Seminar on EPC Implementation

EXPERIENCES IN IMPLEMENTING EPC PROJECTS IN MALAYSIA

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Outline

- EPC PROJECTS IMPLEMENTATION – CNS GROUP'S EXPERIENCES AND ENERGY SAVING SOLUTIONS
- FREQUENTLY ASKED QUESTIONS FROM PROSPECTS IN EPC PROJECTS IMPLEMENTATION IN MALAYSIA
- THE WAY FORWARD…

EPC PROJECTS IMPLEMENTATION – CNS GROUP'S EXPERIENCES AND ENERGY SAVING SOLUTIONS

OPTIONS To Implement Energy Saving Measures at building facilities

MEASURES With LOW/NO COST

Minimal Cost Savings

- Management Directives
- **Implementation of ENERGY MANAGEMENT SYSTEM**- to ensure sustainability of energy cost reduction initiatives

In-house initiatives

MEASURES WITH HIGH COST

Significant Cost Savings

- **Priorities of budget - core business/operations**
- **Investment risks**
- **Limited human resources & expertise**

May require expert assistance & external financing such as EPC model

Scope of Services by ESCO in EPC Projects

- Project Funding & Financing Options
- Engineering & Economic Feasibility Studies
- Project Design, Engineering & Permitting
- Project Construction
- Project Commissioning
- Operation, spare parts & Maintenance
- Performance measurements & monitoring
- Energy performance reporting

Key Features & Success Factors in EPC

Energy Cost savings based on ACTUAL & MEASURED data-before & after

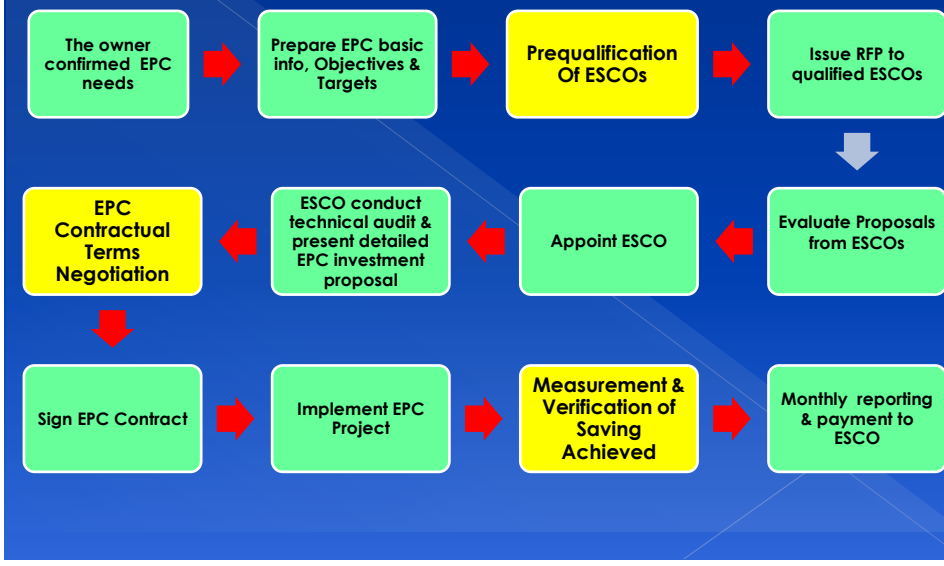
CAPABLE

Commitment to get FASTER results!

