



ISO 50001 Energy Management System and Certification

Ir Vincent C. Y. KONG

Global Products and Services Development Manager

Tel: 852 3543 7934

852 6832 3682

E-mail: vincent.kong@sgs.com

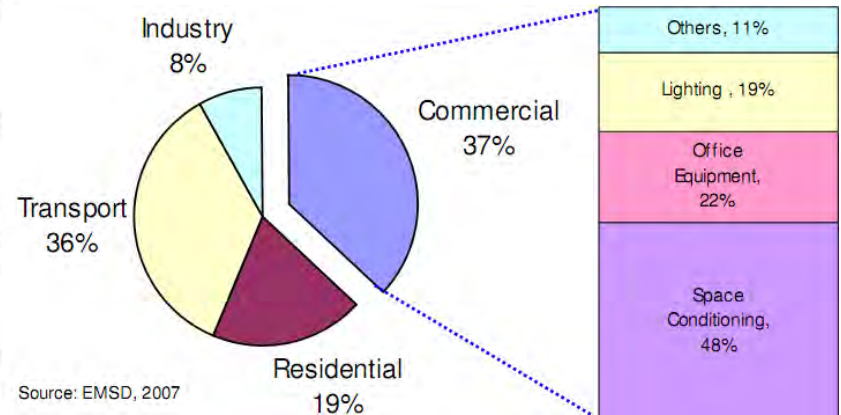
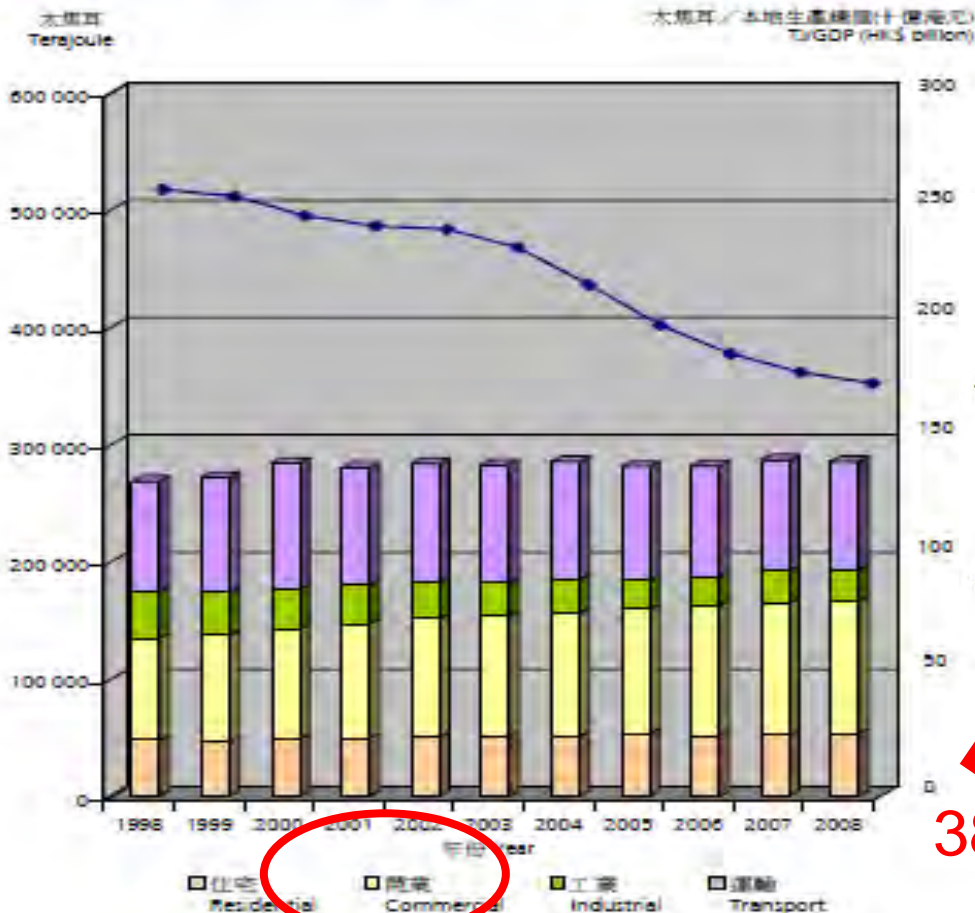


