Suruhanjaya Tenaga
Energy Commission

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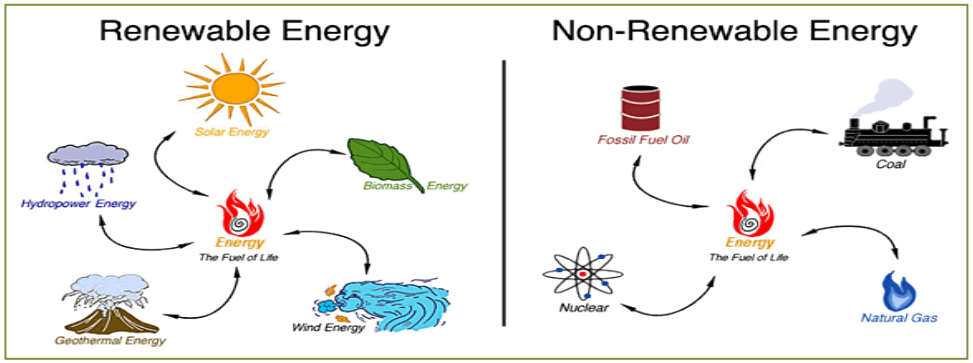
Demand Side Management Unit
16 November 2016

ENHANCING ENERGY EFFICIENCY IN MALAYSIA – RMK11 ENERGY AUDIT CONDITIONAL GRANT (EACG)

Energy Commission Act 2001

To promote efficiency, economy and safety in the generation, production, transmission, distribution supply and use of electricity

To promote the use of renewable energy and the conservation of non-renewable energy



Electricity Supply Act 1990

Section 23A – Minister to determine standards, etc.

"The Minister may, from time to time, prescribe the standards specifications, practices and measures to be adopted and any other matters in respect of the efficient use of electricity."

Section 23B – Installation to meet requirements (EMEER 2008.

"No person shall use or operate any installation unless the installation meets such requirements as may be prescribed in respect of efficient use of electricity."

Section 23C – Equipment to meet requirements (MEPS)

"No person shall manufacture, import, sell or offer for sale or lease any equipment unless the equipment meets such requirements as may be prescribed in respect of efficient use of electricity."

Efficient Management Of Electrical Energy Regulations (EMEER) 2008

- Gazetted on 15th December 2008
- Applied to big energy users (equal or exceeding 3 Million kWh over any period not exceeding 6 consecutives months)
- Notification by Energy Commission
- To appoint a Registered Electrical Energy Manager and to submit written confirmation of the appointment
- To submit Electrical Energy Management Objectives and Policy.
- To submit Electrical Energy Management accounts and documents

738 Registered Electrical Energy Managers.

Recognized Energy Manager Program by Asean Energy Management Scheme (AEMAS) and Malaysian Association of Energy Service Companies (MAESCO)

AEMAS
ASEAN Energy Management Scheme

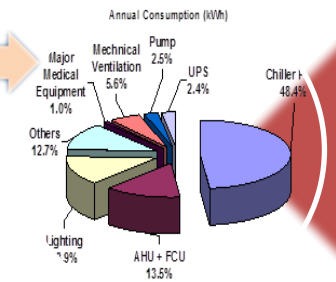
Green Tech Malaysia

MAESCO
(Pertubuhan Syarikat Syarikat Perkhidmatan Tenaga Malaysia)
Malaysia Association of Energy Service Companies

(Pertubuhan Syarikat-Syarikat Perkhidmatan Tenaga Malaysia)
Malaysia Association of Energy Service Companies

Functions And Duties Of REEM

Audit and analyse



Advise in developing and implementing measures

Monitor the implementation of the measures

Supervise the keeping of records and verify its accuracy; and

Ensure the timely submission of information and reports.

INSTALLATIONS SUBJECTED TO EMEER 2008

	2010	2011	2012	2013	2014	2015	*2016
No of Installations	1384	1490	1423	1867	1942	1701	1824
No of Installations appointed REEM	111	153	191	227	109	187	151
No of Installations appointed REEM (accumulative)	111	264	455	682	791	978	1129

REGULATION 22: GENERAL PENALTY

Any person who commits an offence under the Regulations shall, on conviction, be liable to a fine not exceeding five thousand ringgit or to imprisonment for a term not exceeding one year or both.

EE Promotion Initiatives In Malaysia Over The Years

- Energy efficiency promotion in the Seventh Malaysia Plan (1996-2000)
- Fiscal incentives for EE (2001)
- DANIDA Capacity building on EE and DSM for key institutions (2002)
- EE and RE in education curriculum and university courses (2002)
- UNDP-GEF Malaysian Industrial Efficiency Improvement Programme (MIEIP) (1999)
- Development of Malaysian Standard MS 1525 (2001)
- Energy audit on government buildings (2002)

EE Promotion Initiatives In Malaysia Over The Years

- EE rating and labelling of equipment (2009)
- Subsidy rationalisation plan (2010)
- EE equipment rebate scheme (2011)
- MS 1525 provisions in Uniform Building By-Laws (2012)
- Green Technology Financing Scheme (2010)
- Competitive bidding for new generation capacity plant-ups (2011)
- UNDP-GEF Building Sector Energy Efficiency Project (BSEEP) (2011)

Pemantauan 25 Bangunan Kementerian

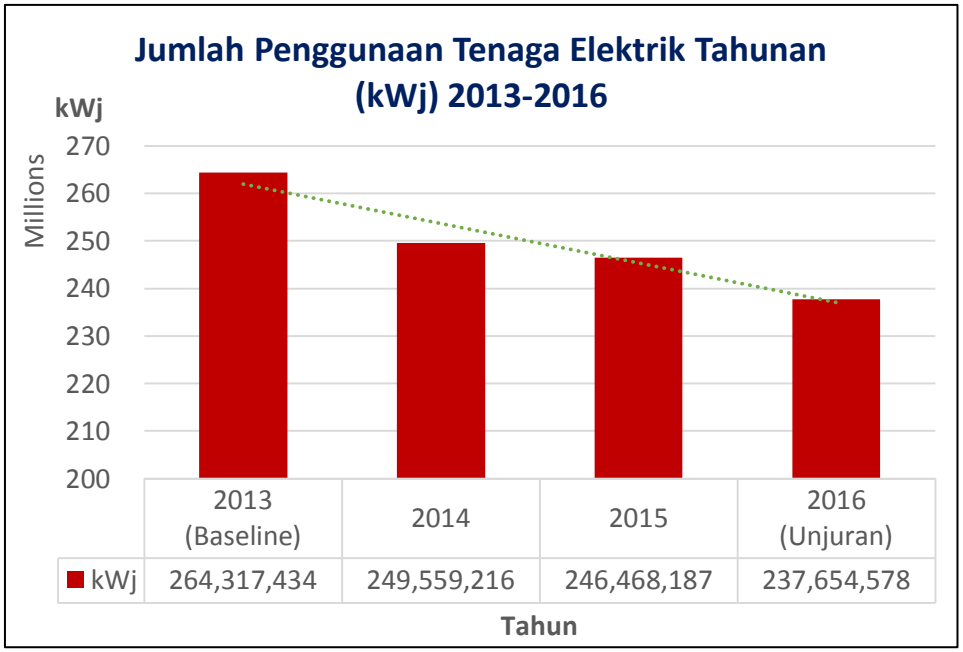
Tahun	2013 (Baseline)	2014	2015	2016 (Unjuran)
Jumlah kWj Setahun	264,317,434	249,559,216	246,468,187	237,654,578
Penjimatan (kWj)	-	14,758,218	17,849,247	26,662,856
Peratusan Penjimatan	-	5.6%	6.8%	10.1%
Penjimatan (RM)*	-	5,386,749.6	6,514,975.2	9,731,942.4
Pengurangan CO2 (TonCO2)**	-	10,935.8	13,226.3	19,757.2