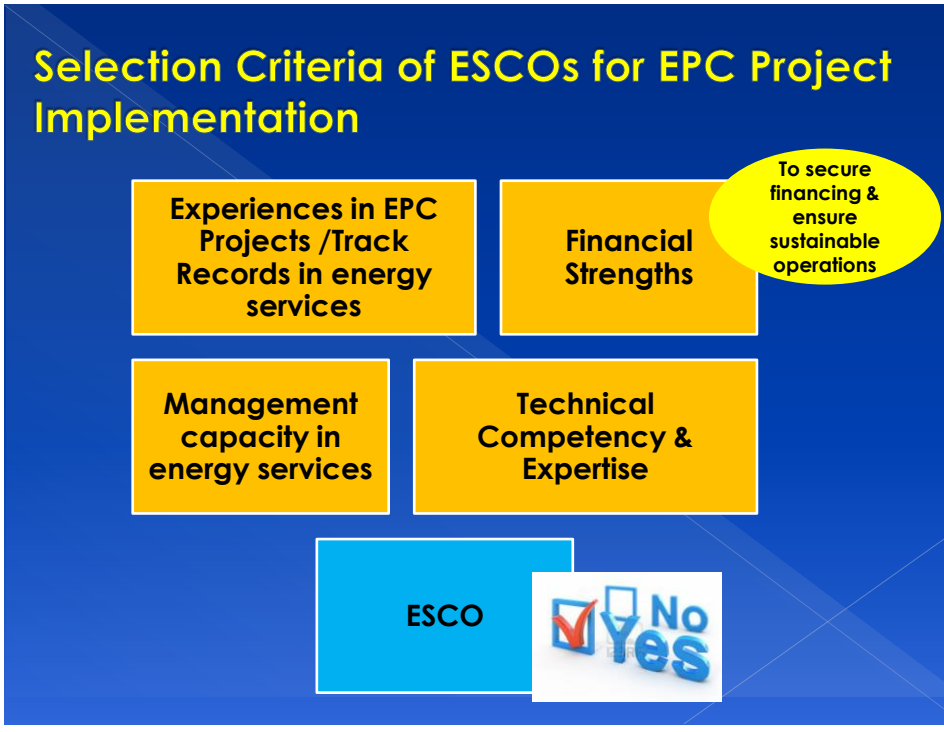
UNDERSTANDING of the how EPC works & it long term benefits by facilities owners

