A Journey in Sustainable Energy Efficiency Management

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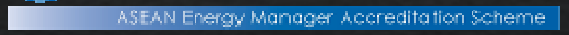
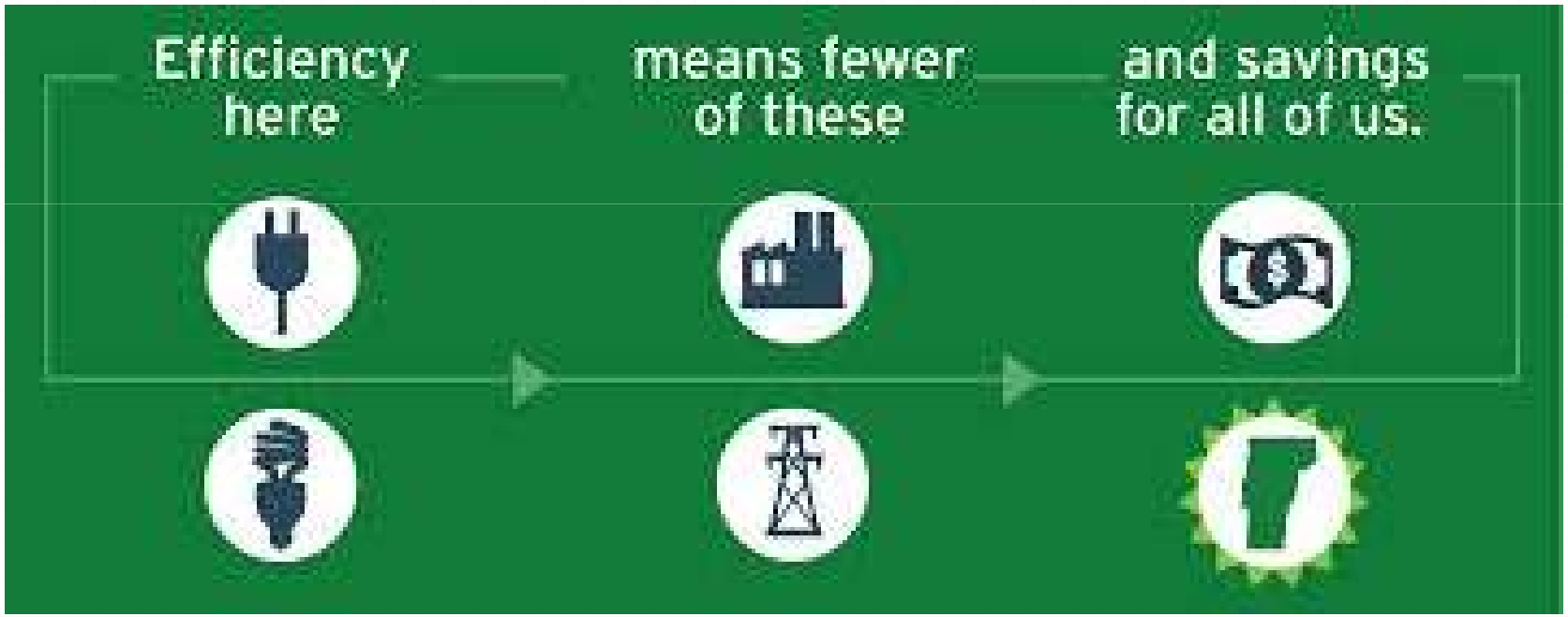


Energy

Efficiency


Efficiency here
means fewer of these
and savings for all of us.

Energy Manager

Energy Management Stories

- Story 1: Prince Court Medical Centre
- Story 2: UTM
- Story 3: Puncak Niaga
- Story 4: MMB
- Conclusion

Story 1:

PUSAT PERUBATAN
PRINCE COURT
MEDICAL CENTRE

Energy Audit vs Energy Management

Energy Efficiency in Start Up

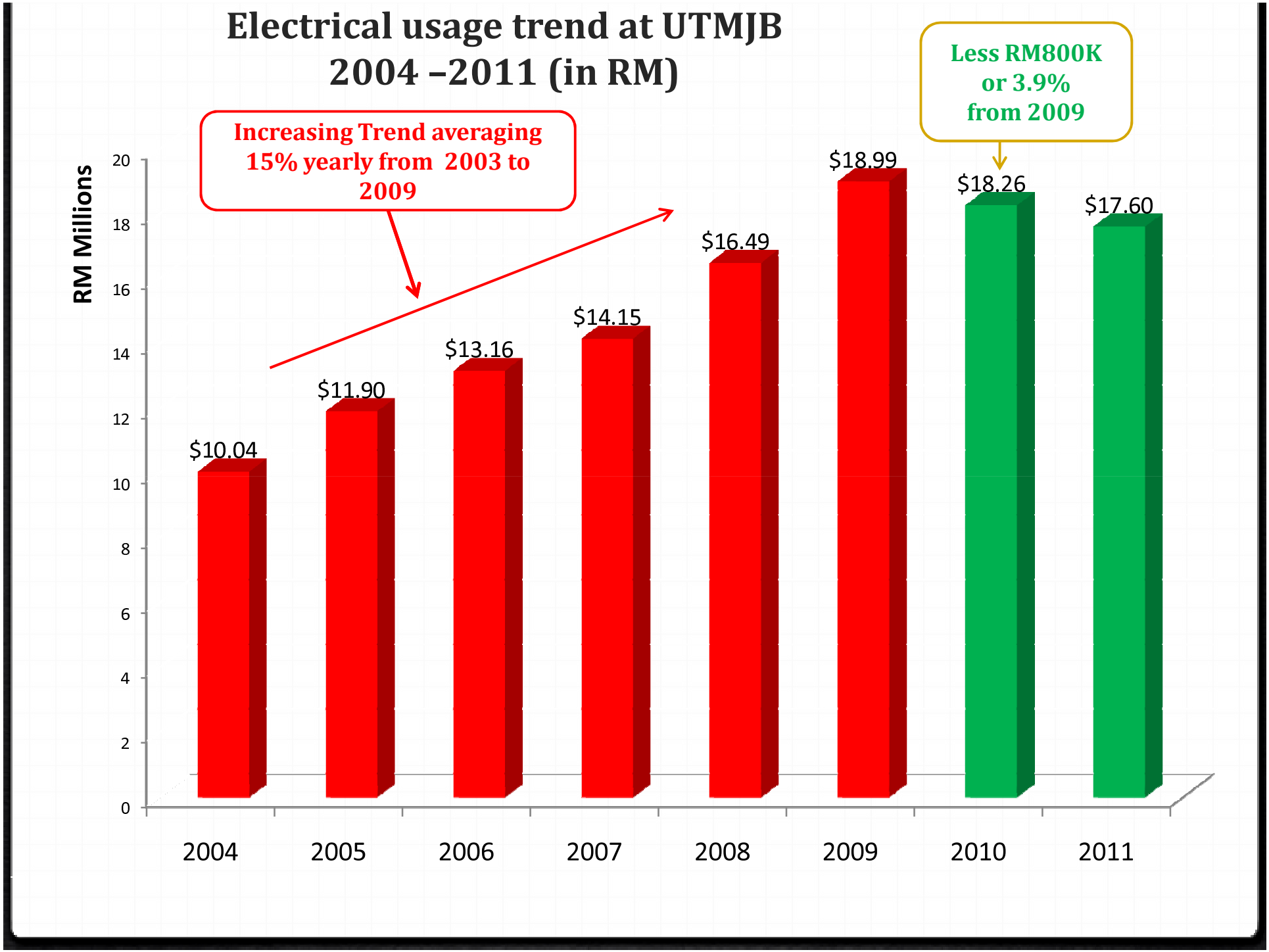
- Energy increases during start up
- Must use Energy Efficiency Index / Building Energy Index/ Specific Energy Consumption
- Convince Accountant / Management

Result

- Saving of RM 150,000/month in 2010.

Story 2:

UTM
UNIVERSITI TEKNOLOGI MALAYSIA


Electrical usage trend at UTMJB
2004 –2011 (in RM)
Increasing Trend averaging 15% yearly from 2003 to 2009
Less RM800K or 3.9% from 2009
RM Millions
20
18
16
14
12
10
8
6
4
2
0
$10.04
$11.90
$13.16
$14.15
$16.49
$18.99
$18.26
$17.60
2004
2005
2006
2007
2008
2009
2010
2011

The Winning Move

SUCCESS
FACTORS

Start by Building People!