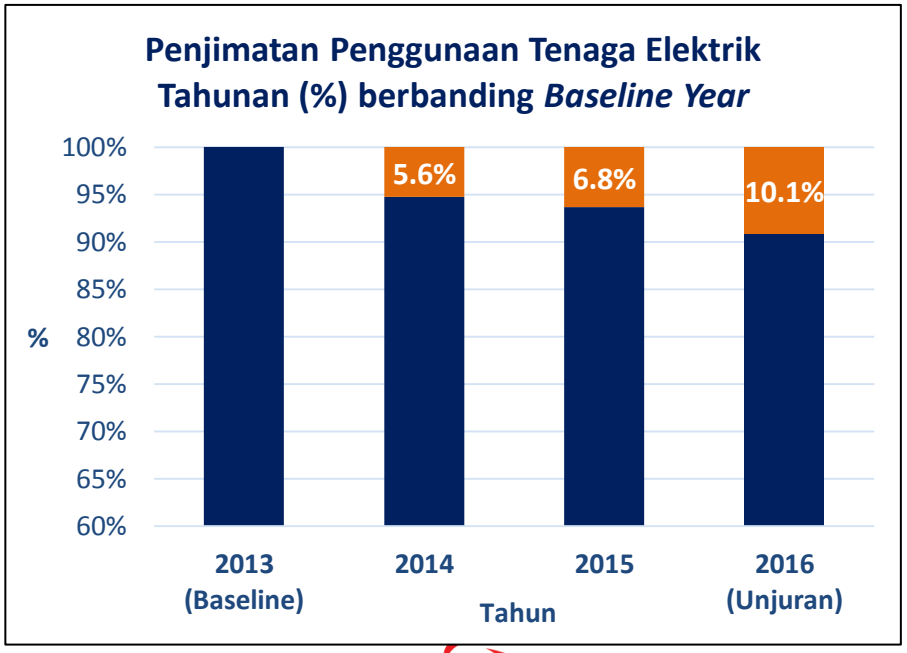
☻ **Perbandingan dengan *Baseline Year:*** Penjimatan Jan-Jun 2016 berbanding Jan-Jun 2013	10.8%
☻ **Perbandingan dengan Tahun Sebelumnya:** Penjimatan Jan-Jun 2016 berbanding Jan-Jun 2015	4.2%

NOTA:

* Tarif C1: RM0.365/kWj

** Emission Fac. 0.741 tCO2/MWh (2012)





Pemantauan 25 Bangunan Kementerian

Tahun	2013 (Baseline)	2014	2015	2016 (Unjuran)
Jumlah RM Setahun	100,261,374	113,020,775	111,304,847	110,011,454
Peningkatan (RM)	-	12,759,401	11,043,473	9,750,079
Peratusan Peningkatan	-	12.7%	11.0%	9.7%
ICPT (RM)	-	-	4,701,727	4,521,839
GST (RM)	-	-	4,640,726	6,042,408
MD (RM)	16,484,002	18,706,306	18,631,205	18,016,500
CLC (RM)	303,090	544,825	825,179	885,357

Nota

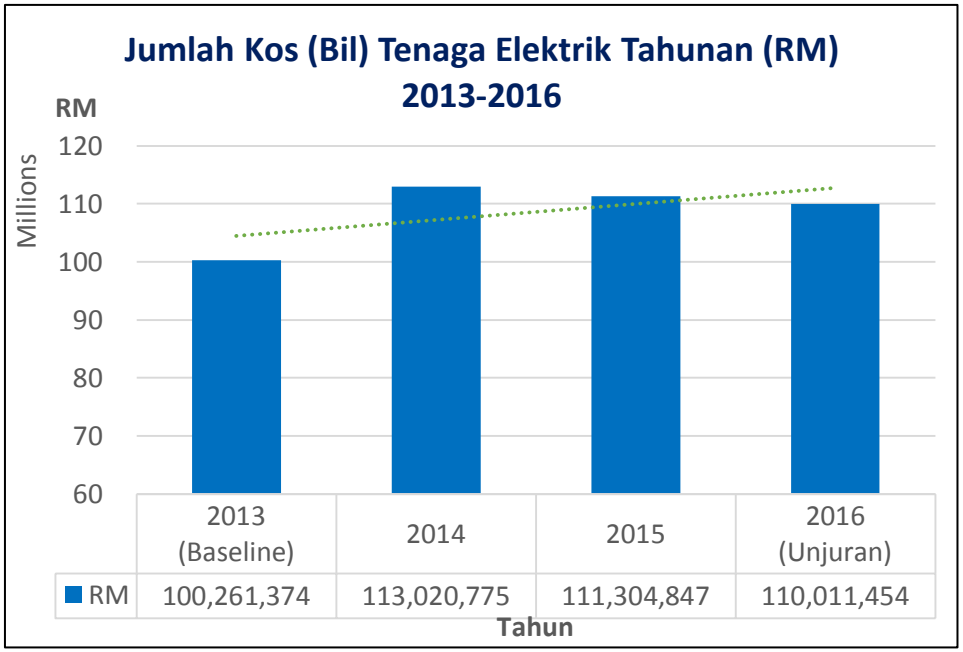
1) Kenaikan tarif pada Januari 2014 (Tarif C1)

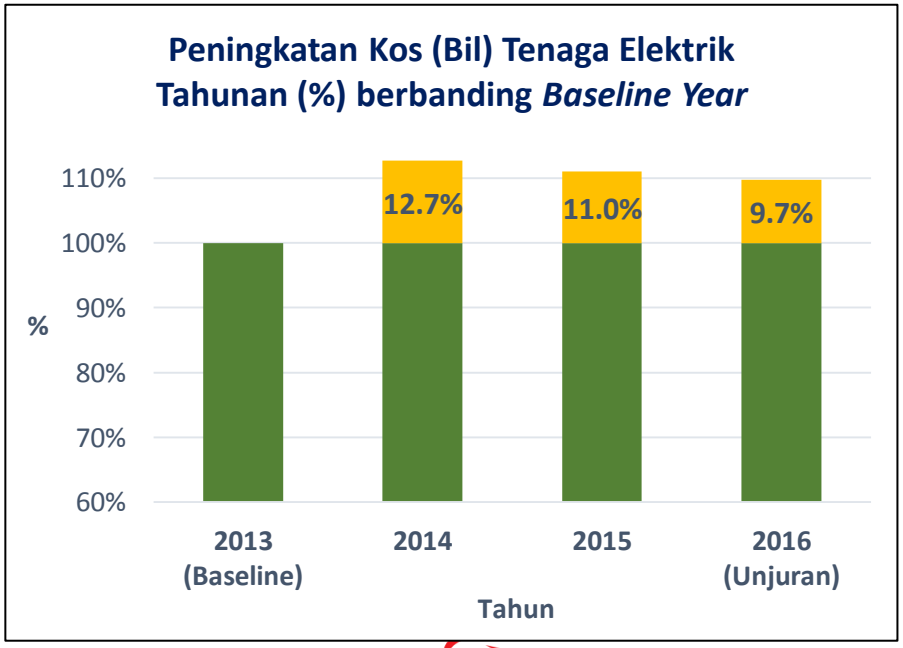
- Kadar tarif daripada RM0.312/kWj kepada RM0.365/kWj
- Kadar MD daripada RM25.9/kW kepada RM30.3/kW
- Kenaikan KWTBB daripada 1% kepada 1.6%