TRUST & TRANPARENCY in strategic partnership to reduce business costs

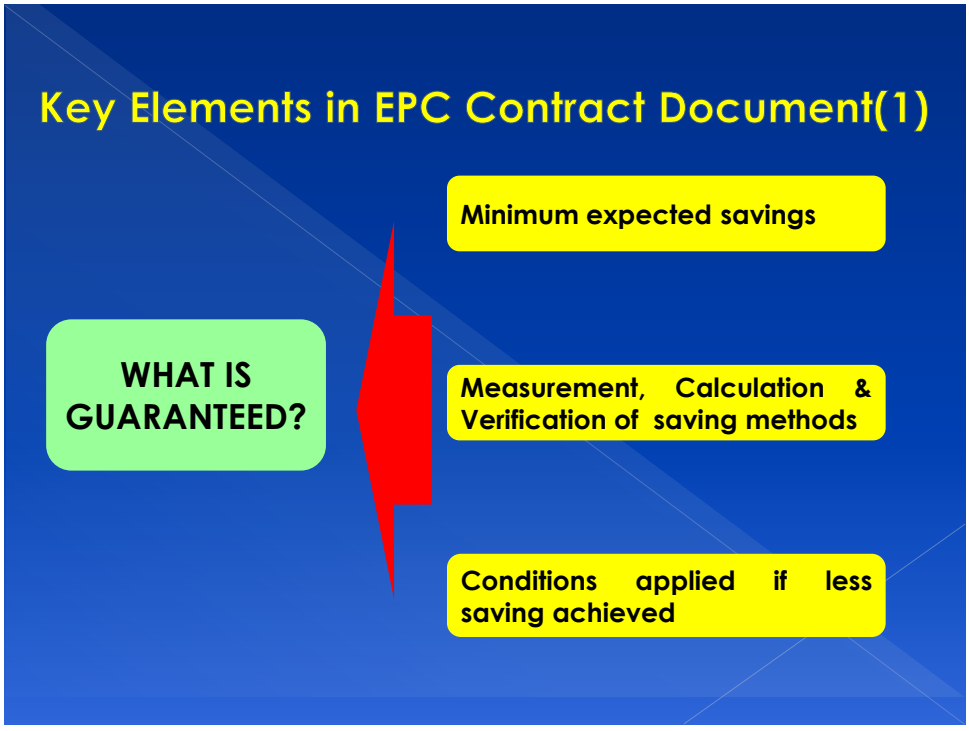
Workable EPC Business Process Flow



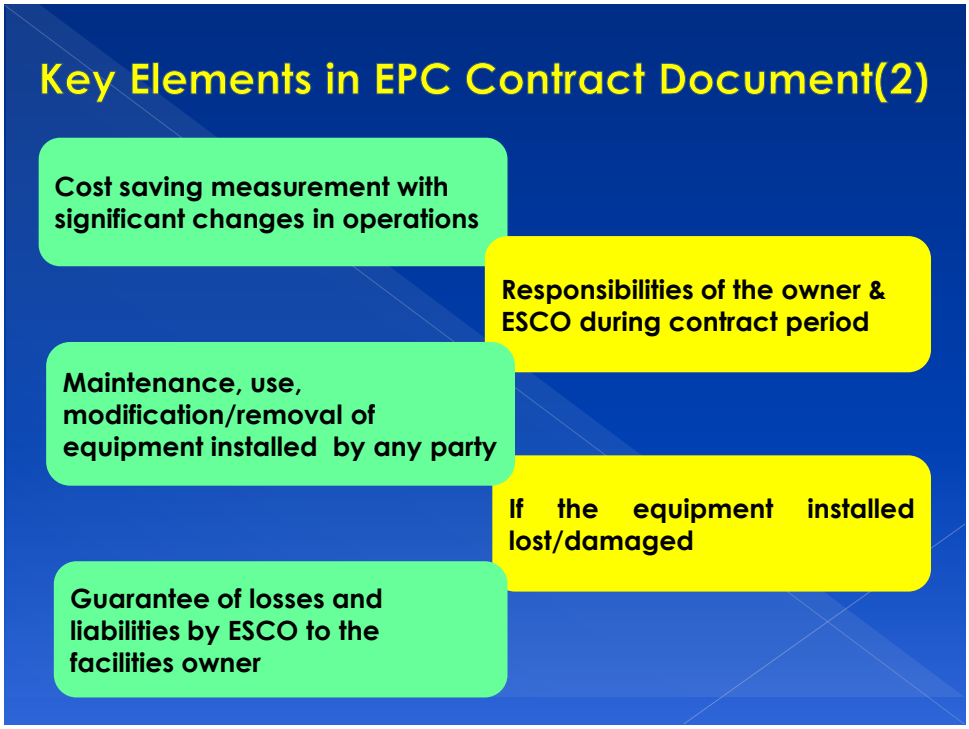
Selection Criteria of ESCOs for EPC Project Implementation



Key Elements in EPC Contract Document(1)



Key Elements in EPC Contract Document(2)



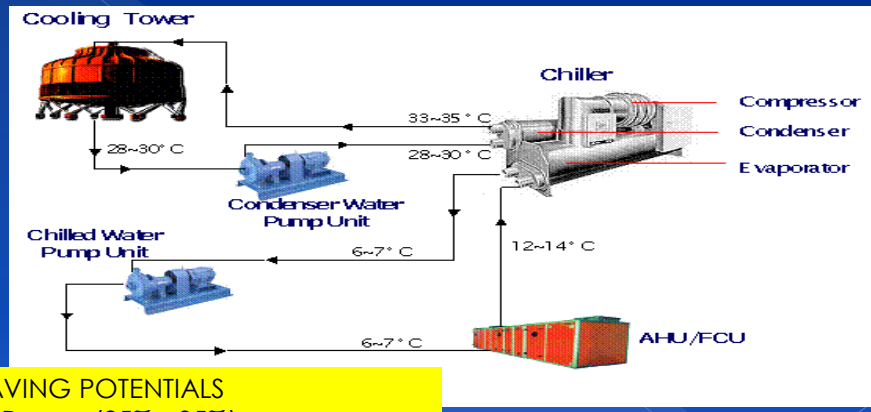
Example of Our M&V Data of Actual Energy Consumption Reduction Achieved for EPC Projects with CERMS

Our EPC Projects Implementation Process

EPC Contract Negotiation & Signing → Install Data Logger/ permanent sub-meters → Collect energy data to establish energy baseline values → Improve & optimize energy consumption with energy saving measures → Measure & monitor actual energy savings achieved against agreed baseline values

WHERE AND HOW TO SAVE ENERGY COST?

