responsibility for energy management
1	No policy	No investment in energy efficiency	No energy monitoring or reporting	No promotion or communication about energy efficiency	Responsibility for energy management hasn't been allocated

▓ Average situation in Energy Smart Businesses in 2000

Figure 2. Example of an Energy Management Matrix. This is based on annual survey data. It can be produced for an individual Partner company, for Partners assisted by a particular Partner Support Manager, or for the program as a whole.

Reporting: How the Energy Smart Business Database Is Used

The database is used to monitor and report on:
- Partner progress
- Partner Support Manager performance (progress of Partners, effectiveness of Partner Support Manager)
- program performance (progress and effectiveness, in itself and relative to other SEDA programs).

Flexibility is a key aspect of the database's reporting functions. SEDA staff can easily generate their own customized reports for particular purposes (prior to a meeting with a Partner or Partner Support Manager, for example, or when re-negotiating a contract with a Partner Support Manager). As well, regular monthly reports are produced to provide a summary of data for various key performance indicators, so progress can be monitored and trends analyzed.

Partner Progress

The database can produce reports for a particular Partner, displaying information such as a brief description of identified or implemented projects, the savings each will achieve, and its stage of implementation ('go-ahead factor'). Another possibility is to generate a list of all Partners showing those which have not yet met the milestones required by their agreement with SEDA.[4]

Tables 2 and 3 are examples of just two of the possible report formats which can be generated from the database. SEDA can use such reports in its discussions with Partners about their progress in the program, or with Partner Support Managers to focus on those Partners who may be having difficulties implementing energy efficiency upgrades.

Table 2. Example of Report Generated from the Energy Smart Business Database: Project Costs and Savings by Go-ahead Factor for a Particular Industrial Partner

Projects with a go-ahead factor of:	Project cost (A$)	Annual savings (A$)	Simple IRR[5]	Energy saved (GJ)	CO_2 saved (tonnes)
25%	$14,650	$4,257	29%	108	74
50%	$2,760	$890	32%	111	8
75%	$56,238	$32,609	58%	1,922	492
90%	$1,455	$740	51%	54	14
95%	$29,500	$7,763	26%	349	93
Implemented (100%)	$47,000	$21,150	45%	1,400	370
All projects	$151,603	$67,409	45%	3,944	1,051

Table 3. Example of Report Generated from the Energy Smart Business Database: Outstanding Milestones for a Range of Partners

	Milestones				
	Plan due Met?	Rep. space Met?	20% upgrade Met?	50% upgrade Met?	75% upgrade Met?
Partner 1	9/09/98 ☑	9/12/98 ☑	9/09/99 ☑	9/06/00 ☐	9/06/03 ☐
Partner 2	26/09/98 ☑	26/12/98 ☑	26/09/99 ☑	26/06/00 ☐	26/06/03 ☐
Partner 3	2/10/98 ☑	2/01/99 ☑	2/10/99 ☑	2/07/00 ☐	2/07/03 ☐
Partner 4	29/10/98 ☑	29/01/99 ☑	29/10/99 ☑	29/07/00 ☐	29/07/03 ☐
Partner 5	22/01/99 ☑	22/04/99 ☑	22/01/00 ☑	22/10/00 ☐	22/10/03 ☐
Partner 6	22/05/99 ☑	22/08/99 ☑	22/05/00 ☑	22/02/01 ☐	22/02/04 ☐

[4] The Partner's Memorandum of Understanding sets out milestones as follows: within three months of signing, submit a plan outlining how the MoU's requirements will be met; carry out all cost-effective upgrades in a 'representative area' of operations within six months; carry out not less than 20% of all cost-effective upgrades within 15 months; not less than 50% within two years and not less than 75% within five years of signing.

[5] Simple internal rate of return is the annual savings expressed as a percentage of the project cost.

Partner Support Manager Performance

The progress of each Partner Support Manager is tracked monthly when the database is updated. The key performance indicators for Partner Support Managers are summarized in a 'scorecard' with most information sourced directly from database reports. Information on the scorecard includes the number of milestones achieved and the number of Partners with outstanding milestones, projects identified/planned/implemented, the amount Partners have invested in energy efficiency projects, and the tonnes of greenhouse gases saved.

This last indicator is important for Partner Support Managers, as they are paid a performance 'bounty' on the tonnes of greenhouse gases saved through energy efficiency projects, and this makes up a large proportion of their payments from SEDA.[6] The program was designed in this way to provide an incentive for Partner Support Managers to focus on the desired outcome—reducing greenhouse gas emissions—rather than concentrating on energy audit reports (energy audit programs had been subsidized by earlier Government programs).

Other information on the scorecard includes whether the database was submitted on time, and how much SEDA has paid the Partner Support Managers.