2) Imbalance Cost Pass Through (ICPT) atau Pelepasan Imbangan Kos Penjanaan bermula 1 Mac 2015

- Caj ICPT dari 1 Mac 2015 hingga 31 Disember 2015 : 2.25 sen/kWh
- Caj ICPT dari 1 Jan 2016 hingga 31 Disember 2016 : 1.52 sen/kWh

3) Goods and Sevices Tax (GST) atau Cukai Barangan dan Perkhidmatan diperkenalkan bermula 1 April 2015





ASEAN PLAN OF ACTION FOR ENERGY COOPERATION (APAEC) 2016-2025

ASEAN Power Grid	**To initiate multilateral electricity trade in at least one sub-region by 2018.**
Trans ASEAN Gas Pipeline	To enhance connectivity for energy security and accessibility via pipelines and regasification terminals
Coal & Clean Coal Technology	To enhance the image of coal through promotion of clean coal technologies (CCT).
Energy Efficiency & Conservation	To reduce energy intensity by 20% in 2020 based on 2005 level.
Renewable Energy	Aspirational target to increase the component of renewable energy to 23% by 2025 in ASEAN Energy Mix5 .
Regional Energy Policy & Planning	To better profile the energy sector internationally.
Civilian Nuclear Energy	To build capabilities in policy, technology and regulatory aspects of nuclear energy.

National Energy Efficiency Action Plan (NEEAP)

A. Initiatives for Appliances and Equipment:

ID.1 - 5-Star Refrigerator Campaign

ID.2 - EE lighting Campaign

ID.3 - 5-Star Air Conditioner Campaign

ID.6 - High Efficiency Motors

B. Initiatives for Commercial Buildings:

ID.4 - Energy Audit and Management in Large Commercial Buildings

ID.8 - Energy Audit and Management in Medium Sized Commercial Buildings

ID.9 - Energy Efficiency in New Buildings

C. Initiatives for Industry:

ID.5 - Energy Audit and Management in Large & Medium Sized Industries

D. Initiatives for Government Facilities:

ID.7 - Energy Audit and Management in Government Facilities

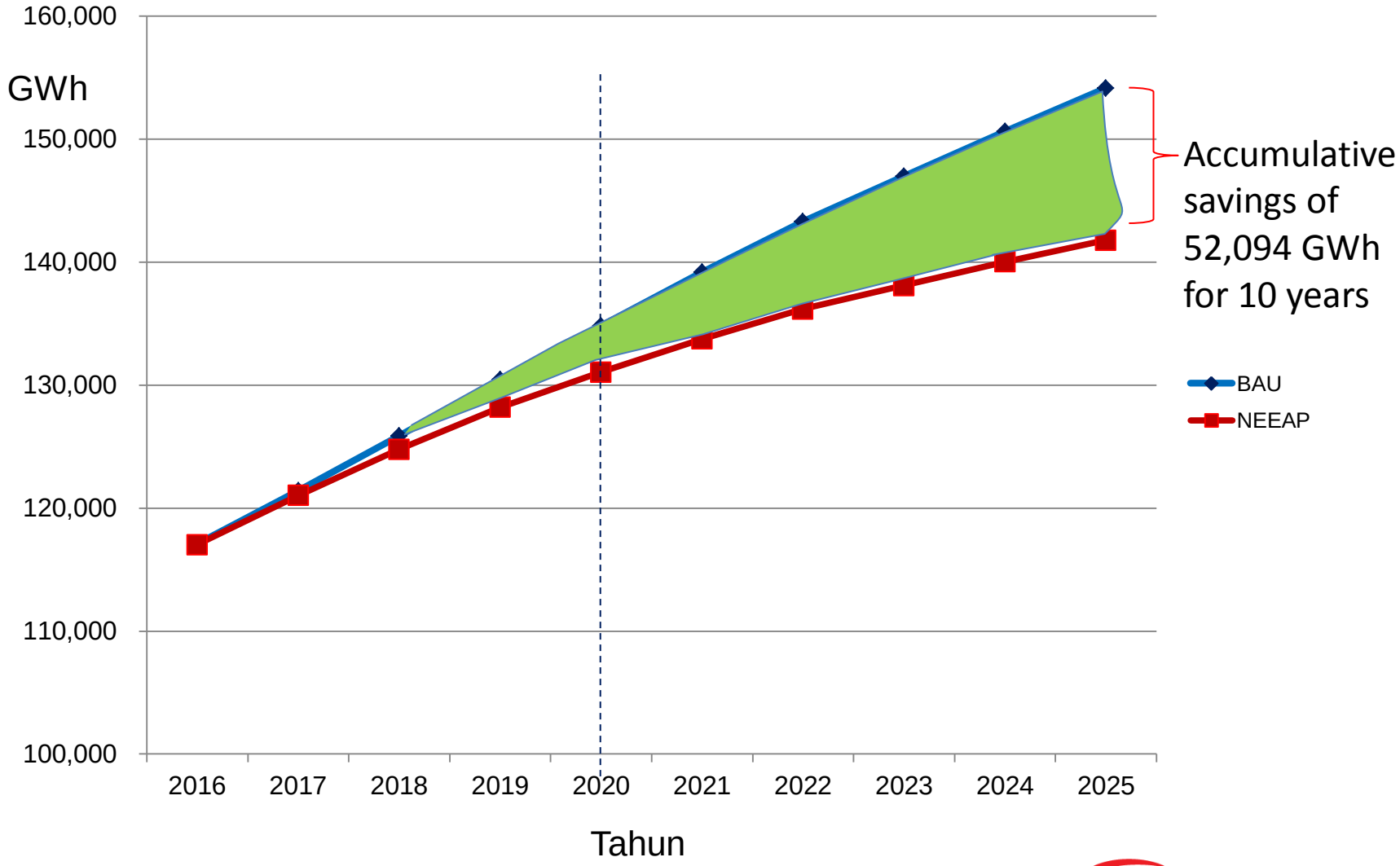
E. Initiatives for Cogeneration:

ID.10 - Cogeneration in Industries and Commercial Buildings

Impact of NEEAP:

Items	NEEAP
Percentage of Saving at the 10th-year	8.0%
Savings at the 10th-year	12,361 GWh
Estimated reduction in demand	1,893 MW
Estimated reduction in generation capacity*	2,520 MW
Cumulative saving for the 10 years period	52,094 GWh
Estimated Public Funding required	RM 465 million
Estimated Private Funding required	RM 5,242 million
Estimated Administration Cost required	RM 50 million
Estimated amount of saving for 10 years period	RM 18.52 billion

Permintaan Tenaga : BAU vs NEEAP



Suruhanjaya Tenaga
Energy Commission

TERHAD

RMK11 Energy Efficiency Programmes

A. Initiatives for Appliances and Equipment:

ID.1 - 5-Star Refrigerator Campaign

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Energy Audit Conditional Grant (EACG) Initiatives Under RMKe-11 (RM26,081,400.00 for 2016)

Energy Audit And Energy Management in :

Large Industrial Buildings
Energy Audit
(2016-2018)
2016: RM7,000,000.00

Large Commercial Buildings
Energy Audit
(2016-2018)
2016: RM3,852,600.00

Shared cost of Energy Audit between Government & Private Sectors as an incentive for Private Sectors to pursue retrofit program

Energy Audit, Retrofit And Energy Management in :

Government Buildings
Energy Audit + Retrofit
(2016-2020)
2016: RM15,255,800.00

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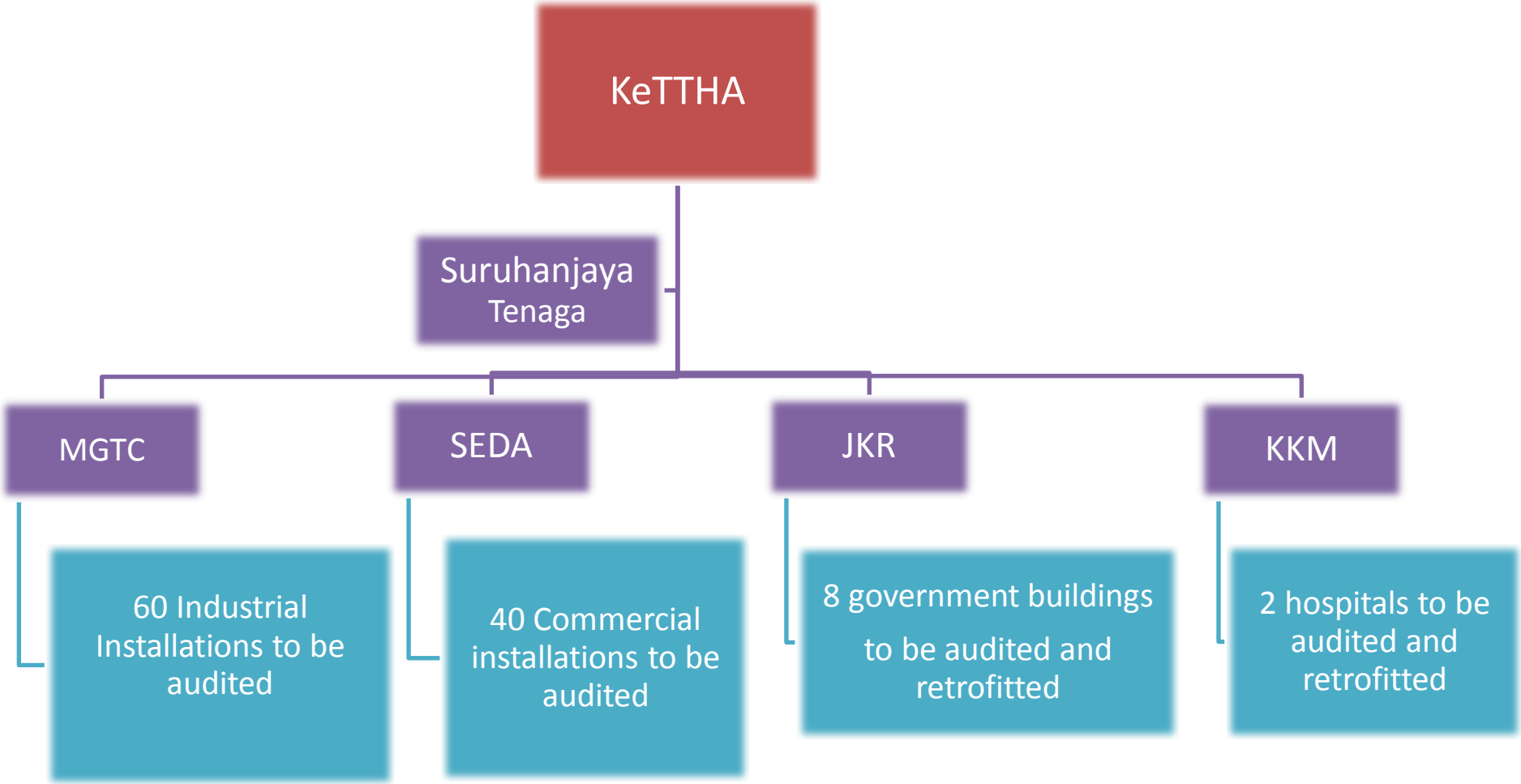
FLOW CHART OF ENERGY EFFICIENCY PROGRAMMES UNDER RMK-11



Expected outcome

1
- Reduction of electrical energy consumption of government buildings by 199 GWh and savings of RM74,529,138.51 in electricity cost for the period RMK-11.

2
- Cost savings in generation and transmission as much as RM130,012,732.97 (13.83 MW) and GHG emission reduction of 147.52 ktCO_2e for the plan period RMK-11

3
- **Drive the Energy Service Company (ESCO) market via Energy Performance Contracting (EPC) mechanism.**

4
- **Cultivate the culture of energy auditing in all sectors in order to improve energy efficiency**

Policies and Guidelines

ENERGY PERFORMANCE CONTRACTING (EPC)

Approve by the Cabinet in January 2013 for implementation in government buildings.

To overcome the capital costs/financing barriers in implementing cost-effective energy efficiency measures.

ESCOs to register with the Ministry of Finance to carry out EPC activities in government buildings under Green Technology Services Code (222801). ESCOs applying for registration under this code must be registered with Energy Commission.

CRITERIAS FOR REGISTRATION ESCO

Registered with the Registrar of Business or the Registrar of Companies,

Employ, on a full time basis, a Registered Electrical Energy,

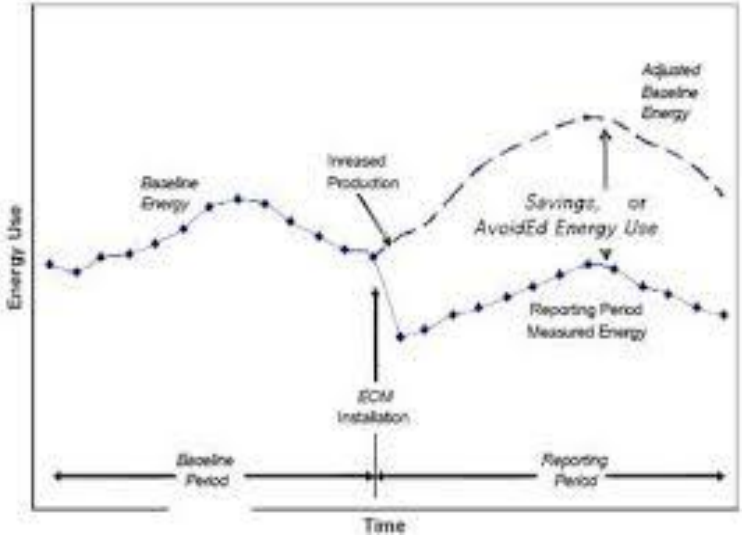
Access to monitoring and testing equipment and instruments, and

the applicant has satisfactorily furnished all the information as stipulated in the Application Form

Registration of Energy Service Company (ESCO);

- Requested by the Ministry of Finance.
- To register ESCOs before registering with Ministry of Finance under code 222801 (Green Technology Services).
- Responsible for the Measurement and Verification (M&V) of energy saving potentials and the actual savings achieved.