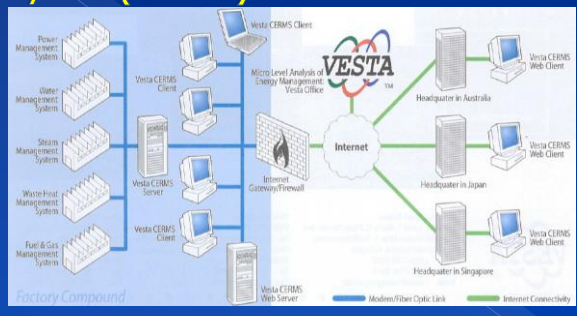
Energy Saving potentials at Buildings



SAVING POTENTIALS
- ✓ Pumps (25% - 35%)
- ✓ Chiller (20% - 25%)
- ✓ AHU/FCU (25% - 35%)
- ✓ Cooling Tower(15% - 20%

Source: MAESCO member

Our Computerized Energy Resource Management System(CERMS)

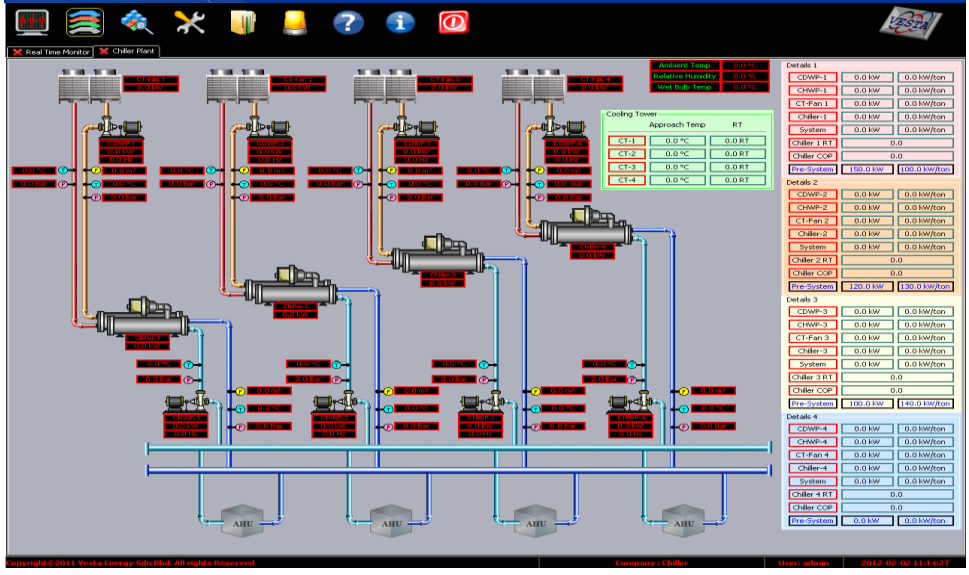


For new & existing buildings/ facilities

- **COMMMON BMS/BAS**
  - Data collection & monitoring
  - Basic analysis & controls

- **CERMS - CUSTOMIZED & SMART CONTROLS FOR ENERGY EFFICIENT OPERATIONS**
  - HVAC Systems
  - Motors, pump & fans systems
  - Lighting system
  - Heating & heat recovery systems
  - Compressed air systems
  - Internal electrical incoming supply system

CERMS Applications for M&V and energy efficient operations at Air Conditioning Systems for EPC Projects



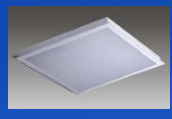
Energy Efficient Lighting Technologies for EPC Projects

