Utility Perspective: Experience and Lessons Learned

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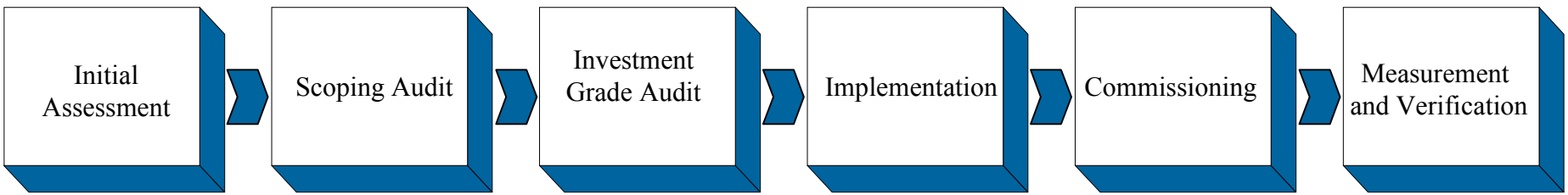
FUPWG Fall Meeting 2001

October 11, 2001

The Process

Con Edison Solutions employs multi-step process in identifying, developing and implementing energy infrastructure projects. Following is a description of the steps to be employed in this process:



Engineering principles in accordance with reference standards such as ASHRAE, ASME, etc.

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Initial Facility Assessment

- **Gather preliminary facility utility data**
- **Gather preliminary facility equipment and systems data**
- **Site visit as required**

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Scoping Audit Process

- **Conduct analyses of energy systems opportunities**
- **Develop initial recommendations**
- **Perform Cost / Benefit analyses**

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Investment Grade Audit Process

- **Perform detailed energy analysis**
- **Finalize project budgets through development of a guaranteed maximum price for each opportunity**
- **Preliminary drawings if necessary**
- **Propose measurement and verification protocols for each recommended measure**

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Implementation Phase

- **Develop construction drawings for final review**
- **Hold regular review meetings**
- **Initiate employee training and awareness process**
- **Install required metering and verification equipment**

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Commissioning Phase

- **The commissioning effort starts at the onset of the design process and continues all the way through construction and startup**
- **Verify installation in accordance with design**
- **Re-test equipment and systems as necessary**

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Measurement and Verification Phase

- **Execute measurement and verification plan outlined in Investment Grade Audit Report**
- **Follow applicable DOE M&V Protocols**
- **Investigate negative variances in predicted/stipulated savings in excess of 10%**