KEMENTERIAN KEWANGAN MALAYSIA
SEIL TAMBAH HIDANG



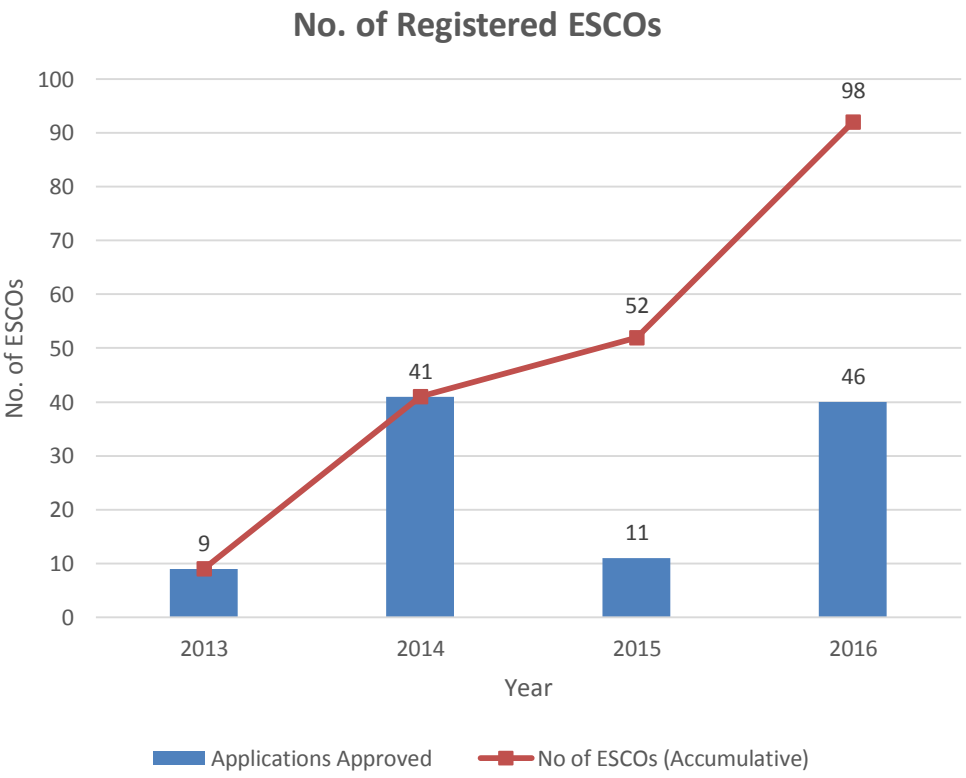
SCOPE OF WORK OF ESCOs

Under the Green Technology Services Code, registration of ESCOs is required for the following scope of work:

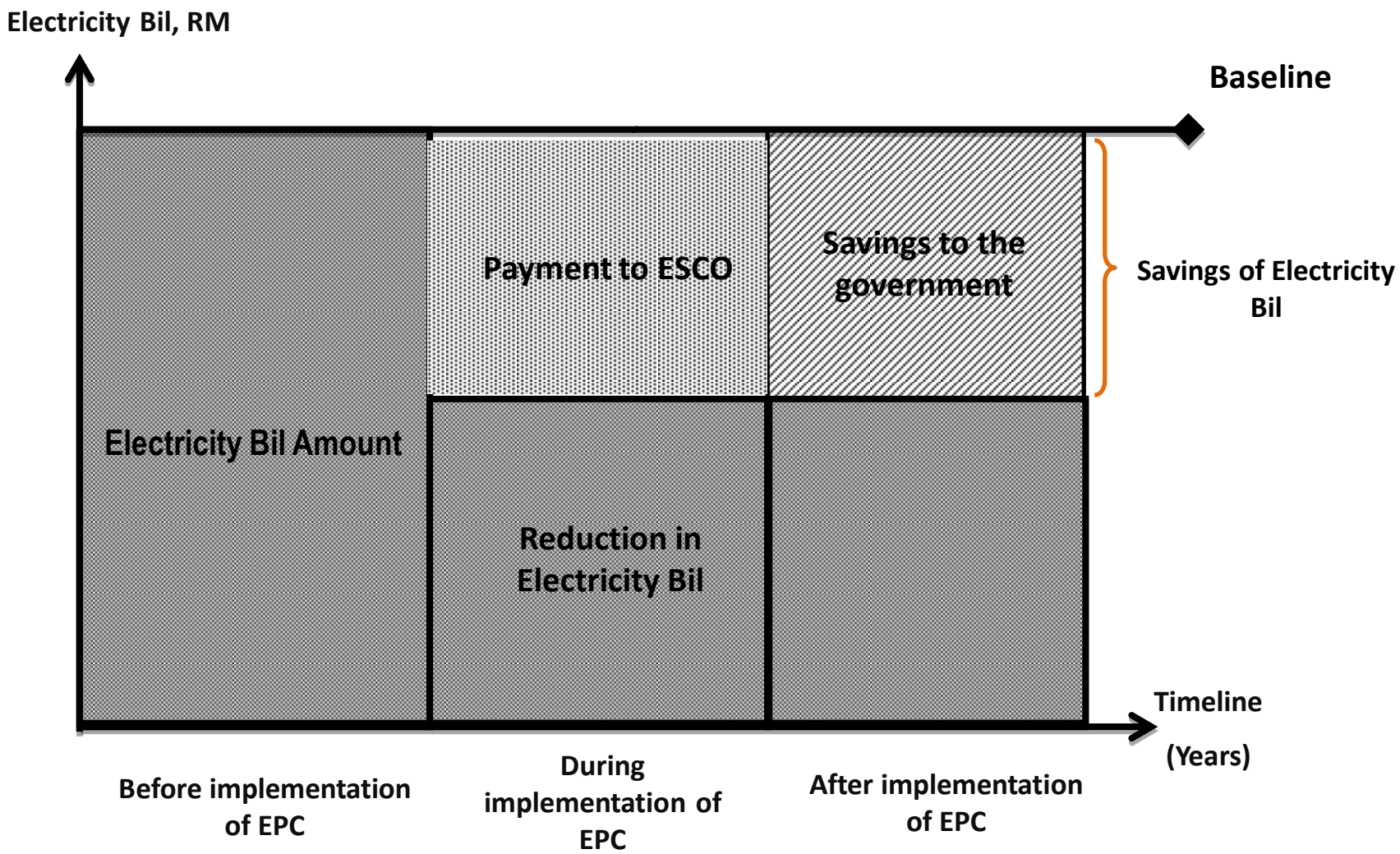
1) Supply of energy efficient devices and equipment.
2) Consultancy Services.
3) Contract Works.
4) Energy Audit.
5) Design Engineering.
6) Project Financing.
7) Management of EPC Contract.
8) Commissioning and Services.
9) The operation and maintenance of equipment / energy-efficient installation, and
10) Inspections of energy efficiency improvement projects .

