BREAKOUT SESSION 7

BENCHMARKING ENERGY USE AND ASSET PERFORMANCE IN VICTORIAN PUBLIC HOSPITALS
BENCHMARKING ENERGY AND ASSET PERFORMANCE IN VICTORIAN PUBLIC HOSPITALS

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1. **Objective**

The objectives of the study were to:
- Set operational benchmark targets for each hospital type by survey of Victorian public hospitals.
- Provide guidelines for Department of Human Services application of the performance indicators and benchmarks.

2. **Background**

The first phase of the project addressed the contextual issues of the public sector, the methodology of performance measurement and undertook a pilot study of three hospital sites to measure key performance indicators.

The initial literature review of benchmarking practices of asset management in the health industry both in Australia and overseas confirmed that an information gap existed in the strategic management of Victorian Public Hospitals in the context of measuring performance. The initial study investigated three hospitals in Victoria to identify unique measurable attributes of a hospital in a way that performance measurement and benchmark targets can be established. The first phase study identified the following:
- performance measures would be assessed by the application of performance measures designed to identify the utilisation of an asset, cost efficiency and value.
- in a public hospital the asset can be categorised under eight functional areas.
- costs associated with modifying the internal environment of an asset is the primary focus.
- six key areas that influence performance were identified and Key Performance Indicators (KPIs) linking five of these were identified.

3. **Survey form**

The second phase survey was carried out through the use of a questionnaire survey form. Facility managers for each of the hospitals were asked to complete a survey form for each hospital campus for which they were responsible. Financial information was requested for the last completed financial year, 1999/2000. The survey was sent to all hospitals within the study group and was divided into five main sections: Buildings, Functional areas, Hospital revenue, Facilities management expenditure, Energy use and cost.

The development of performance indicators in relation to the operation of Victorian public hospitals is dealt with in great detail in the first report (Pullen, Atkinson and Tucker 1998). Only some relevant general concepts are repeated or expanded upon here in summary form.

The primary focus of the study was to collect data for performance indicators for assessing the performance of hospital assets, from which relevant performance indicators or measures, and benchmarks can be derived. One of the main aims was to provide asset managers with the necessary indicators or measures which will allow them to evaluate objectively the performance of their portfolio of operational assets, and to make rational decisions in asset planning and management to support their service delivery strategies.
4. Demand for indicators

The Victorian government requires public service providers to prove that efficient management of assets is being undertaken. To satisfy this need compilation of data that will enable meaningful management decisions to be made must be facilitated. The financial performance of an organisation is a key indicator of its success (Kaplin and Norton 1992 and Green 1993) and integral with this is the utilisation of its assets. This information may be utilised for any one or more of the following purposes:

- accountability for the asset’s existence
- reporting the asset’s value
- estimating the depreciation expense associated with their use
- assisting with their efficient utilisation and management

4.1 Performance indicators calculated

The performance indicators determined in the phase one study formed the basis of the performance indicators evaluated. When carefully considered in terms of setting benchmarks and their characteristics, some changes were needed.

Some indicators relating to functional area could not be calculated, as data was not available by functional area. Table 1 shows the status of the performance indicators identified in the earlier project (those in bold were used in the second study). A replacement indicator was created for the Functional Area Energy per unit Gross Floor Area by simply using the aggregated energy for the whole hospital.

The Key Performance Indicators used for this study are as listed in Table 2. The original performance indicators varied in their sense of improvement, i.e. some required a larger value for improvement, some a smaller value. Thus some performance indicators were inverted to arrange for all indicators to have a *smaller is better* approach to benchmarks.