**HOW CAN YOU CONTINUOUSLY
IMPROVE ENERGY EFFICIENCY?**

主要最終能源使用數據 Key Energy End-use Data

按香港本地生產總值計算的能源最終用途 (按2008年環比物量計算)
Energy End-use Per GDP in Hong Kong in chained (2008) HK dollars

Figure 1 Graph 1



Source: EMSD, 2007

38 %

(From EMSD – Hong Kong Energy End-Use Data 2010)

- Asia and the Pacific's primary energy demand is projected to increase at 2.1% per year between 2010 and 2035.
- Faster than the world average of 1.5% for the same period.
- PRC and India will account for 70% of total electricity generated by 2035.

Considerable pressure on companies and organisations to **improve energy performance** and to be seen to be doing so

Need to position themselves and their brands as '**green**' and be seen to 1) reduce GHG emission & 2) environmental impact and 3) energy cost of their products and services

Source: ADB, Energy Outlook for Asia and the Pacific, October 2013



Most energy efficiency is achieved through changes in **how energy is managed** rather than through installation of new technologies

An Energy Management System standard will provide a framework for integrating **energy efficiency** into existing systems for **continuous improvement**



BENEFITS OF Energy Management System

- Enhance **cost control & saving** on energy use
- Continue to **improve energy use & efficiency**
- Reduce **GHG emission & environmental impact**
- Actively **manage energy use**, rather than through installation of new technology
- Enable consistence, organized, integrated, and documented Energy Management System (EnMS)
- Highly compatible with other management systems (e.g. ISO 9001 QMS, ISO 14001 EMS, etc.)



BENEFITS OF Energy Management System



- Assist organizations in making **better use of their existing energy-consuming assets**
- Offer **guidance** on benchmarking, measuring, documenting, and reporting energy intensity improvements and their projected impact on reductions in GHG emissions
- Create **transparency and facilitate communication** on the management of energy resources
- Promote energy management **best practices** and **reinforce** good energy management behaviors
- Assist facilities in **evaluating and prioritizing** the implementation of new energy-efficient technologies
- Provide a framework for promoting energy efficiency throughout the **supply chain or the property owner**
- Facilitate energy management improvements in the context of **GHG emission reduction** projects