REGISTRATION OF ENERGY SERVICE COMPANY (ESCO)

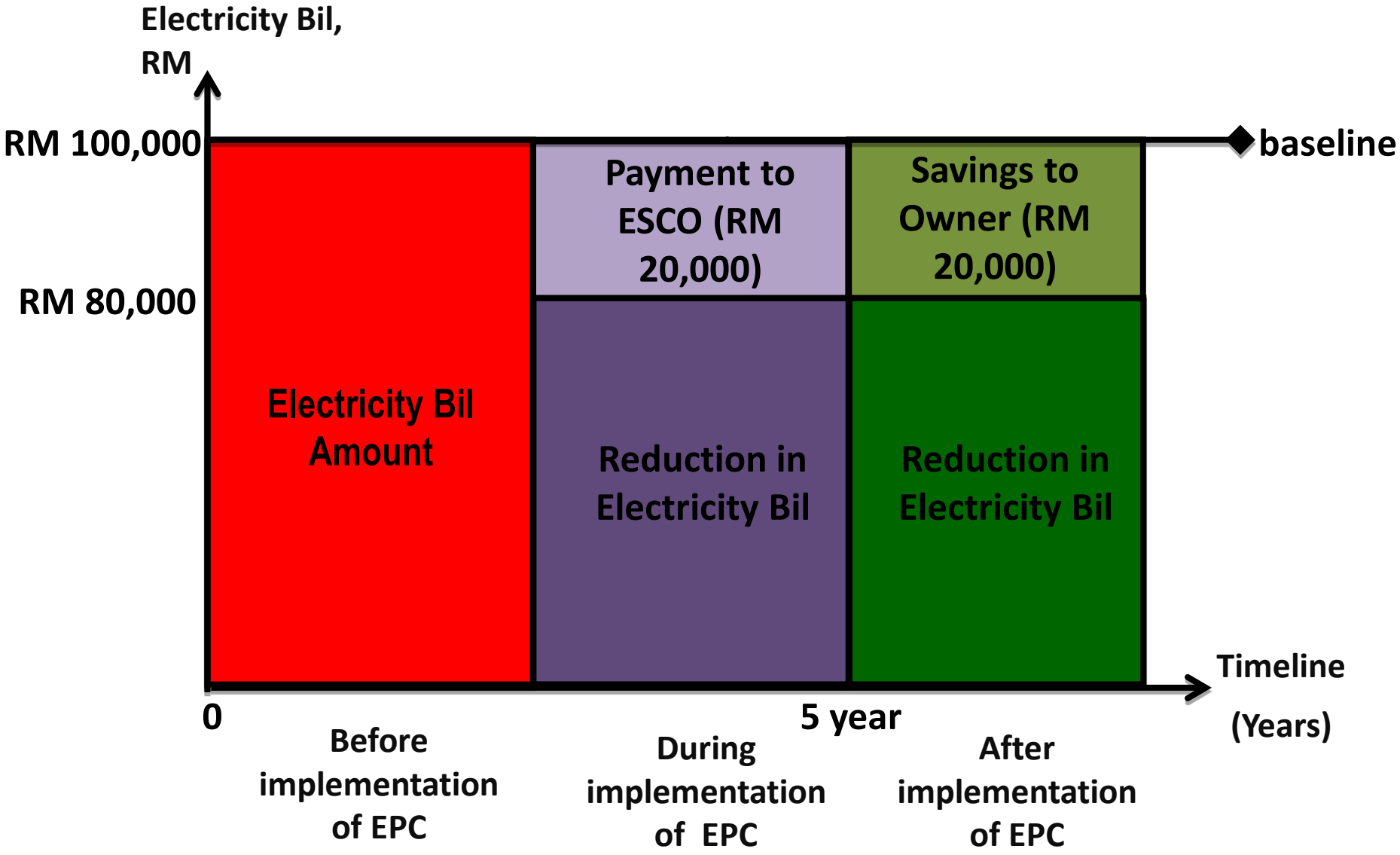
	2013	2014	2015	2016
No of application received	11	42	11	46
No of application approved	9	41	11	46
No of application failed	2	1	0	0
Total no. of registered ESCOs	9	41	52	98



EPC Implementation Concept



Example:


Electricity Bil, RM
RM 100,000
RM 80,000
baseline
Payment to ESCO (RM 20,000)
Savings to Owner (RM 20,000)
Electricity Bil Amount
Reduction in Electricity Bil
Reduction in Electricity Bil
Timeline (Years)
0
5 year
Before implementation of EPC
During implementation of EPC
After implementation of EPC

How will Energy Performance Contracting (EPC) in government sector be implemented?

To engage the service of ESCO

To perform energy audit to determine savings potential

ESCO will offer to implement and finance the project

Guarantee the savings over an agreed terms

Payment to ESCO is based upon the guaranteed savings achieve

Actual amount paid will be based upon agreed sharing value between ESCO and the owner of the government facility.

After agreement ended, ownership of all equipment and system installed will be transferred to facility's owner (Government).

PEMBANGUNAN GARIS PANDUAN PELAKSANAAN EPC DI SEKTOR KERAJAAN

25 Feb 2016

Mesy. Pelaksanaan EPC Sektor Kerajaan di KeTTHA yang dipengerusikan oleh YBhg. Dato' TKSU (TTH)

20 Apr 2016

Mesy. Penyediaan Draf Garis Panduan Pelaksanaan EPC Sektor Kerajaan bersama *Stakeholders* di ST

29 Jul 2016

Mesy. Pelaksanaan EPC Sektor Kerajaan di MOF Dipengerusikan oleh YBhg. Datin TSUB (Perolehan)

17 Ogos 2016

Mesy. Memuktamadkan Garis Panduan Pelaksanaan EPC Sektor Kerajaan bersama *stakeholders* di ST

September 2016

Mengemukakan Garis Panduan yang telah disediakan kepada Mesy. Ahli ST untuk kelulusan

Summary:

NO UPFRONT COST to the Owner

ESCO will finance and implement the Energy Saving Measures.