This combined information enables SEDA to determine how many SEDA dollars each tonne of greenhouse gas reduction has cost, and also calculate the 'leverage' of the program by comparing SEDA's Partner Support Manager costs with how much Partners have invested in energy efficiency projects (see table 4). This quantification of the cost of each tonne of greenhouse gas saved has proved to be useful during fee negotiations with the Partner Support Managers. It provides a scale for overall performance, and encourages competition between Partner Support Managers.

Table 4. Sample Comparison of Partner Support Manager (PSM) Statistics. These figures are easily generated from database reports

Partner Support Manager (PSM)	$SEDA/Lifetime tonnes of CO_2 saved	$Partners invested/ $Total PSM fees	$Partners savings/ $Total PSM fees
Contractor 1	$2.27	1.6	1.8
Contractor 2	$2.39	5.9	2.3
Contractor 3	$3.01	7.9	2.8
Contractor 4	$0.95	33.2	7.7

Program Performance

Results for most of the key performance indicators (see table 1) used in monitoring the progress and effectiveness of the Energy Smart Business Program are easily generated from the database.

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[6] In the early days of the program, Partner Support Managers were paid monthly fees with a small incentive for projects implemented during the contract period. As the experience of both SEDA and the consultants has grown, fees are now split. Ideally one third of the payment is a monthly fee (based on the number of Partners and size of Partners' energy bills) while two-thirds is a performance payment based on the CO2 savings of projects implemented during the contract period.

For example, one of the primary performance indicators is how many **tonnes of greenhouse gases are saved** every month through the implementation of energy efficiency projects. The actual tonnes saved from *implemented* projects is tracked, as are the tonnes that Partner Support Managers estimate will be saved from *planned* or *identified* projects. (As mentioned previously, the implementation status of a project is indicated in the database by the 'go-ahead' factor.) A forecast or 'dynamic target'—an estimate of tonnes to be saved from future implementation of projects—can also be derived by considering data on projects currently identified or in planning stages (see Figure 3).

The program also has *minimum* targets for reductions in greenhouse gas emissions. These targets are relatively conservative and are easily being exceeded, but as government funding for the program depends on these targets being met, reliable reporting is essential.

The ability to analyze the data by stage of implementation (using 'go-ahead' factors) also allows SEDA to monitor trends and plan strategies to solve problems that may emerge. One example is to examine the **average internal rate of return** (IRR) for projects at different stages. The IRR is a measure that companies use to decide whether or not an investment is worth the outlay; it refers to the relationship between capital investment in a project and the savings that will result from it over time.

Partners are currently saving nearly A$10 million (US$5.3 million) annually in energy costs, with an average internal rate of return of 38 per cent. This is lower than when the program began—when companies were focusing on the 'low-hanging fruit' (projects with a very high IRR). But it is still much higher than the IRR that defines a project as cost-effective in SEDA's agreement with Partners, which states that all projects with an IRR of 20 per cent or more should be implemented. Furthermore, database analysis has revealed that the average IRR for *planned* projects is much less—only 24 per cent—than that the 38 per cent for implemented projects. The challenge is to encourage Partners to move towards a lower IRR to ensure that these planned projects are actually implemented.

Finally, information from the database is used to monitor the performance of the Energy Smart Business Program as a whole, compared to other SEDA programs. SEDA must report regularly on all its programs to the NSW Minister for Energy and to the general public. Relevant performance indicators in this context include capital investment, and annual and lifetime savings from implemented and planned projects.

Future Development

The Energy Smart Business database has evolved from a single data table focused mainly on marketing the program to potential Partner companies, to a fully integrated, multi-table relational database used for data entry, program monitoring, target-setting and reporting. However there is still scope for further development.

Some reports, such as the Partner Support Manager scorecard and other performance indicator graphs, cannot be automatically updated, but require manual input of figures generated from the database.

Most data can be entered easily into the system. However, information such as the results of the annual survey sent to Partner companies must be entered manually, which is very time-consuming. Financial information such as expenditure on Partner Support Managers must also be manually entered from other SEDA information systems.