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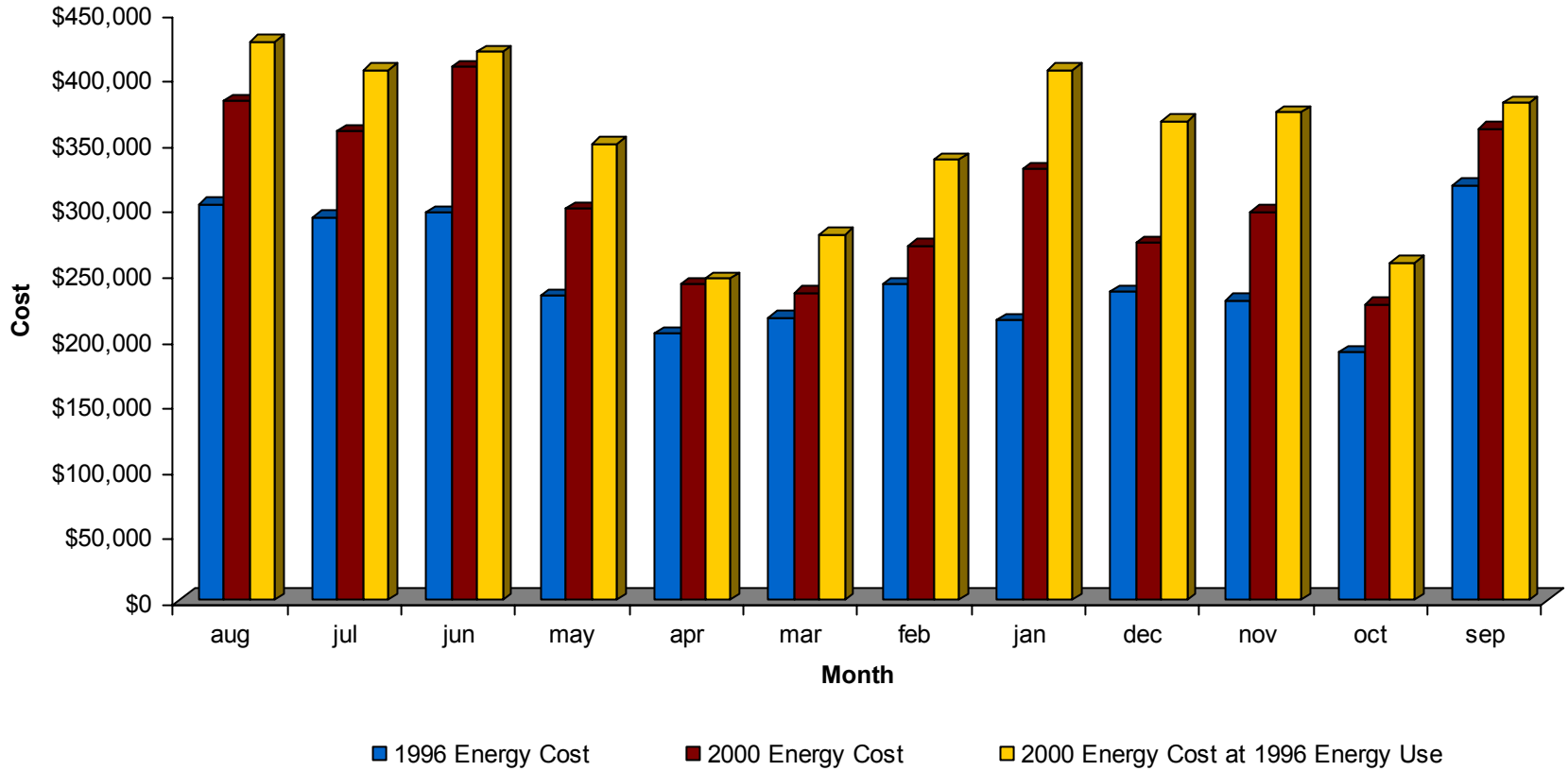
Monthly Electric Cost Comparison