Saving achieved without compromising user's comfort

ESCO install & maintain the E.E equipment involved

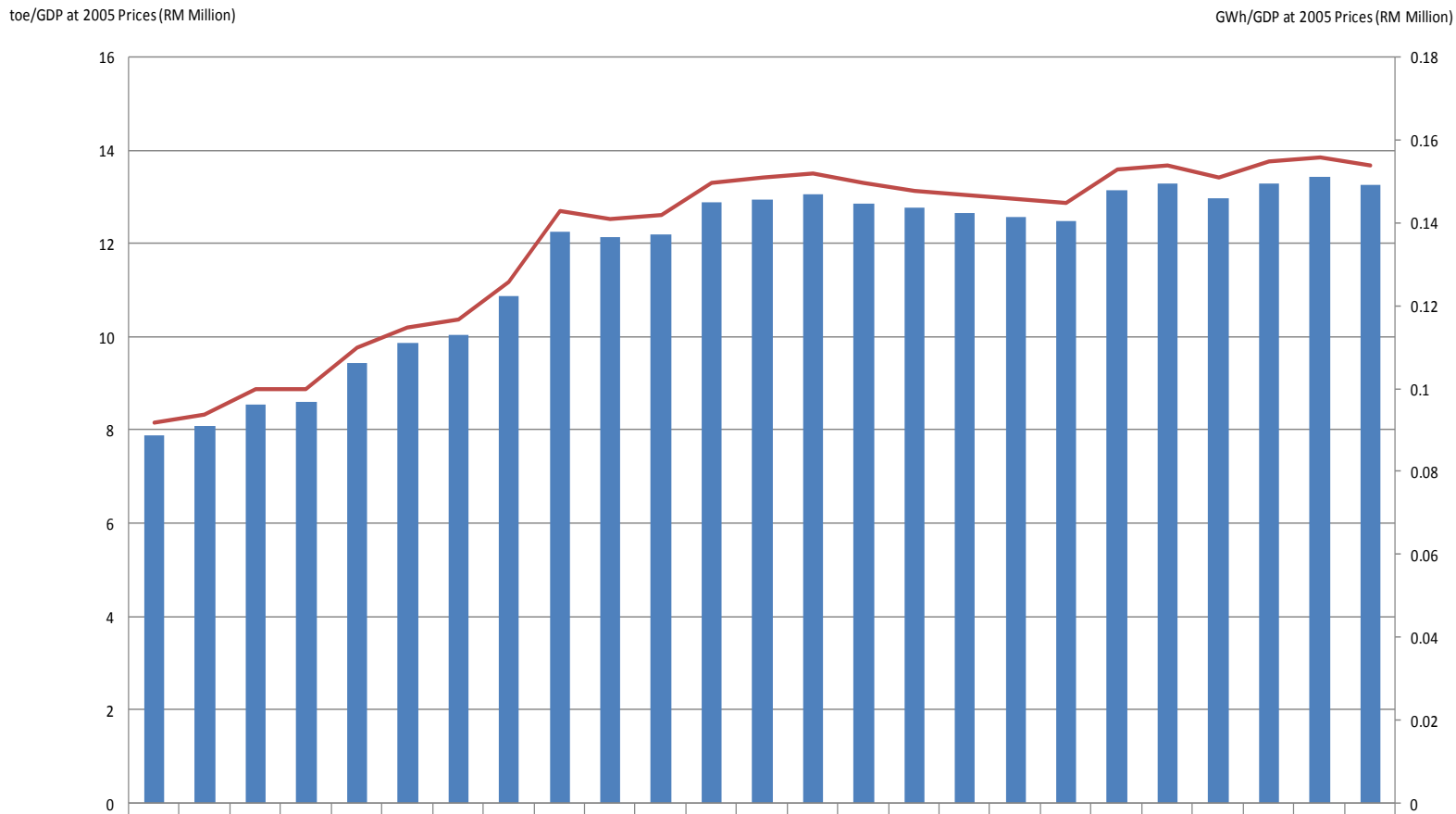
ESCO payment based on actual savings achieved in electricity bill

All equipments installed become the property of the Owner after the contract period ended

Malaysia's Electricity Intensity

Electricity Intensity =

(GWh/RM Million GDP)
at 2005 prices



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Electricity Intensity (toe/GDP at 2005 Prices (RM Million))	7.9	8.1	8.57	8.61	9.44	9.89	10.06	10.88	12.26	12.15	12.2	12.91	12.96	13.06	12.87	12.77	12.67	12.59	12.49	13.15	13.29	12.97	13.31	13.45	13.26
Electricity Intensity (GWh/GDP at 2005 Prices (RM Million))	0.092	0.094	0.1	0.1	0.11	0.115	0.117	0.126	0.143	0.141	0.142	0.15	0.151	0.152	0.15	0.148	0.147	0.146	0.145	0.153	0.154	0.151	0.155	0.156	0.154

Note: Intensity = Quantity of energy required per unit output or activity
(*): Electricity Intensity (toe/RM Million GDP at 2005 prices
(**): Electricity Intensity (GWh/RM Million GDP) at 2005 prices
Preliminary Data for 2013

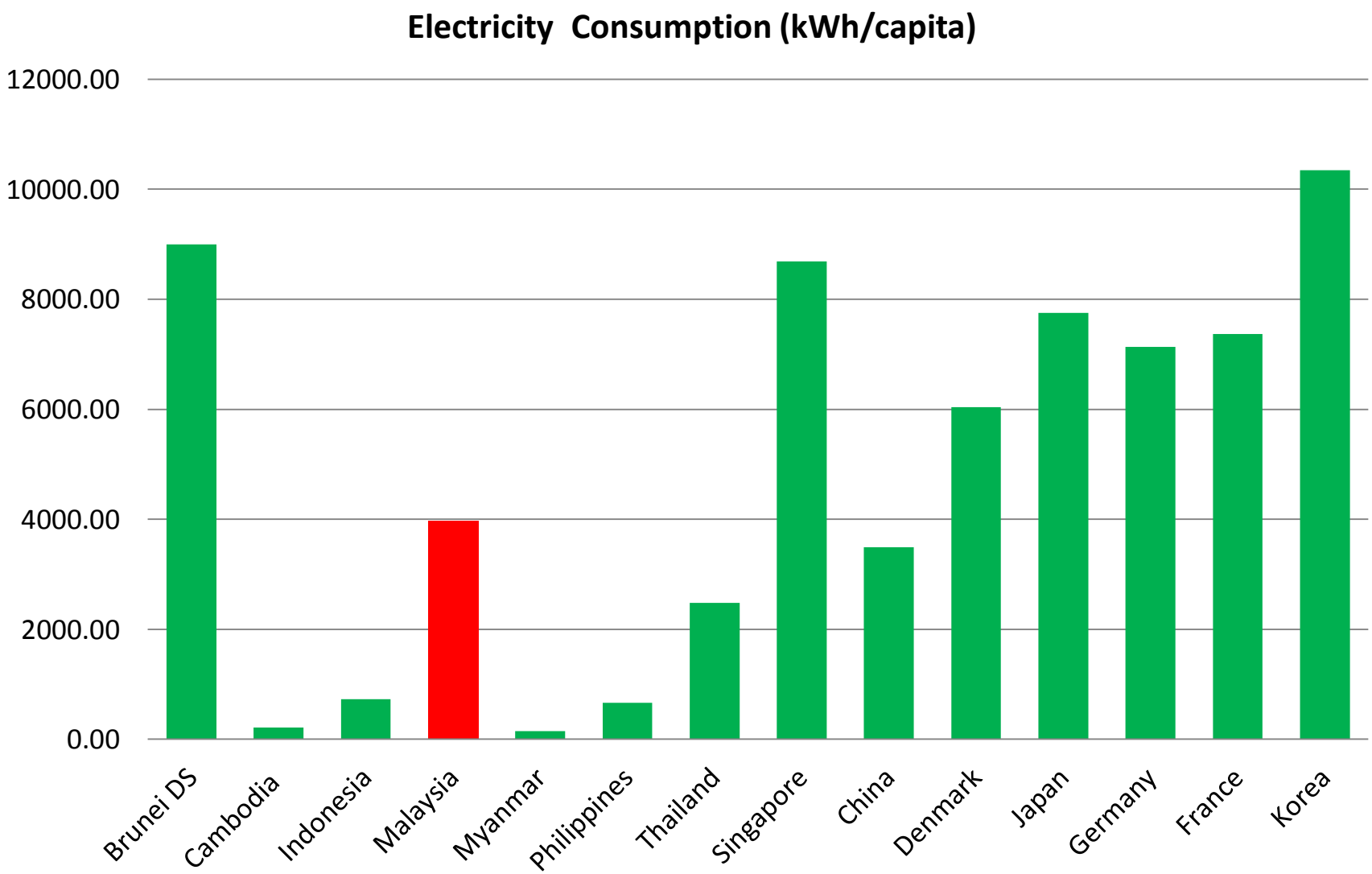
Sources: i) Department of Statistics Malaysia
ii) TNB, SESB, SEB and IPPs
iii) National Energy Balance 2012