STRUCTURE OF EnMS

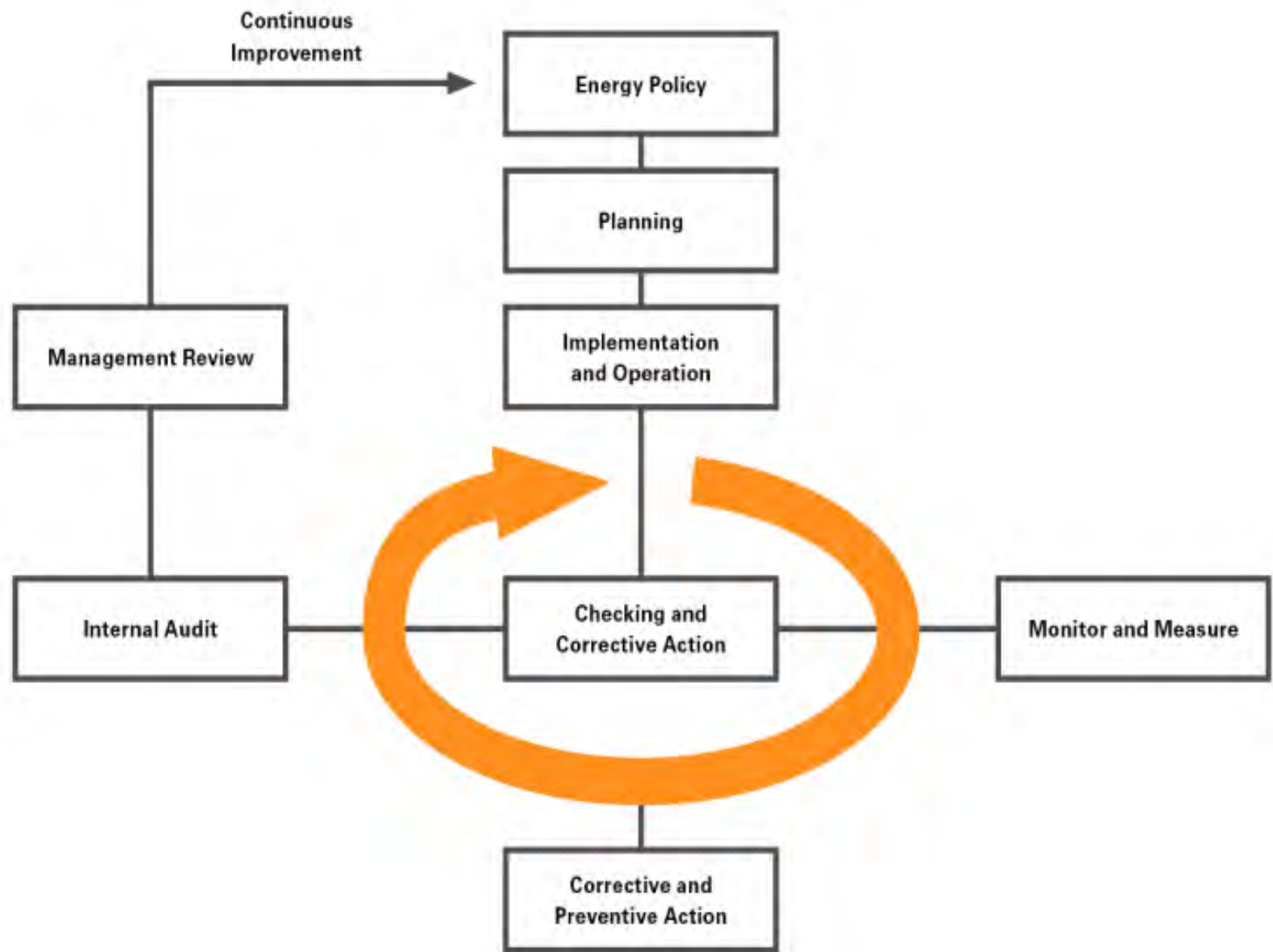
- The structure of the EnMS standard is highly compatible with ISO 14001 EMS and ISO 9001 QMS
- The EnMS standard is based on the Plan-Do-Check-Act (PDCA) methodology & continual improvement
- The EnMS standard can be used independently or integrated with other management systems (ISO 9001, ISO 14001, OHSAS 18001, etc.)

The stated objective of the standard is to enable organizations to:

“...establish the systems and processes necessary to improve energy performance, including energy efficiency, use and consumption”



THE ENERGY MANAGEMENT SYSTEM MODEL



ISO 50001 Energy Management System

MANAGEMENT 管理

PLAN 規劃

- Policy/goals/targets 政策、目標、標的(4.3, 4.4.6)
- Resources 資源(4.2.1)

DO 執行

- Training 訓練(4.5.2)
- Communication 溝通(4.5.5)
- Control equipment system & processes 系統設施及製程控制(4.5.4)