### Table 1 Status of Performance Indicators

<table>
<thead>
<tr>
<th>Measure</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key performance Indicators</strong></td>
<td></td>
</tr>
<tr>
<td>FMB ($) / HRI ($)</td>
<td>Used as is</td>
</tr>
<tr>
<td>WIES / En_{Tot} ($)</td>
<td>Inverted</td>
</tr>
<tr>
<td>WIES / GFA (m$^2$)</td>
<td>Inverted</td>
</tr>
<tr>
<td>HRI ($) / CRV ($)</td>
<td>Inverted</td>
</tr>
<tr>
<td>HRI ($) / CV ($)</td>
<td>Not calculable</td>
</tr>
<tr>
<td>HRI ($) / GFA (m$^2$)</td>
<td>Inverted</td>
</tr>
<tr>
<td>Energy GJs / Th$_{fa}$ (hr)</td>
<td>Not calculable</td>
</tr>
<tr>
<td><strong>Other performance Indicators</strong></td>
<td></td>
</tr>
<tr>
<td>FA$_{fa}$ (m$^2$) / GFA (m$^2$)</td>
<td>Modified</td>
</tr>
<tr>
<td>Energy$<em>{fa}$ (GJ) / Energy$</em>{Tot}$ (GJ)</td>
<td>Not calculable</td>
</tr>
<tr>
<td>Energy cost ($) / Energy$_{Tot}$ (GJ)</td>
<td>Not used</td>
</tr>
<tr>
<td>FMB ($) / FMB ($)</td>
<td>Not used</td>
</tr>
<tr>
<td>FMB ($) / CRV ($)</td>
<td>Not used</td>
</tr>
<tr>
<td>FMB ($) / CV ($)</td>
<td>Not calculable</td>
</tr>
<tr>
<td>Energy cost ($) / CRV ($)</td>
<td>Not used</td>
</tr>
<tr>
<td>FMB ($) / GFA (m$^2$)</td>
<td>Not used</td>
</tr>
<tr>
<td>CV ($) / GFA ($)</td>
<td>Modified</td>
</tr>
<tr>
<td>Weighted Energy distribution (GJ)/ FA$_{fa}$ (m$^2$)</td>
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</tr>
<tr>
<td>Key Performance Indicator</td>
<td>Calculation</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Facility energy efficiency</td>
<td>Ratio of annual energy costs to hospital gross floor area</td>
</tr>
<tr>
<td>Hospital services energy consumption rate</td>
<td>Ratio of annual energy cost to annual WIES units</td>
</tr>
<tr>
<td>Hospital services facility utilisation</td>
<td>Ratio of hospital gross floor area to annual WIES units</td>
</tr>
<tr>
<td>Facility income efficiency</td>
<td>Ratio of hospital gross floor area to annual hospital income</td>
</tr>
<tr>
<td>Capital utilisation</td>
<td>Ratio of capital replacement value to annual hospital income</td>
</tr>
<tr>
<td>Facility management ratio</td>
<td>Ratio of annual facility management expenditure to annual hospital income</td>
</tr>
</tbody>
</table>

### 4.2 Setting benchmarks

A range of criteria was considered for setting benchmarks and ultimately the benchmark had to satisfy the following criteria:

- The benchmark must be achievable by a significant proportion of the hospitals
- The benchmark should, if possible, apply to all hospitals and not subsets of the hospitals
- The performance indicator on which the benchmark is based should be simple to understand
- The performance indicator on which the benchmark is based should be easy to calculate from readily available information
- All benchmarks should move in the same direction for improvement (i.e. smaller is better or larger is better)
- Benchmarks should be dynamic in that as all hospitals improve, the benchmark self-adjusts to continually (but slowly) raise the required performance level

From the analysis of the survey data which covered 52 Victorian hospitals (85% of the acute hospital portfolio), the research team in collaboration with Department of Human Services recommended that

**Benchmarks should be set at the lower quartile of the current performance level of the surveyed hospitals.**

At first glance this may appear to be a very high target but the performance indicators across all hospitals show that the difference between the lower and upper quartiles are not generally very great. Thus for about 50% of the hospitals in the mid-range of performance, the improvement required to achieve the benchmark is not particularly difficult with the target still being sensible.