Jan 2011: Training for 30 Energy Managers

SEMP METHODOLOGY

A. Building Housekeeping & Best Practices
(ie Electrical Tariff Review, TNB OPTR Scheme, Retime of centralised a/c system operation, EAC Electrical Bill statement system, Operation& Maintenance Policy)

B. SETTING UP SUSTAINABLE ENERGY MANAGEMENT SYSTEM

- Development of energy policy
- Development of an energy management committee
- Establishment of energy accounting center (EAC) & appointmnt of Headof EAC
- Establishment of Energy Efficiency Index for overall organization and each EAC
- Establishment of overall & EAC working procedure
- Establishment of reporting and monitoring system

C. ENERGY AUDIT & RECOMMENDATION FOR IMPROVEMENT

- Overall energy survey
- Establish building energy balances and existing equipment details
- Evaluating systems performance
- Setting the practical utility benchmark targets and building benchmarking
- Recommendations for improvement via UTM Transformation Projects
- Economic analysis

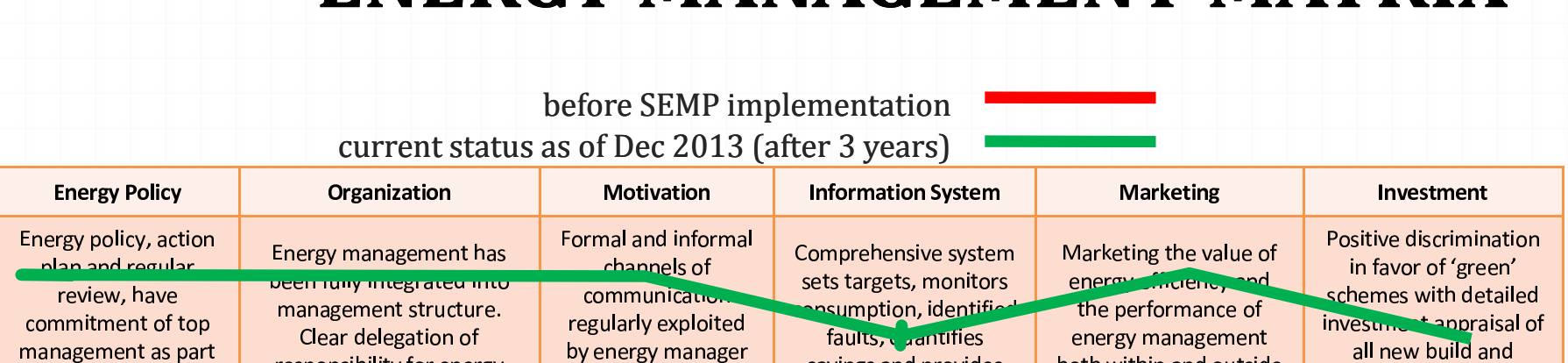
D. OTHERS

- Energy saving and policy posters
- Working manuals booklet
- 'Energy Manager' in-house workshop
- Providing Energy Awareness seminar
- Installation of electrical meters

ENERGY MANAGEMENT MATRIX

before SEMP implementation

current status as of Dec 2013 (after 3 years)



	Energy Policy	Organization	Motivation	Information System	Marketing	Investment
4	Energy policy, action plan and regular review, have commitment of top management as part of an environmental strategy	Energy management has been fully integrated into management structure. Clear delegation of responsibility for energy consumption	Formal and informal channels of communication regularly exploited by energy manager and energy staff at all levels	Comprehensive system sets targets, monitors consumption, identifies faults, quantifies savings and provides budget tracking	Marketing the value of energy efficiency and the performance of energy management both within and outside the organization	Positive discrimination in favor of 'green' schemes with detailed investment appraisal of all new build and refurbishment opportunities
3	Formal energy policy, but no active commitment from top management	Energy manager accountable to energy committee representing all users, chaired by a member of the managing board	Energy committee used as main channel together with direct contact with major users	M & T reports for individual premises based on sub-metering, but savings not reported effectively to users	Programme of staff awareness and regular publicity campaigns	Some payback criteria employed as for all other investment
2	Un adopted energy policy set by energy manager or senior department manager	Energy manager in post reporting to ad-hoc committee, but line management and authority are unclear	Contact with major users through ad-hoc committee chaired by senior department manager	Monitoring and targeting reports based on supply meter data. Energy unit has ad-hoc involvement in budget setting	Some ad-hoc staff awareness training	Investment using short term payback criteria only
1	An unwritten set of guidelines	Energy management is the part-time responsibility of someone with only limited authority or influence	Informal contacts between engineer and a few users	Cost reporting based on invoice data. Engineer complies reports for internal use within technical department	Informal contacts used to promote energy efficiency	Only low cost measures taken
0	No explicit policy	No energy management or any formal delegation of responsibility for energy consumption	No contact with users	No information system. No accounting for energy consumption	No promotion of energy efficiency	No investment in increasing energy efficiency in premises