Energy Saving Micro Ballast , HP Fluorescent T8-28 watts

LED Fluorescent Tubes

LED Down Light

EE Lamps at our show room at the Group's HQ



LED Ceiling Light

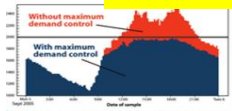
High Performance LED Street Light

LED Spot/Flood Light

With manufacturing partners in Korea & Taiwan

Our stages approach for EPC Project implementation

Stage 3 : MD Monitoring & Control



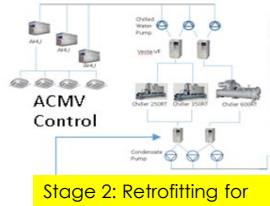
Max Demand Control

Traditionally, companies have concentrated their energy saving efforts in two areas:

1. Reduction of Kilowatt Hour consumption
2. Improving the electrical system's Power Factor

There is a third item to consider when reducing the amount of the utility bill:

3. **Proper kW Demand management**
   - *The reduction of the consumed power*
   - *Adjusting to the new kW limit*
   - *Avoiding Maximum Demand penalties*



ACMV Control

Auto On/Off
Temperature setting
Time Schedule
Demand Based control
- temperature
- Traffic

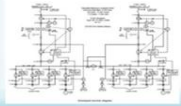
Stage 2: Retrofitting for Improving Chiller Performance

Centralized Billing System

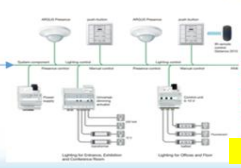
Incoming Power Control

Stage 1: Electricity Incoming Supply Optimization

Lighting Control



Incoming Voltage Management
Power Quality Management
THD management



Auto On/Off
Time Schedule
Zoning control
Day light control
Sensors

Source: MAESCO member

Examples of MINIMUM GUARANTEED SAVINGS POTENTIALS identified from a detailed energy audit for air conditioning systems at a hospital building

ITEM	MOTOR (kW)	Actual (kW)	Normal kWh/Year	Saving Mode kWh/Year	Saving %	Saving	
						kWh/ year	RM
CHWP 1 Old Block Chiller Room	18.5	19.1	165,024	107,266	35.0%	49,505	25,199
CHWP 2 New Block Chiller Room	18.5	19.0	164,160	106,704	35.0%	49248	25,067
CDWP 1 Old Block Chiller Room	15	13.3	114,912	82,737	28.0%	32,175	16,377
CDWP 1 New Block Chiller Room	18.5	15.3	132,192	95,178	28.0%	37,014	18,840
Total Pumps Saving		**67**	**576,288**	**391,885**	**32.0%**	**184,403**	**85,484**

ITEM	MOTOR (kW)	Actual (kW)	Normal kWh/Year	Saving Mode kWh/Year	Saving %	Saving	
						kWh	RM
Chiller - Old Block CERMS	210	128	1,105,920	995,328	10.0%	405,873	206,589
Chiller - New Block Chiller Room	210	115	993,600	914,112	8.0%	337,824	171,952
Total Chillers Saving	**420**	**243**	**2,099,520**	**1,909,440**	**9.1%**	733,697	378,541
TOTAL ACMV SAVING							**464,025**

Examples of MINIMUM GUARANTEED SAVINGS POTENTIALS identified from a detailed energy audit for lighting systems at an office building

Current Lighting	Present Usage (W)	Vesta Usage (W)	Saving (W)	Saving (KW)	Saving %	Saving Amount (RM) per yr
Fl. Light T8 1x36W	230,010	123,420	106,590	38,143	46.3	11,900
Fl. Light T8 2x36W	1,815,480	974,160	841,320	222,108	46.3	69,298
Fl. Light T8 2x18W	153,272	59,976	93,296	27,469	60.9	8,570
PLC 1x18W	6,624	2,880	3,744	112	56.5	35
PLC 2x18W	180,320	78,400	101,920	34,395	56.5	10,731
Spotlight 1x150W	1,980	900	1,080	389	54.5	121
Spotlight 1x250W	135,300	76,260	59,040	21,254	43.6	6,631
Total	**2,522,986**	**1,315,996**	**1,206,990**	**343,870**		**107,287**
Total Lighting Saving per year						**RM 107,287**

FREQUENTLY ASKED QUESTIONS FROM PROSPECTS IN ENERGY PERFORMANCE CONTRACTING-SHARED SAVING PROJECTS IMPLEMENTATION IN MALAYSIA

How the actual savings is measured?

