

Evaluation Methodology- A Case Study for the Government Initiative on Energy Saving

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Contents

- ✦ Case study outline
- ✦ Background of the EE&C programme
 - ✦ Overview of government electricity consumption
 - ✦ Classification of venues/ facilities and examples
- ✦ Normalisation of electricity consumption
 - ✦ “Why” & “how”
 - ✦ Factors affecting consumption of venues/ facilities
 - ✦ Normalisation methodology- the factors & changes
- ✦ Difficulties encountered and lesson learnt
- ✦ Conclusions

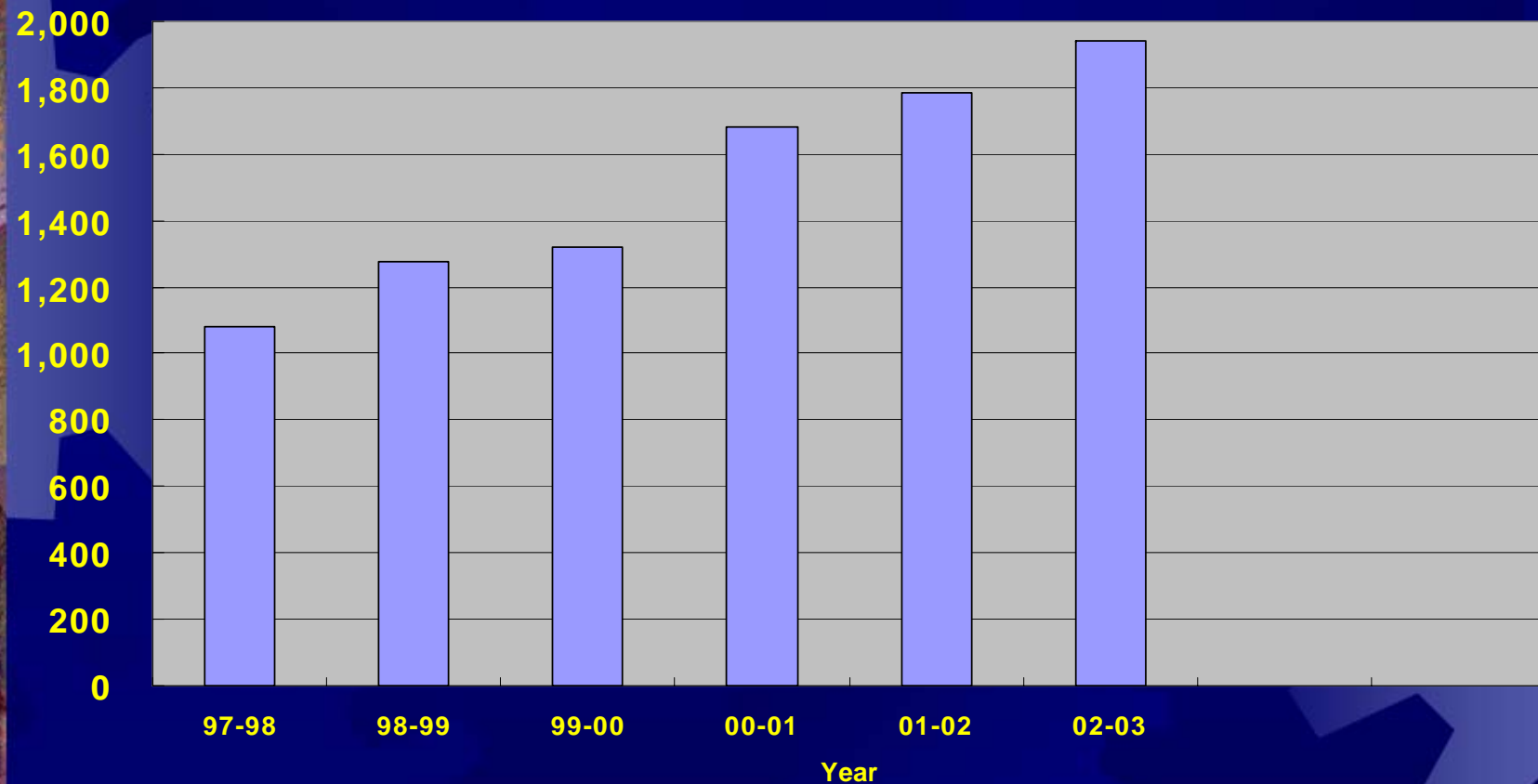
Case Study Outline

- ★ **EE&C programme**: Electricity saving in government by 6% in 4 years (FY 03/04 to FY 06/07)
- ★ Programme performance **evaluation** by normalisation techniques