UTM SEMP key activities

- Change operation hours of centralised air-conditioned from 7:00am-5:00pm to 7:30am to 4:30pm
- Increase PTJ awareness on their electricity energy usage when receiving monthly electric bill statement and after Energy Saving Campaign organized in faculties, colleges, offices, UTM security guards and UTM Cleaners
- Controlling the usage of the centralized air-conditions (AC) system during weekends. All SPACE program and weekend classes are only conducted in rooms with split unit AC
- Retrofit energy saving lamps T5 of 60,000 units.
  - 50% reduction of 60,000 lamps x 20 Watt =1200 kW/h @ RM10K/month
  - Maximum Demand reduced from 15.5 MW to 13.5 MW or 2.5 MW saving
  - Maximum Demand charges reduced 2.5 MW of RM30.3/kW @ RM75K/month
- Switched to a tariff with an *Off-peak Tariff Rider (OPTR),* starting 19 July, 2011 a special tariff allowing UTM to enjoy a 20% discount of energy usage from 10:00 pm – 8:00 am
- Technical and System Energy Audits done by in-house team
- Training of 30 Certified Energy Managers in January 2011 and another training for 12 more Certified Energy Manager in December 2013 (the only organization that have this much certified energy manager by AEMAS/Greentech
- More organized and structured SEMP at faculties, colleges & offices

UTM highlighted as the exemplary Energy Management Institution - In Green Purchasing Asia Magazine

COVER | OPPORTUNITIES | RETROFITS

Practising what it preaches

UTM's electricity bill hit new low in July 2011

UTM Saves > RM 7 Million in Energy Bills (2011-2014)

the first time since 2008, the university's electricity bill dipped below the RM1 million (US$318,000) markenergy efficient drive . Considering that the university's monthly power consumption over the past three years was as high as RM1.7 million, the July figure of RM962,345 was a sterling achievement.

To Prof Dr Zainuddin Abdul Manan, a key member of a group who

(Single Star) (see explanation). The other was a subsidiary of Malaysia's telecommunications company, **TM Research and Development (TMRD)**.

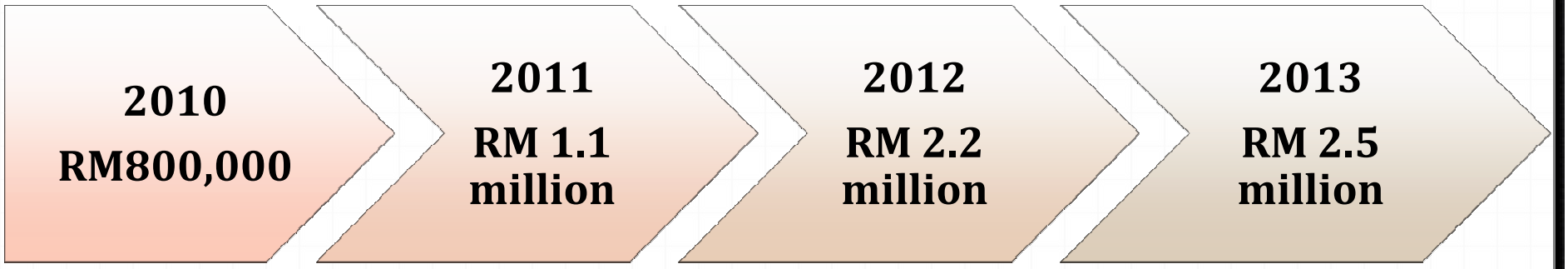
university in ASEAN has taken up the challenge," he says.

Working within budget

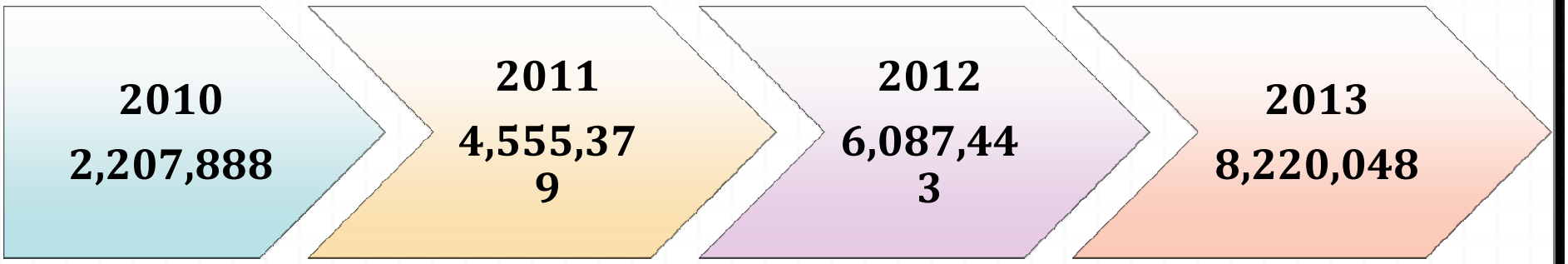
Energy-saving initiatives began in UTM as far back as 2003, when the facilities maintenance team improved power usage at the library with the help of an energy services company (ESCO) which provided the investments, and subsequently shared the savings. Early