A. Annual savings in greenhouse gas emissions achieved by the Energy Smart Business Program since June 1998, for projects identified, planned or implemented by Partners
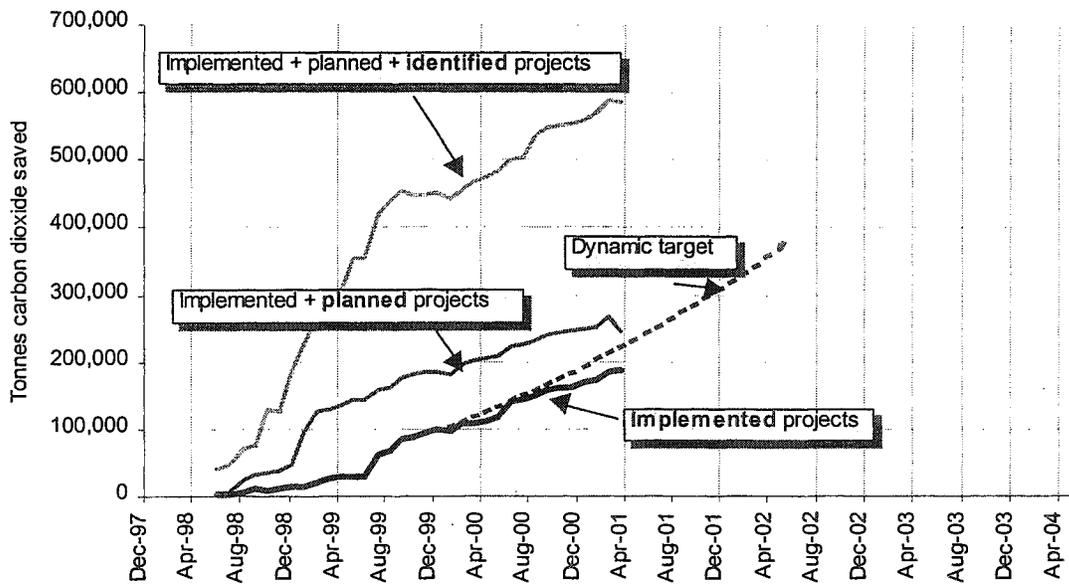
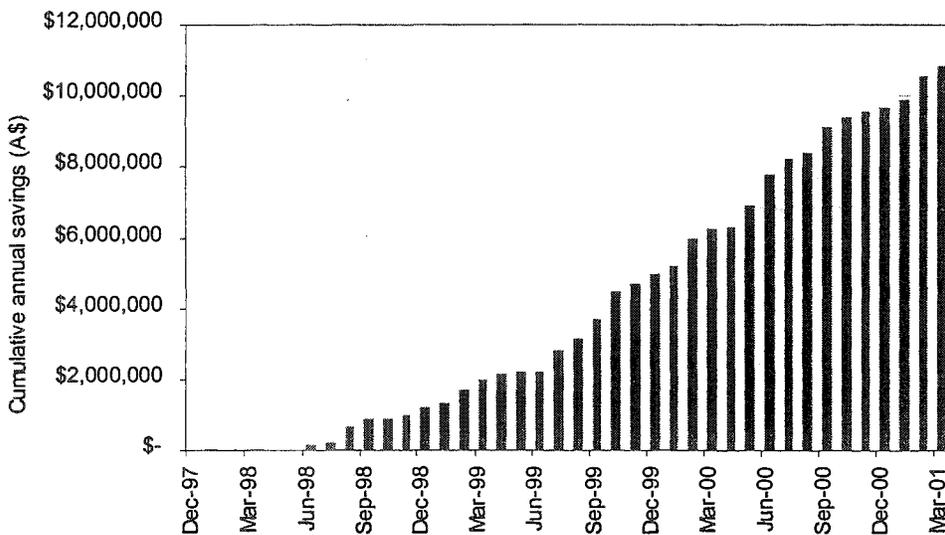B. Accumulated annual Australian dollar savings for Energy Smart Business Partners (A$1=US$0.48)

Figure 3. Examples of Key Performance Indicators, with Values Generated from the Database.

The energy management matrices generated from the annual survey results are separate spreadsheets and not part of the database; linking them would be a useful addition. It would also be of great benefit to improve the links with other SEDA programs which overlap with Energy Smart Business.

SEDA is currently working on all these issues.

Conclusion

The Energy Smart Business database and its associated information gathering and reporting processes allow effective account management as well as comprehensive monitoring of the Energy Smart Business Program. Characteristics of the system which are particularly important to its effectiveness can be summarized as:

- efficient data gathering, including responsibility for information gathering given to Partner Support Managers rather than Partner companies
- the ability to track projects at different levels of implementation, from 'identified' through 'planned' to 'implemented', and to accommodate estimates of savings with varying levels of confidence
- flexible reporting, including the ability for SEDA staff to generate their own reports as required to manage their Partner accounts and monitor progress, and the ease of generating statistics for key performance indicators.

Significant financial savings are now accruing from the Energy Smart Business Program, and the environmental benefits are building. Effective monitoring and reporting processes have been fundamental to this success, and SEDA will continue to develop these processes, enhancing its ability to track the program, demonstrate its effectiveness and encourage many more businesses to share in the benefits.

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