Government Electricity Expenditure Since FY 97/98

Government Electricity Expenditure (HK\$M)



Electricity Consumption in Government

- ✦ Consumption in FY 02/03:
 - 2,272 GWh (i.e. 2,272 million kWh)
 - About 5.5% of HK's electricity
- ✦ Electricity consumption in Government was increasing over the preceding 6 years

Electricity Saving Targets for Whole Government from Policy Bureau (ETWB) (March 2003)

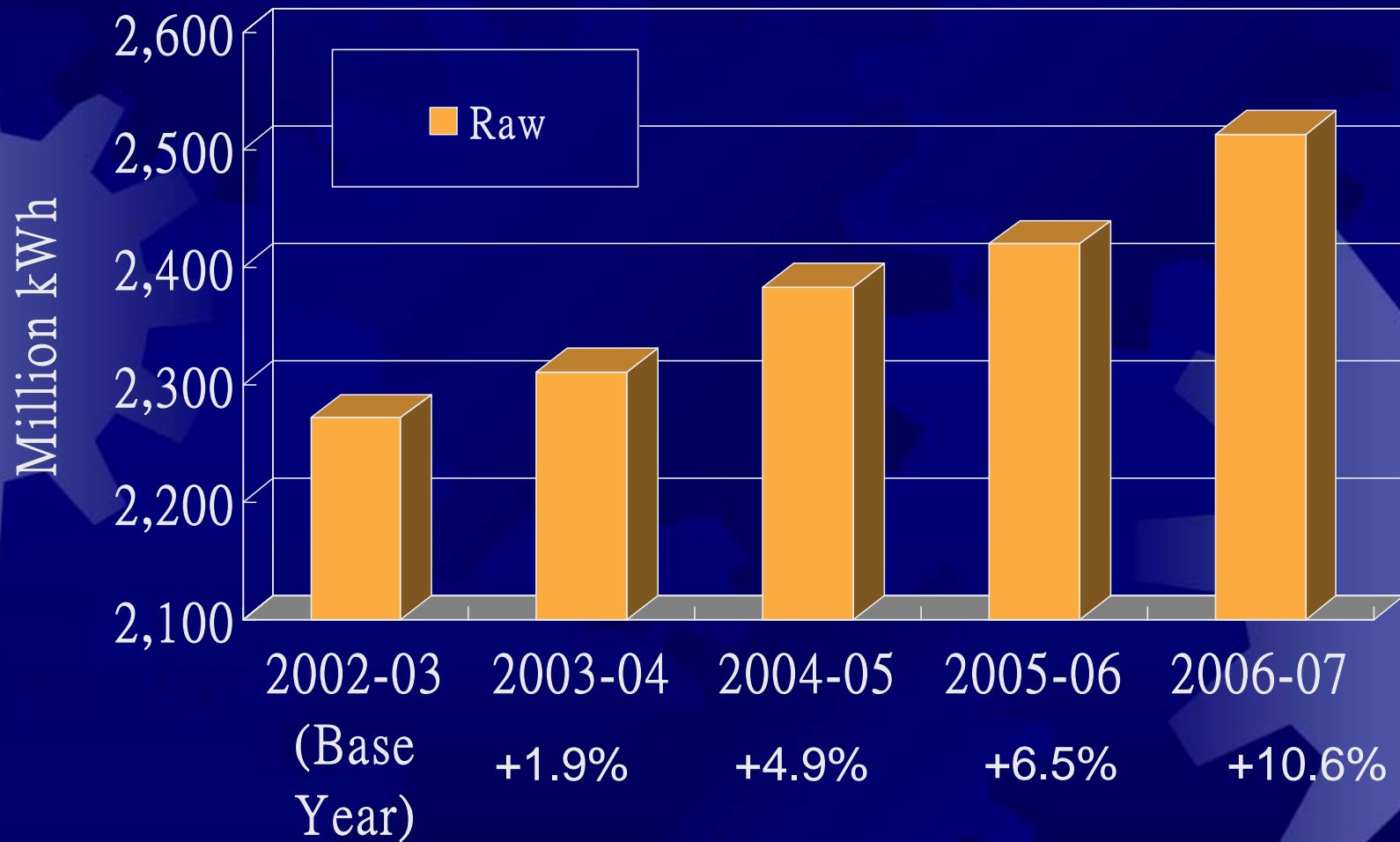
- ★ Base Year: FY 2002/03
- ★ Cut down kWh consumption by 1.5%, 3%, 4.5% and 6% in 4 years