Veterans Administration Hospital



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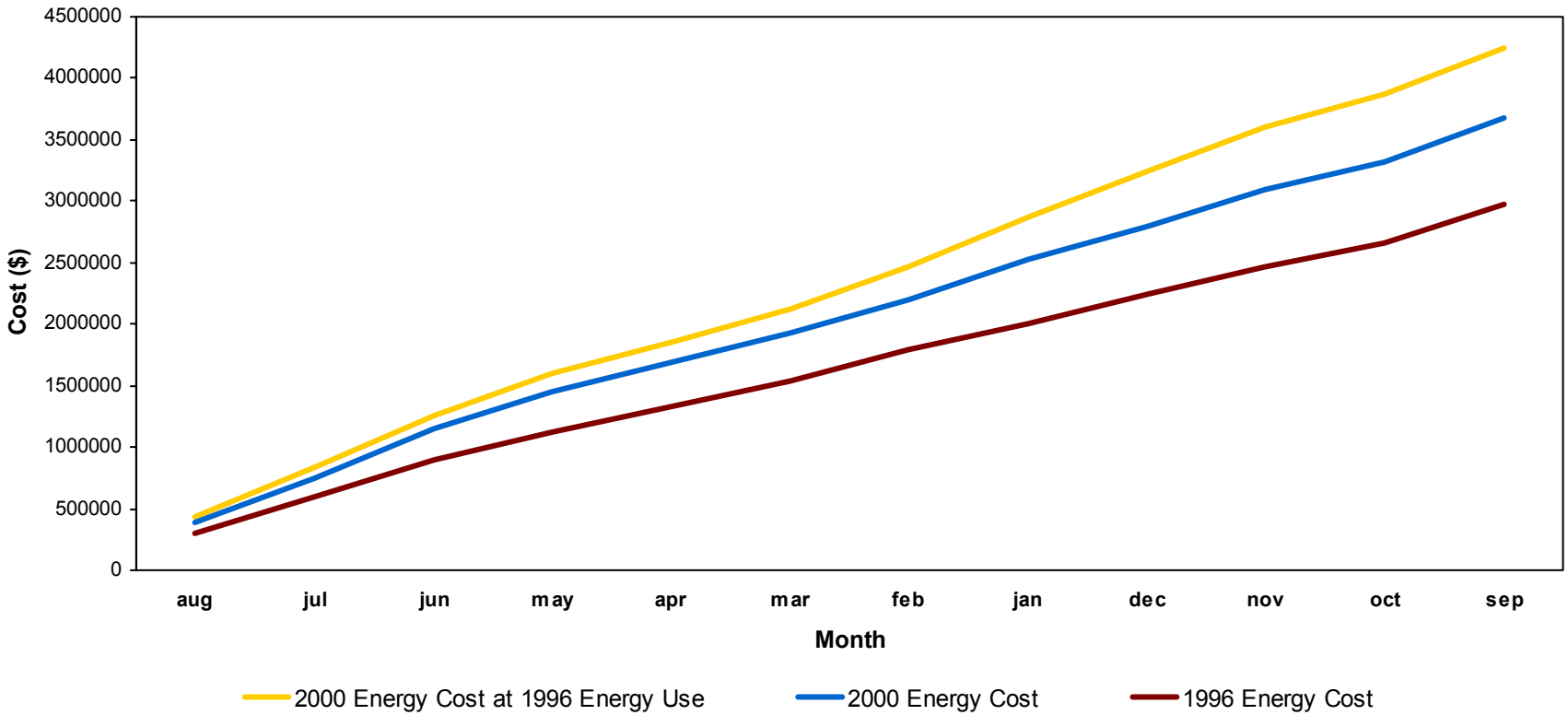
Annual Cumulative Electric Cost Comparison