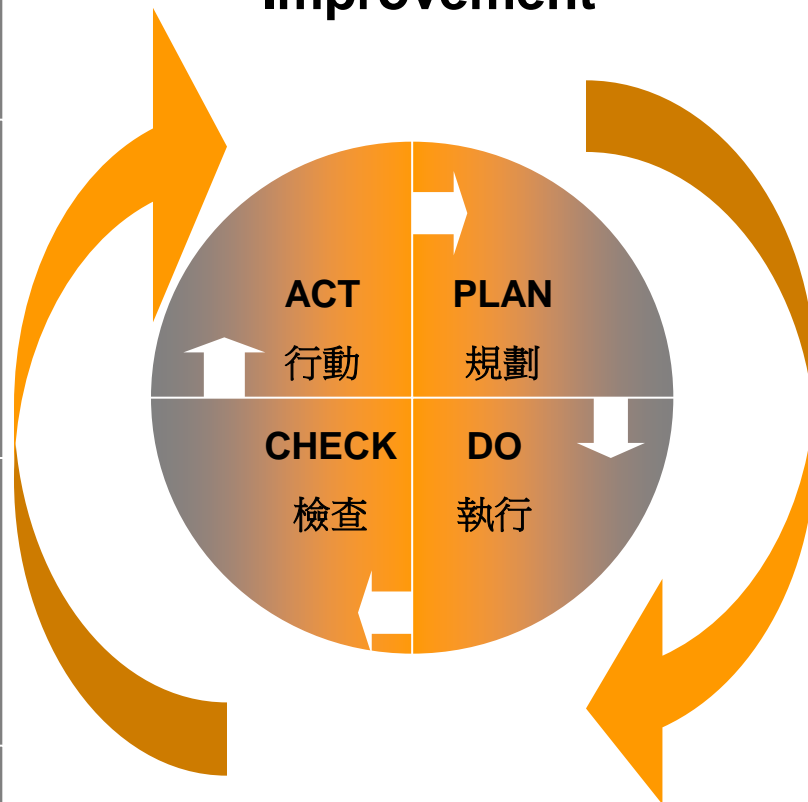
CHECK 檢查

- Corrective/preventive action 矯正/預防措施(4.6.4)
- Internal Audit 內部稽核(4.6.3)

ACT 行動

- Management review 管理審查(4.7)

Continual Improvement



TECHNICAL 技術

PLAN 規劃

- Energy Review (4.4.3)
- Energy baseline (4.4.4)
- Energy Performance Indicators 能源績效指標 (4.4.5)

DO 執行

- Operation Control (4.5.5)
- Design 設計(4.5.6)
- Energy purchasing 能源購買(4.5.7)