	FY 02/03	FY 03/04	FY 04/05	FY 05/06	FY 06/07
Target kWh Consumption	100%	98.5%	97.0%	95.5%	94.0%

Types of Government Venues/ Facilities

- ✦ Offices
- ✦ Public and municipal services
- ✦ Infrastructure

Government Raw Electricity Consumption in the 4-year Programme



Normalisation of Electricity Consumption – Why?

- ✦ Saving target was set at a certain moment in time while the operating environment of the Government is continuously **changing**
- ✦ Necessary to **eliminate** the effect of time/ activities/ circumstances changes in order to ensure **realistic, like-to-like comparison**

Normalisation of Electricity Consumption – How to interpret “saving %”?

- ★ The “saving %” in electricity consumption shows **improvement in energy efficiency** due to concerted efforts by B&Ds despite raw consumption is increasing
 - housekeeping and energy efficiency retrofits projects
- ★ The “saving %” presents the scenario **quantitatively** for easier understanding
- ★ If B&Ds had **not** performed such efforts, the “saving %” would have been expended

Normalisation of Electricity Consumption – How to calculate?

- ✦ Normalisation aims to **quantify the effect of changes** attributable to or likely to cause changes in electricity consumption
- ✦ To find out the **net consumption figures** should there be no change in operation profiles or activities of a government department
- ✦ Have to identify the **significant, quantifiable parameters** which reflect the **activity changes**

Normalisation Methodology

- ✦ Relevant **parameters** to be considered
- ✦ Different factors to be applied depending on the **activity/ operation profiles** of bureau/ department
- ✦ Consider also **inter-dependency** among different factors
- ✦ Keep track the **activity changes**

Major Factors Affecting Consumption of Venues/ Facilities

- ✦ Building/ plant age
- ✦ Gross floor area
- ✦ Operating hours
- ✦ Room temperature
- ✦ Occupant behaviours
- ✦ Operating & maintenance practices
- ✦ Type of air-conditioning systems
- ✦ Type of lighting systems

Normalisation Factors Used

Examples of normalisation factors:

- ✦ gross floor area
- ✦ working hours
- ✦ utilisation rate of premises
- ✦ volume of water/sewage treated