When considered by hospital group (or category A1, A2, B, C, D, E) the performance indicators showed similar ranges of values so there is not a need for setting separate benchmarks for different groups. However, there are some performance indicators where almost all of a particular group exceed the benchmark but overall, setting one benchmark for all hospitals appears to be the simplest approach which still satisfies the criterion above.
4.3 Key Performance Indicators

The values for all the Key Performance Indicators were plotted in ascending rank order for all hospitals and their group (A1, A2, B, C, D, E) in a manner which preserves anonymity for all hospitals. To ensure that not even a hint of how well (or otherwise) other hospitals are faring, the ranking is retained as 1 to number of hospitals for each graph of a Key Performance Indicator. If the hospitals were identified by having the same number on each graph, it would be possible to identify each hospital’s profile and thus deduce, in many circumstances, which results applied to which hospital.

4.4 Benchmarks

A horizontal line shows the value of the benchmark for that Key Performance Indicator. Note that significant differences from the benchmark at the ends of the graphs may indicate that the data has not been provided on the same basis as the others.

Six Key Performance Indicators (KPI) recommended for annual updating to provide a range of insights into hospital energy and facility use are:

- Facility Energy Efficiency
- Hospital Services Energy Consumption Rate
- Hospital Services Facility Utilisation
- Facility Income Efficiency
- Capital Utilisation
- Facility Management Ratio

The rank order for all hospitals for which the Key Performance Indicators could be calculated are shown in Figure 1. The dark vertical bars are an example of results (arbitrarily determined for illustrative purposes) for one particular hospital. Such information would only be made available to that hospital as an aid to the facility manager.

5. Discussion

The chosen KPI and Benchmarks should be addressed at least on an annual basis to review level of benchmarks, ease of collection and reliability of data, availability of previously only aggregated data, definition of terms and usefulness of collected data and the resulting Key Performance Indicators.

Benchmarks should be set for the whole hospital system rather than for individual hospital group (A1, A2, B, C, D, E) as most performance indicators have similar ranges for each group. It is also easier to understand and manage a single benchmark.

Benchmarks should be set at the lower quartile of the current performance level of the surveyed hospitals. At first glance this may appear to be a very high target but the performance indicators across all hospitals show that the difference between the lower and upper quartiles are not generally very great.

The most significant improvement in collection of survey data would be to provide definitions of all values required to overcome problems of compatibility as interpretation of existing information appears to vary considerably, particularly in the energy sub-divisions. Consistency is also required in determining hospital revenue and facility management.
Figure 1
Individual hospital performance profile
Current Replacement Value should be readily available as it is a most important value in determining indicators which relate activities to the resources utilised. Similarly Functional Area details should be available to be able to determine which functions of a hospital consume which resource as not all hospitals have the same distribution of functions in energy use or facility use. Some potentially useful performance indicators cannot be calculated without a breakdown of resources used by functional area.

A common approach to allocating energy consumption and costs (and other energy dependent resources such as steam) is required, particularly where there are contract-operated co-generation plants which consume hospital supplied gas and sell part of the electricity to the grid.

Ease of obtaining the necessary data has ranged from very easy (readily available) to very difficult (not available) and should be improved for ongoing Key Performance Indicators by better structure and disaggregation of records, keeping records up-to-date, integrating accounts for administration and engineering and overcoming problems with commercial in confidence.

Collection of energy data should be undertaken in more detail to enable identification of those functional areas which consume the most energy if appropriate steps are to be implemented to reduce energy consumption in line with the Victorian Government policy. Currently, only aggregate values are available for inter-hospital comparison.

A thorough study of the implementation of the Key Performance Indicators and benchmarks should be undertaken to ensure that a regular survey can be carried out readily and accurately. Topics should include data definition and availability, methods of data collection and potential for online updating and automatic analysis.

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6. References