- The based on actual measured data collected using agreed measurement methods (mostly with permanent energy meters) to be compared with the agreed baselines - Energy saving reports will be submitted on monthly basis.
- Will follow the international guidelines, International Performance Measurement and Verification Protocol (IPMVP).
- The owner is entitled to engage independent parties to measure and verify energy saving results using the same method.

Assurance about the performance of the equipment/systems such as lighting especially with the fast changing in efficiency in the technologies?

- The ESCO will ensure the best and the most economical technologies throughout the contract period to maximize savings that will benefit both parties.
- The facilities will be able to change to other technologies after the contract ended (fittings for lighting systems are generic and easily fitted with other types of lamps)

What if the energy saving achieved is less than promised by the ESCO and vice versa?

- If the saving achieved is less, the owner will only need to pay the ESCO actual saving achieved- ESCO will take the full risks to get less returns in its investment until the contract ended;or
- The owner can terminate the contract with sufficient notice for the ESCO to remove all equipment installed at their own costs and bring back the operation to its initial conditions; or
- To renegotiate the contract period and conditions.

What if there are significant changes of operations in the facilities?

- New energy data will be collected and energy baselines to be reviewed to accommodate changes based on discussion and agreement between the ESCO and the owner.

How about energy savings achieved by own initiatives by the owner throughout the contract period?

- The ESCO's and the owner's personnel will closely communicating to update on all energy related activities that may affect the actual saving achieved from the ESCO's projects.
- Suitable methods to isolate results from each initiative will be proposed and discussed and later agreed.

Who will bear the costs for maintenance and spare parts of equipment installed by the ESCO in the project?

- All costs for maintenance and spare parts for all systems and equipment installed to achieve energy savings proposed by the ESCO will be borne by the ESCO.

Why don't the ESCO install everything and run for 3 months and later the owner will sign the EPC contract?

- The ESCO need to have the signed agreement to secure funding from investors for the project; and
- There will be provisions in the contract that will allow the owner to instruct the ESCO to dismantle everything with sufficient notice or whenever the ESCO fail to fulfill its contractual obligations.

What will happen after the contract period?

- All system and equipment installed will be handed over and owned by the owner.
- The owner will enjoy the 100% saving from the energy saving measures implemented.
- The owner may engage the ESCO to for specified support services at agreed and minimal service rates for maintenance and reporting.

What if the project fail and how to deal with the consequences of that situation

- If the ESCO fail to deliver or the project caused serious problems to the facilities which could not be resolved, the ESCO will remove all equipment from the facilities at its own cost and bring the operation back to normal; or
- Delayed to resolve technical problems or other issues acknowledged by both parties, the ESCO will request to renegotiate the contract where longer period of contract may be needed to complete the project
- All responsibilities by the ESCO will be clearly stipulated in the contract terms and conditions to mitigate all possible consequences where the ESCO will be accountable to fix it or bring it back to the normal conditions at its own cost

THE WAY FORWARD….

- EPC implementation process must match the ESCOs business model.
- EPC is a proven EFFECTIVE model for faster ENERGY EFFICIENCY implementation for MORE ENERGY EFFICIENT BUILDINGS!
- Interested parties must have the same understanding & goals on how to make EPC works – WIN-WIN & LONG TERM ENERGY COST SAVINGS!
- ESCOs must have/develop competency & capability to ensure successful EPC projects implementation.
- More successful EPC projects are required to attract more attention of building owners & banks/investors

THANK YOU!

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