Activity Changes of Government in Recent Years

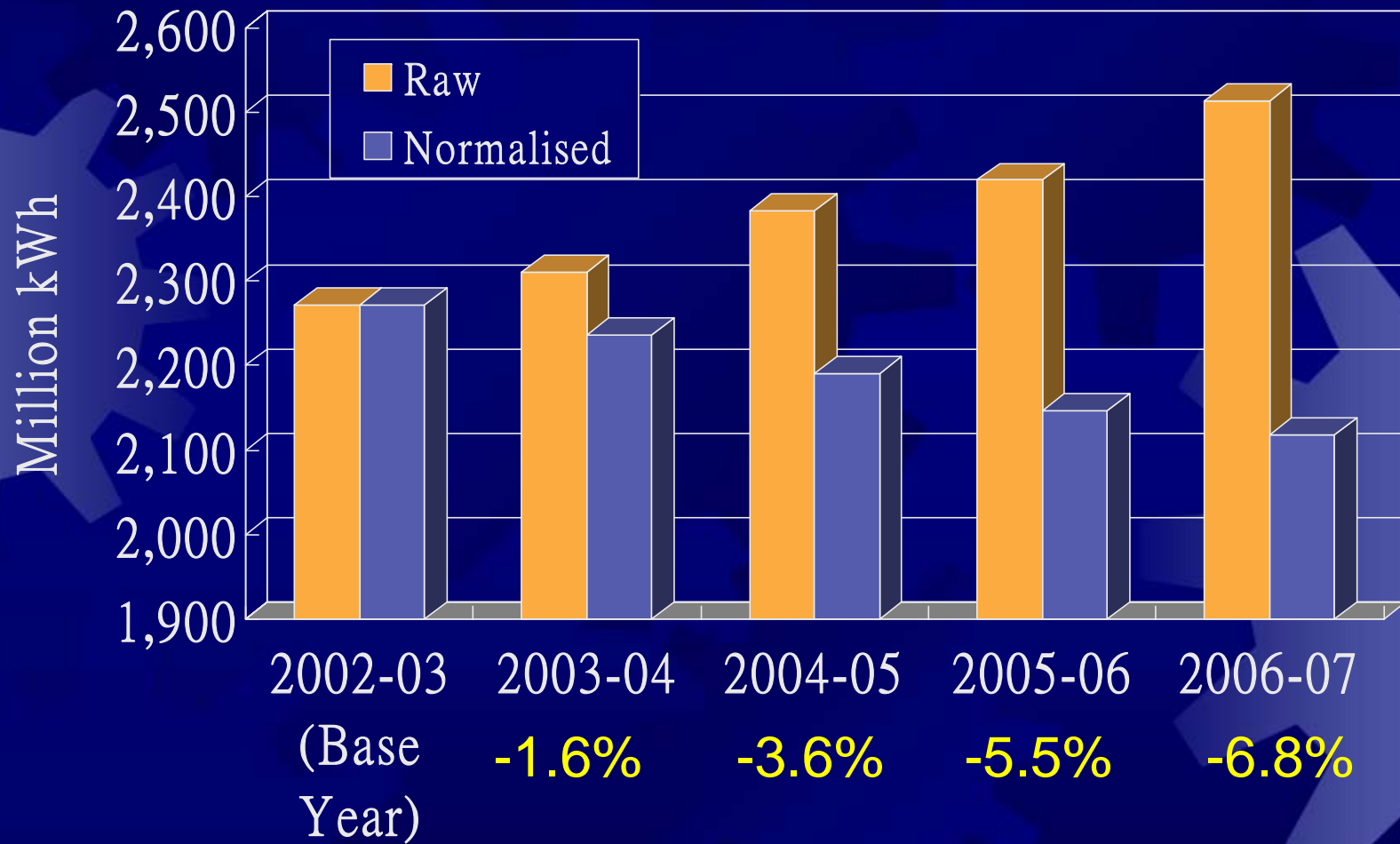
- ☀ Public demand for Government services
 - Population / tourists
 - Economic changes
 - Social-cultural changes
- ☀ Internally driven initiatives
 - Quality of Government service delivery
 - Efficiency improvement
- ☀ Provision of new facilities
 - New venues/ facilities
 - Alteration/ refurbishment of existing venues/ facilities

Activity Changes of Government in Recent Years

★ Some major energy consuming departments

- ★ Water Supplies Department
- ★ Food & Environmental Health Department
- ★ Leisure & Cultural Services Department
- ★ Government Property Agency
- ★ Drainage Services Department

Evaluation- Government Electricity Consumption in 4-year Programme



Difficulties Encountered and Lesson Learnt

Problem	Suggestions
No / incomplete / outdated list of accounts	<ul style="list-style-type: none">✦ Meticulously search for electricity accounts registered with power companies for each and every venue/ facility✦ Establish and update database for electricity accounts and kWh consumption