Veterans Administration Hospital



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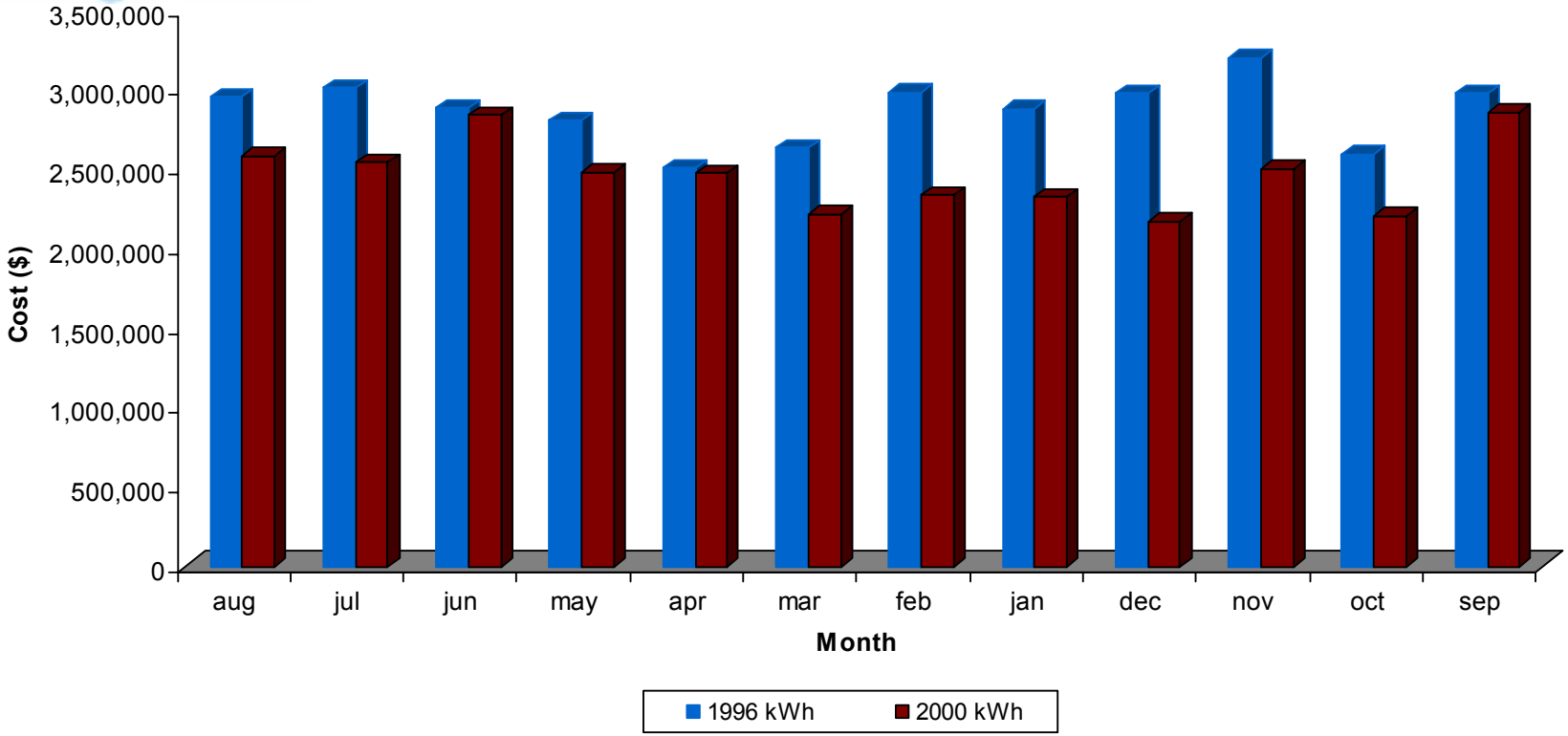
Monthly Electric Consumption Comparison