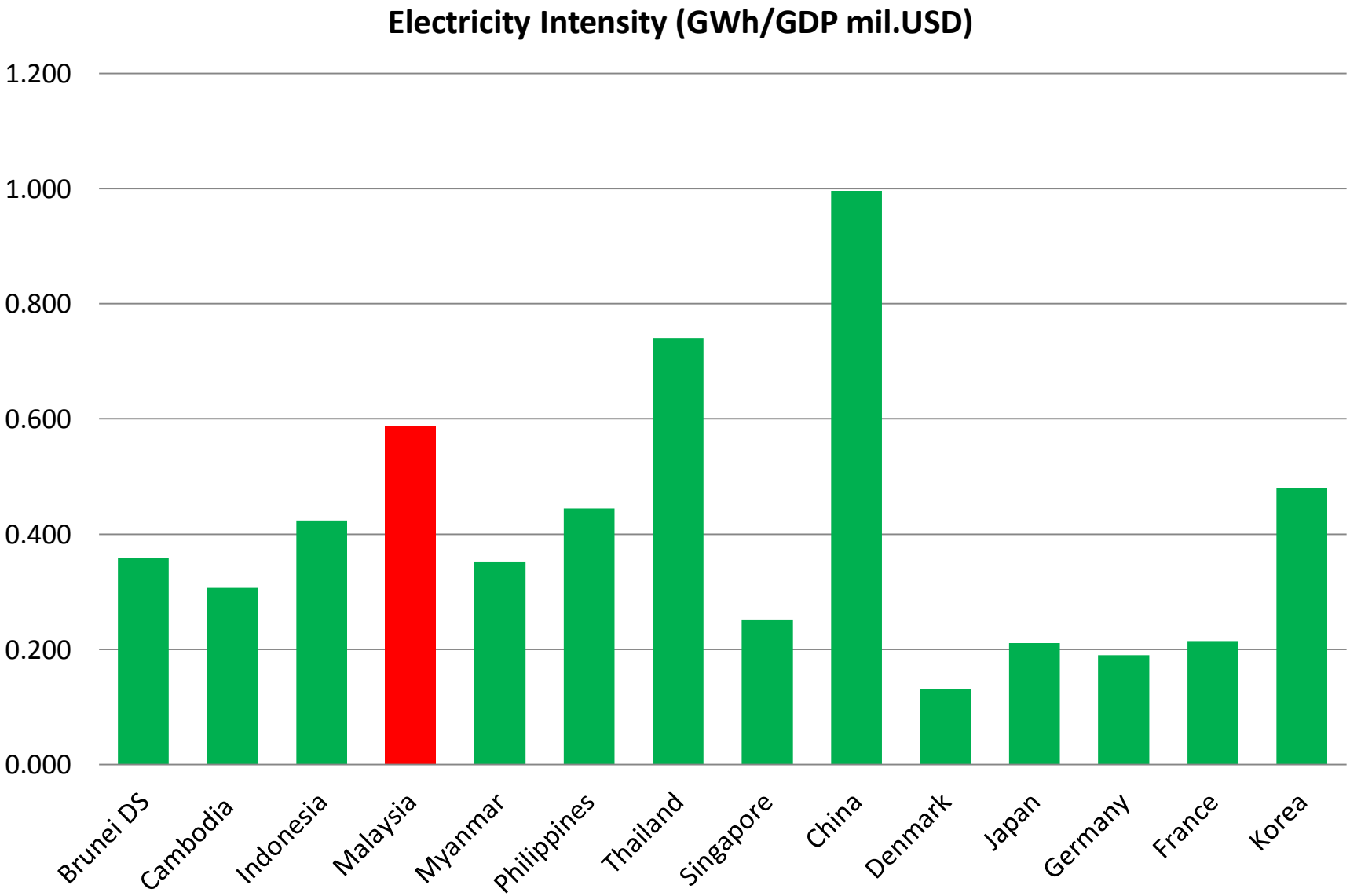
Suru Energy
Suruhanjaya Tenaga Energy Commission

Electricity Intensity within ASEAN and other economies (2012)

	Population (mil)	GDP (Bil.USD)	Elect.Cons (GWh)	Elec.Cons. (kWh/capita)	Elect.Intensity (GWh/GDP mill USD)
Brunei Darussalam	0.41	10.28	3,690	9,000	**0.359**
Cambodia	14.47	9.98	3,060	211	**0.307**
Indonesia	246.86	427.48	181,040	733	**0.424**
Malaysia	29.24	198.43	116,350	3,979	**0.586**
Myanmar	52.8	22.85	8,020	152	**0.351**
Philippines	96.71	145.16	64,560	668	**0.445**
Thailand	66.79	223.9	165,540	2,479	**0.739**
Singapore	5.31	183.37	46,160	8,693	**0.252**
China	1358	4756	4737000	3488	**0.996**
Denmark	5.59	258.64	33,770	6,041	**0.131**
Japan	127.55	4694.39	988,920	7,753	**0.211**
Germany	81.92	3073.86	584,710	7,138	**0.190**
France	65.43	2249.44	482,050	7,367	**0.214**
Korea	50	1078.21	517330	10347	**0.480**

Data from IEA (2012 Energy Indicators)


Electricity Consumption (kWh/capita)
12000.00
10000.00
8000.00
6000.00
4000.00
2000.00
0.00
Brunei DS
Cambodia
Indonesia
Malaysia
Myanmar
Philippines
Thailand
Singapore
China
Denmark
Japan
Germany
France
Korea



Data from IEA (2012 Energy Indicators)

Way Forward For Energy Efficiency In Malaysia

Introduction of National EE Action Plan with SMART electricity consumption savings target of 8.0% compared to business-as-usual at the end of 10 years

Establish effective and sustainable funding mechanism for EE projects

Strengthen capacity of industry players in EE

Intensify enforcement of EE legislation

Strengthen and streamline policy as well as legal and institutional framework

Foster EE culture among industry stakeholders and the public

Terima Kasih

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