Difficulties Encountered and Lesson Learnt

Problem	Suggestions
Incorrect particulars of accounts (e.g. customer name, supply address, nature of venue/ facility etc.)	<ul style="list-style-type: none">✦ Inform power companies of up-to-date particulars✦ Correlate name of venue with supply address✦ Classify venue/ facility properly

Difficulties Encountered and Lesson Learnt

Problem	Suggestions
Loose/ non-systematic management	<ul style="list-style-type: none">✦ Better handover/ takeover arrangement upon change of personnel✦ Watch out for incompleteness / inaccuracy of existing records✦ Consider centralisation of bill payment and consumption recording

Difficulties Encountered and Lesson Learnt

Problem	Suggestions
Loose/ non-systematic management (Cont'd)	<ul style="list-style-type: none">✦ Consider group billing for accounts for same venue or under same regional office✦ Note any parent-and-children account relationships✦ Consider installing check meters for different floors or units for better monitoring

Conclusions

- ✦ **Normalisation** found useful in evaluating the Government initiative on energy conservation
- ✦ Important to understand **activities changes** in **normalisation factors** in adopting normalisation.
- ✦ **Account management**, consumption monitoring and reporting to be taken up effectively



Thank You

Website

www.emsd.gov.hk

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Appendices

Types of Government Venues/Facilities

Public and municipal services, e.g.

★ Disciplinary services

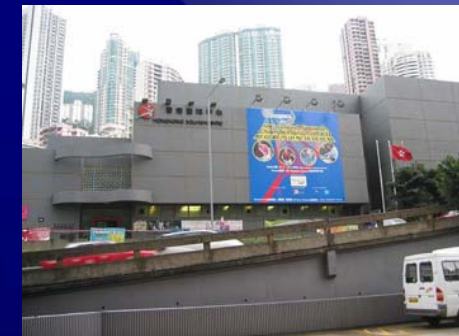
- Fire station, ambulance depot
- Correctional institute, prison

★ Health services

- Clinic
- Health centre

★ Municipal services

- Market
- Town hall, museum, park



[Return](#)

Types of Government Venues/Facilities

Infrastructure, e.g.

- ★ Water and drainage
 - Treatment works
 - Pumping station
- ★ Border Control
 - Border control points
 - Airport/Ferry terminals
- ★ Public transport facilities
 - Public transport interchange
 - Escalators
- ★ Street lightings



[Return](#)

Activity Changes of Major Energy-Consuming Depts in Recent Years - WSD

- ☀ Increased pumping volumes of raw water, fresh water and flushing water
 - ☀ Dry spells
 - ☀ Strategic transfers
- ☀ Increase in office gross floor area (FY 06/07 vs FY 02/03)

[Return](#)

Activity Changes of Major Energy-Consuming Depts in Recent Years - FEHD

- ✦ New venues (e.g. markets)
- ✦ Redevelopment of existing facilities
- ✦ New offices and change in gross floor area
- ✦ Change in accounting arrangement (e.g. paying bills for self-use/ other departments)
- ✦ Change in equipment / improvement in facilities (e.g. upgrading of ventilation/ air-conditioning system in markets and cooked food centres)

[Return](#)

Activity Changes of Major Energy-Consuming Depts in Recent Years - LCSD

- ✦ Opening of new venues (e.g. sports centres, public libraries, parks, playgrounds etc)
- ✦ Extension of service hours
- ✦ Expansion of activity/service areas
- ✦ High usage rate of venues

[Return](#)

Activity Changes in Major Energy-Consuming Depts in Recent Years - GPA

- ✦ Increased occupied floor area of offices
- ✦ More IT/ computer equipment
- ✦ Increased duty and standby air-conditioning units
- ✦ Large scale fitting-out works

[Return](#)

Activity Changes of Major Energy-Consuming Depts in Recent Years - DSD

- ★ Commissioning of new sewage pumping stations and treatment plants
- ★ Upgrading of existing sewage treatment facilities
- ★ Enhancement of treatment quality to meet latest effluent discharge standard
- ★ Sewage flow volume increases by 5.9% in FY 05/06 when compared to FY 02/03

[Return](#)