Veterans Administration Hospital



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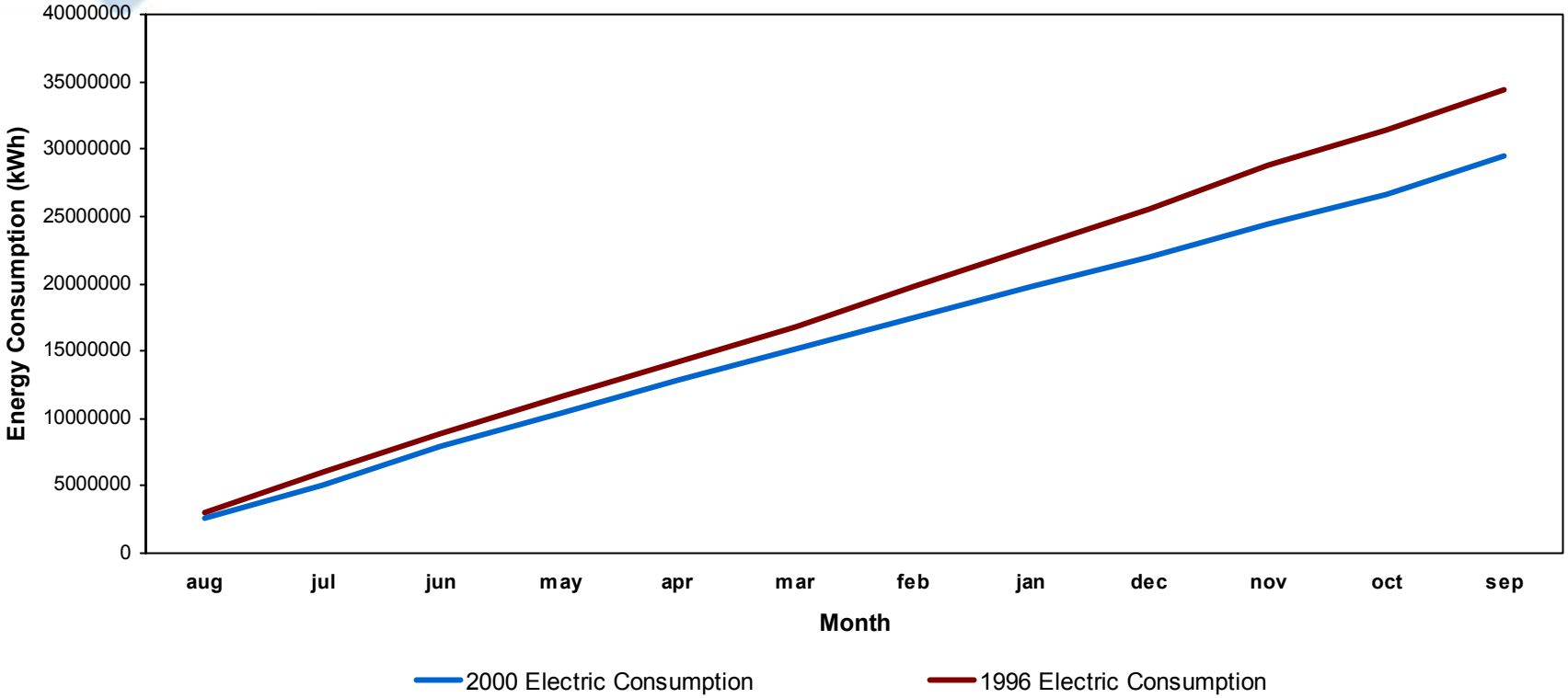
Annual Cumulative Electric Consumption Comparison

Veterans Administration Hospital



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Electric Consumption Savings Comparison