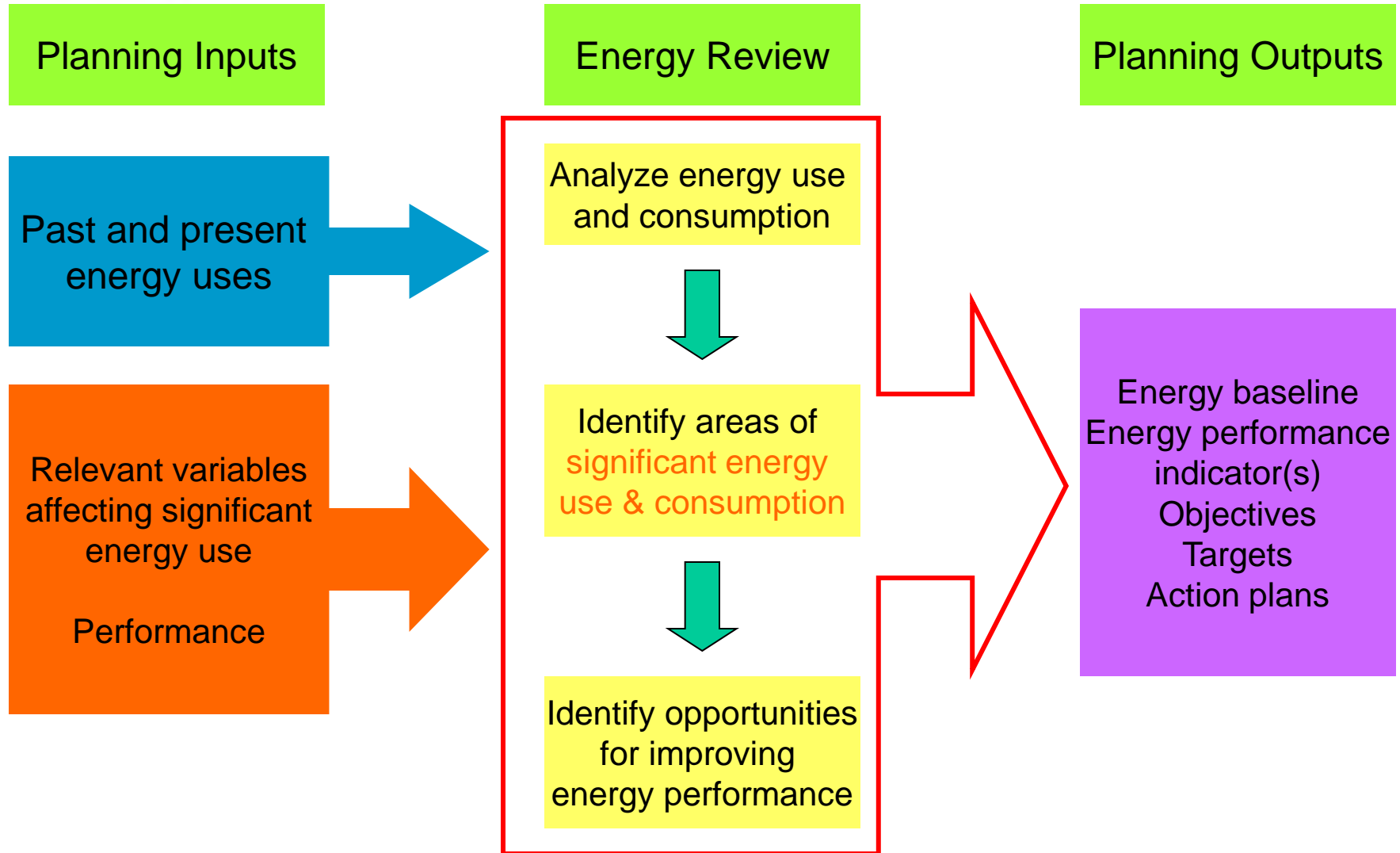
CHECK 檢查

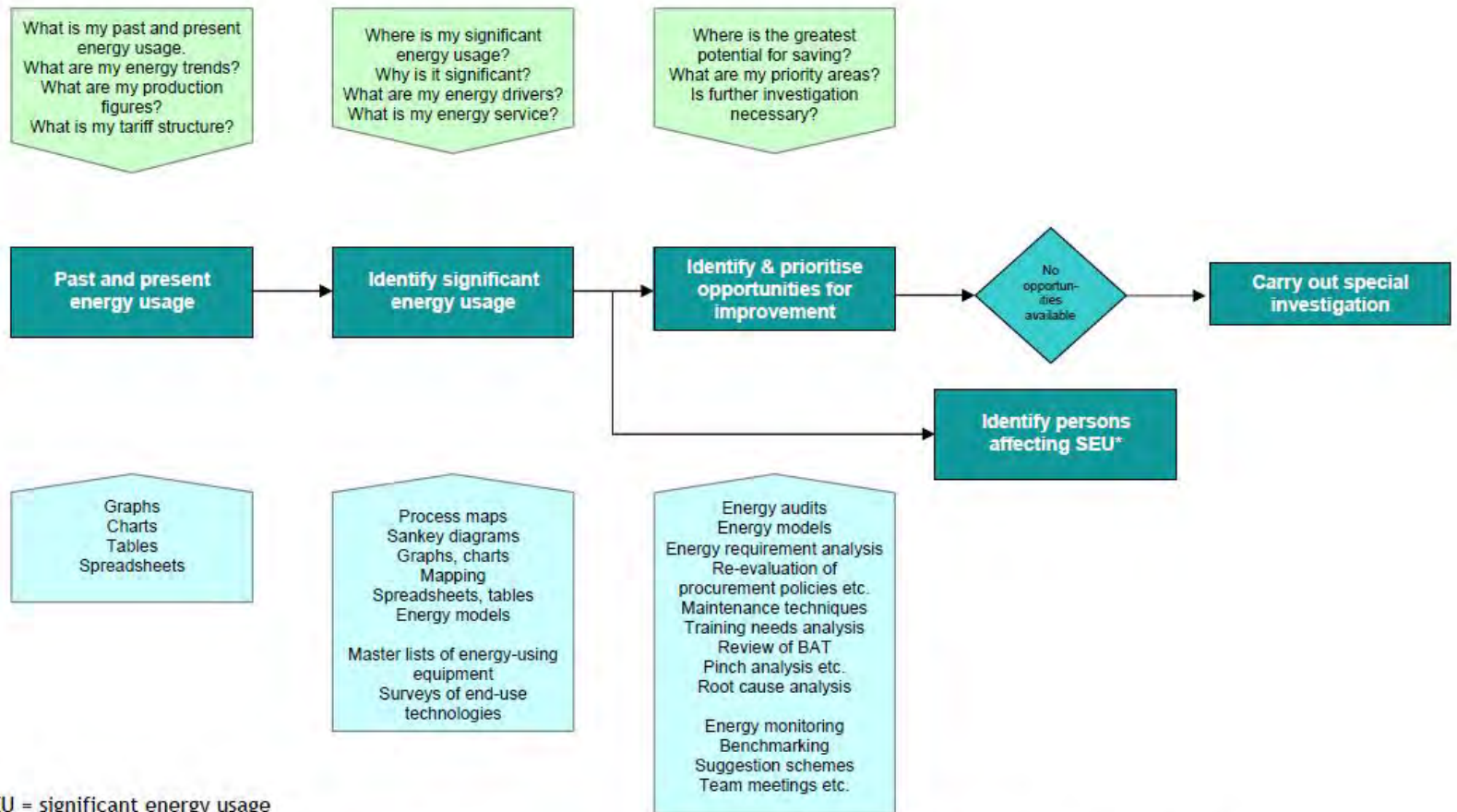
- Monitoring 監督(4.6.1)
- Measurement 測量 (4.6.1)