Veterans Administration Hospital

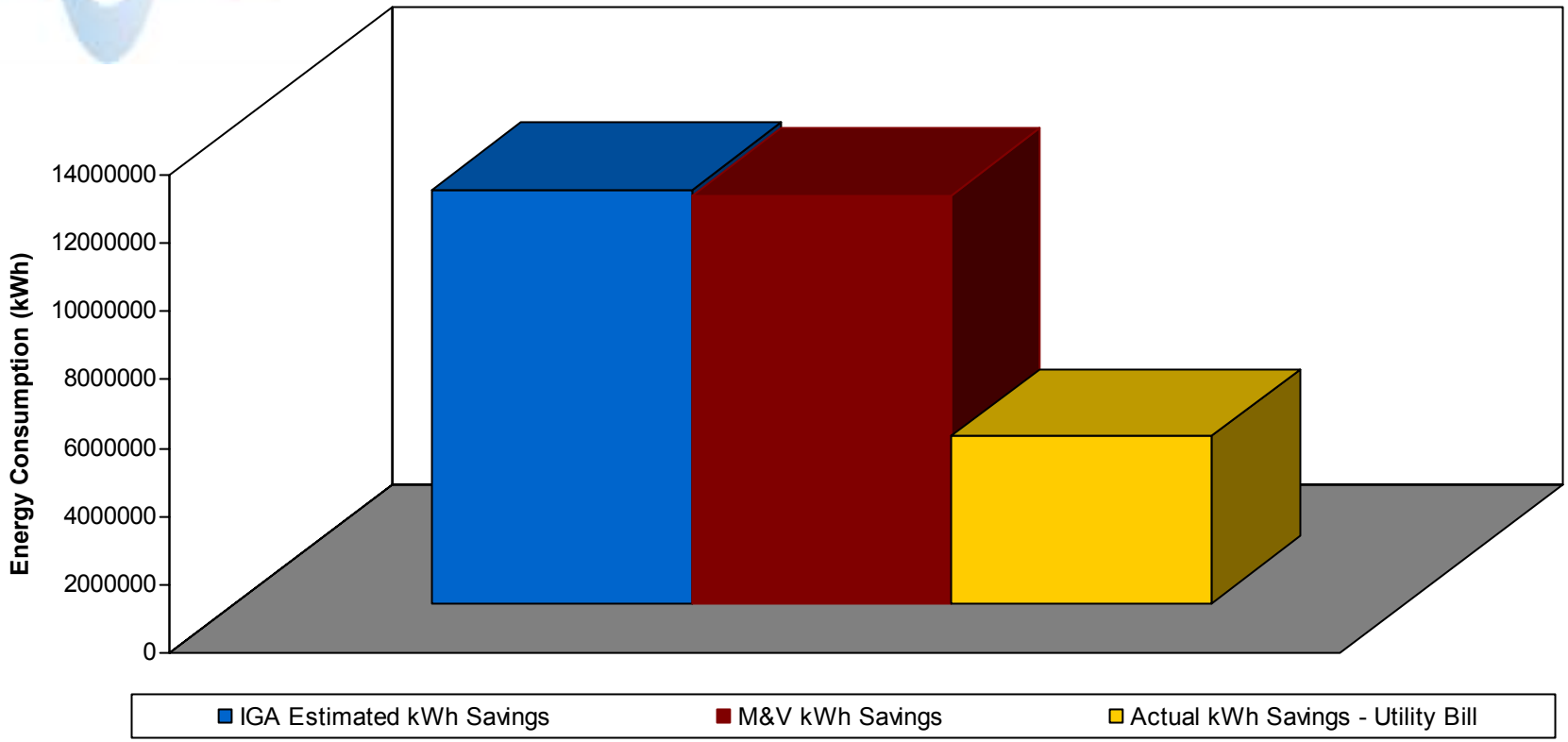

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Table 2.2: Overview of M&V Options

M&V Option	Performance and Operation Factors*	Savings Calculation	M&V Cost**
Option A—Stipulated and measured factors	Based on a combination of measured and stipulated factors. Measurements are spot or short-term taken at the component or system level. The stipulated factor is supported by historical or manufacturer's data.	Engineering calculations, component, or system models.	Estimated range is 1%-3%. Depends on number of points measured.
Option B—Measured factors	Based on spot or short-term measurements taken at the component or system level when variations in factors are not expected. Based on continuous measurements taken at the component or system level when variations are expected.	Engineering calculations, components, or system models.	Estimated range is 3%-15%. Depends on number of points and term of metering.
Option C—Utility billing data analysis	Based on long-term, whole-building utility meter, facility level, or sub-meter data.	Based on regression analysis of utility billing meter data.	Estimated range is 1%-10%. Depends on complexity of billing analysis.
Option D—Calibrated computer simulation	Computer simulation inputs may be based on several of the following: engineering estimates; spot, short-, or long-term measurements of system components; and long-term, whole-building utility meter data.	Based on computer simulation model calibrated with whole-building and end-use data.	Estimated range is 3%-10%. Depends on number and complexity of systems modeled.

*Performance factors indicate equipment or system performance characteristics such as kW/ton for a chiller or watts/fixture for lighting; operating factors indicate equipment or system operating characteristics such as annual cooling ton-hours for chillers or operating hours for lighting.

**M&V costs are expressed as a percentage of measure energy savings.

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Customer Benefits

- **More Bang for the Buck**
- **Minimal Administrative Burden**
- **In Line With Established Engineering Practices**
- **Safety Net**
- **Protects Agency's Interest**

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