ACT 行動

- Energy performance and EnPIs review 能源績效及指標審查 (4.7.1)

ENERGY PLANNING PROCESS





*SEU = significant energy usage

Note This diagram is for illustrative purposes only, and merely provides a synopsis of the guidance on the Review of energy aspects

Source: IS 393: 2005 Technical Guideline

ENERGY CONSUMPTION INDICATORS

Principal Group 7 – Central Services for Shopping Arcade

Subgroup ⁽¹⁾	Annual Energy Consumption per Area ⁽²⁾ (MJ/m ² /annum)
B26: Central Services for Shopping Arcade	2302

Principal Group 8 – Private Office

Subgroup ⁽¹⁾	Annual Energy Consumption per Area ⁽²⁾ (MJ/m ² /annum)
B27: Central services for building (multiple tenants) with central air-conditioning supply for tenants	944
B28: Tenant lighting and power in building (multiple tenants) with central air-conditioning supply for tenants	354
B29: Central services for building (multiple tenants) without central air-conditioning supply for tenants	196
B30: Tenant lighting and power in building (multiple tenants) without central air-conditioning supply for tenants	507
B31: Whole building (single tenant)	1271

Source: EMSD – http://www.atechsupports.com/new-emsd/en/indicator_cmc.htm

Energy Review

■ Energy use register (Example)

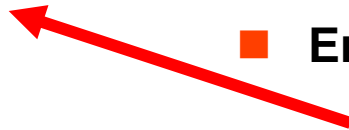
e.g. GHG, environmental impact, etc.

From Energy Assessment

Energy use	Energy			Evaluation of significance				Significant energy use
	Electricity	Fuel	Gas	Consumption / Efficiency	Legal	Relevant Legislation	Corporate Concern	
Office								
Lighting	X			1	1	Cap 598	1	1
HVAC	X			1	-	-	-	1
Refrigerator	X			-	1	Cap 598	-	1
Water Heater			X	-	-	-	-	-
Vehicle		X		-	-	-	-	-

From Energy Assessment / Other Measures

■ Energy use register (Example)



Energy use	Significant energy use	Area for Improvement / Operational Control / O&T / Others	Prioritization			Rank
			Time	Impact	Cost / ROI	
Office						
Lighting	1	Change from T8 to T5 lighting	2	2	2	1
HVAC	1	Replace from air-cooled to water-cooled chiller	4	3	5	4
Refrigerator	1	Buy energy-efficiency refrigerator	3	2	4	3
Water Heater	-	-	-	-	-	-
Vehicle	-	Check and maintain regularly / Send energy guidance notes to supplier & contractor	2	2	3	2

Energy objectives, targets and action plan (Example)

(2010 – 2011 yr) 工程及設備部

重要能源使用	目標	指標	行動計劃	運行控制	監測及測量
建築供熱	減少建築能源消耗, 按照2009年當年水平最少10%	建築供熱能耗 [(kWh / m ² yr)]	<ol style="list-style-type: none"> 1. 安裝最適宜起動的供熱控制器 2. 增加熱傳導的隔熱板 3. 用PVC花紋帶填塞建築縫隙 4. 對窗, 屋頂, 照明和門做密封性試驗 5. 確保溫度調節裝置準確設置 6. 確保熱輻射不受阻擋 	<ol style="list-style-type: none"> 1. 制定最適宜起動控制器安裝規範 2. 編制增強熱傳導隔熱板的程序 3. 制定PVC花紋帶使用規範 4. 編制檢查設置的溫度調節裝置, 熱輻射, 窗及門的狀態的程序 	<ol style="list-style-type: none"> 1. 每月測量供熱燃料能耗 2. 經常監視場所溫度 3. 定期監視供熱系統, 時間和控制安裝

照明裝置

實施能源管理機會時可考慮的常用措施，包括：

1. 改善操作，例如有需要時，才開啟照明裝置；
2. 改善保養/ 維修，如經常清潔；
3. 更換故障的開關/ 感應器；
4. 過亮或不需照明的地方，拆掉燈具並切斷電路；
5. 調低通道地方的照明水平（所需光度通常比辦公地點低）；
6. 改用高能源效益的燈具，可提供同樣足夠光度但耗能量較少；例如改用緊湊型節能螢光燈取代白熾燈、用T5螢光燈管取代T12/ T10燈管；
7. 用電子鎮流器取代電磁鎮流器；
8. 加裝工作燈；
9. 加裝時間掣控制；
10. 加裝調光器控制；
11. 加裝光感應器控制；
12. 加裝有人感應器控制；
13. 更改開關安排，以使得能夠更靈活控制各組照明裝置，更好配合使用者需要；
14. 修改非長期開啟的緊急照明的電路，使它們只在正常電力中斷時方會啟動（根據消防處規定）；
15. 電子鎮流器與各種自動控制器（如調光器、光感應器、有人感應器及時間掣等）結合一起使用，以達到各種效果，例如：受控制照明裝置可根據太陽光的水平改變輸出，以提供所需光度；或於室內無人時，將燈關掉；或在辦公時間以外將光度調低至指定水平；
16. 改裝高能源效益的照明裝置（如改用配備T5螢光燈管、電子鎮流器和拋物面反射器的高能源效益照明裝置，取代低吊放電燈）；
17. 加裝可編程照明控制器，以配合使用者需要；
18. 採用自身發光的氬「出口」標誌，替代用傳統燈管照亮的標誌；
19. 照明裝置/ 燈具接近使用年限時，提前更換高能源效益照明裝置/ 燈具/ 控制器。

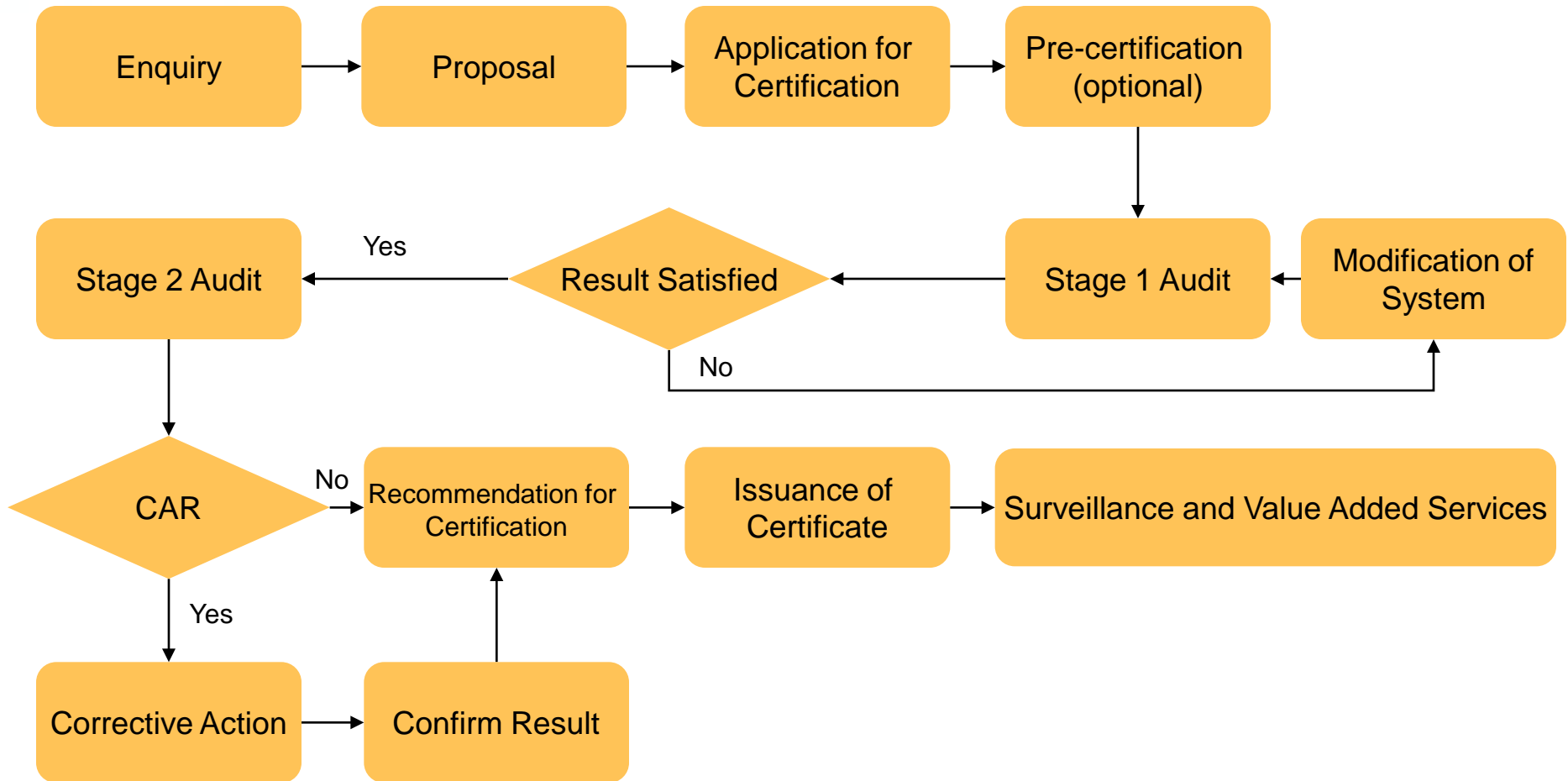


(From EMSD –
Guidelines on
Energy Audit
2007.pdf)

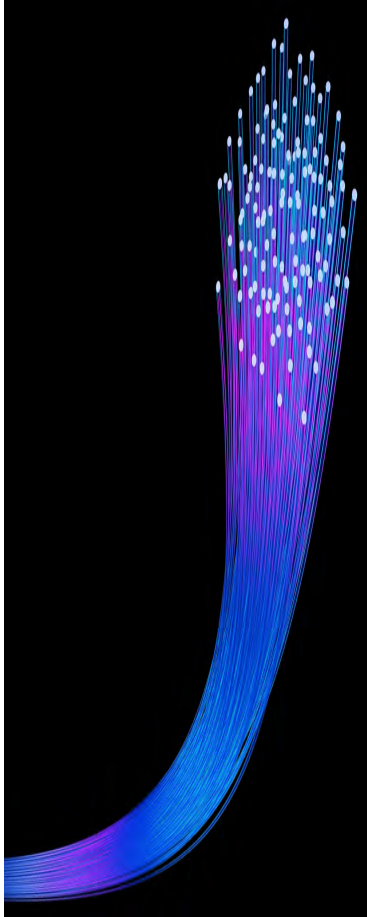
Standards under ISO/TC 242 (Energy Management) Development

- ISO/DIS 50002: Energy audits
- ISO/DIS 50003: Energy management systems – Requirements for bodies providing audit and certification of energy management
- ISO/DIS 50004: Energy management systems – Guidance for the implementation, maintenance and improvement of an energy management system
- ISO/DIS 50006: Energy managements systems- Measuring energy performance using energy baselines (EnB) and energy performance indicators (EnPI) – General Principles and guidance
- ISO/DIS 50015: Energy management systems – Measurement and Verification of Organizational Energy Performance – General Principles and Guidance

ISO 50001:2011 EnMS Certification Flow



Why choose SGS as your partner in Energy Management?



- Show you commitment, continuous improvement, added-value, market differentiation
- The world's no: 1 in Environmental Management Systems and Quality Management Systems certification;
- Has leading Climate Change program;
- Global network of experts who operate in English as well as in local language in a globally consistent manner.
- ANAB, JAB, TAF, etc. accredited

ENERGY MANAGEMENT SYSTEMS
AUDIT, CERTIFICATION & TRAINING SERVICES

Systems & Services Certification