AWARDS RECEIVED 2011-2014

ENERGY SAVING RM6.6 MILLION FOR 2010-2013



ENERGY SAVING 21,070,758 kWh FOR 2010-2013



The only organization to get 2nd STAR ASEAN Energy Management Gold Standard

Award for the achievement of energy saving

29 January 2013 @ Marriot Hotel, Putrajaya


AEMAS

Certificate of Registration

Awarded to

Universiti Teknologi Malaysia (UTM)

AEMAS certifies that the Energy Management System of Universiti Teknologi Malaysia, (UTM), has been audited and found in accordance with the requirements of:

Energy Management Gold Standard

Audit conducted: 14-15 January 2013

Auditors: Ir. Al Khair Mohd Dasa (AEMAS Country Expert Malaysia)

AEMAS Certificate No.: EMGS-MY-2-001-0313

Gold Standard level: 2-star

The validity of this certificate can be verified from the following web site:

www.aemas.org

The Energy Management Gold Standard, delivered under the ASEAN Energy Management Scheme (AEMAS), requires companies to establish their sustainable energy management system with demonstration for the achievement of measurable energy savings.

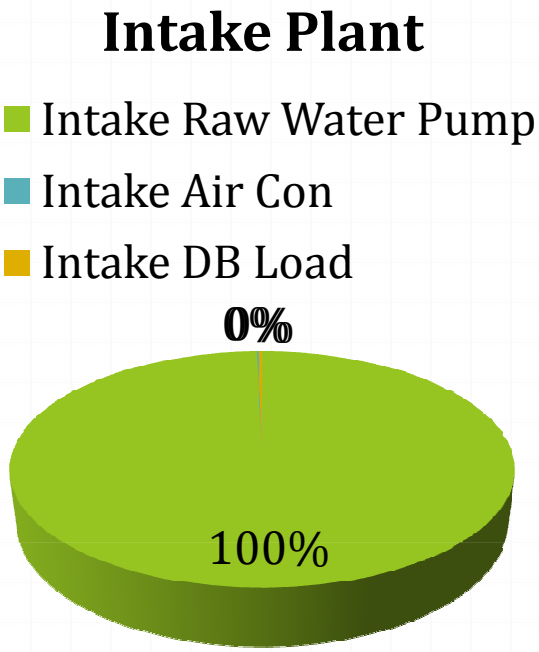
UTM is being awarded

3rd STAR EMGS

The only ASEAN organization

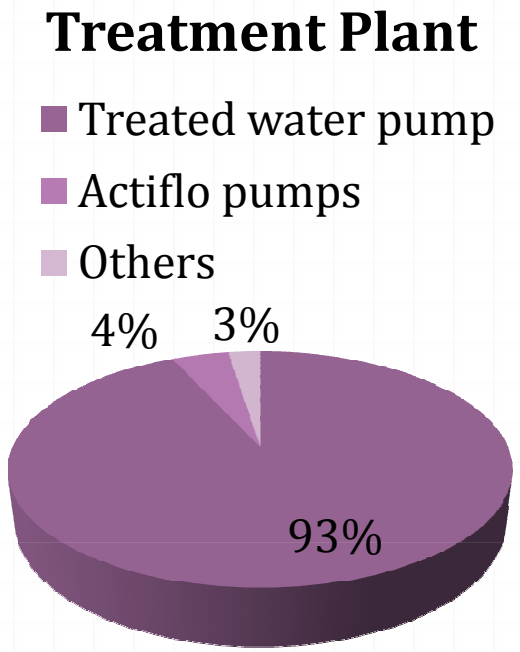
Story 3: SSP2

PUNCAK NIAGA (M) SDN BHD
"Pakar Air Malaysia"



112,677,246 kWH

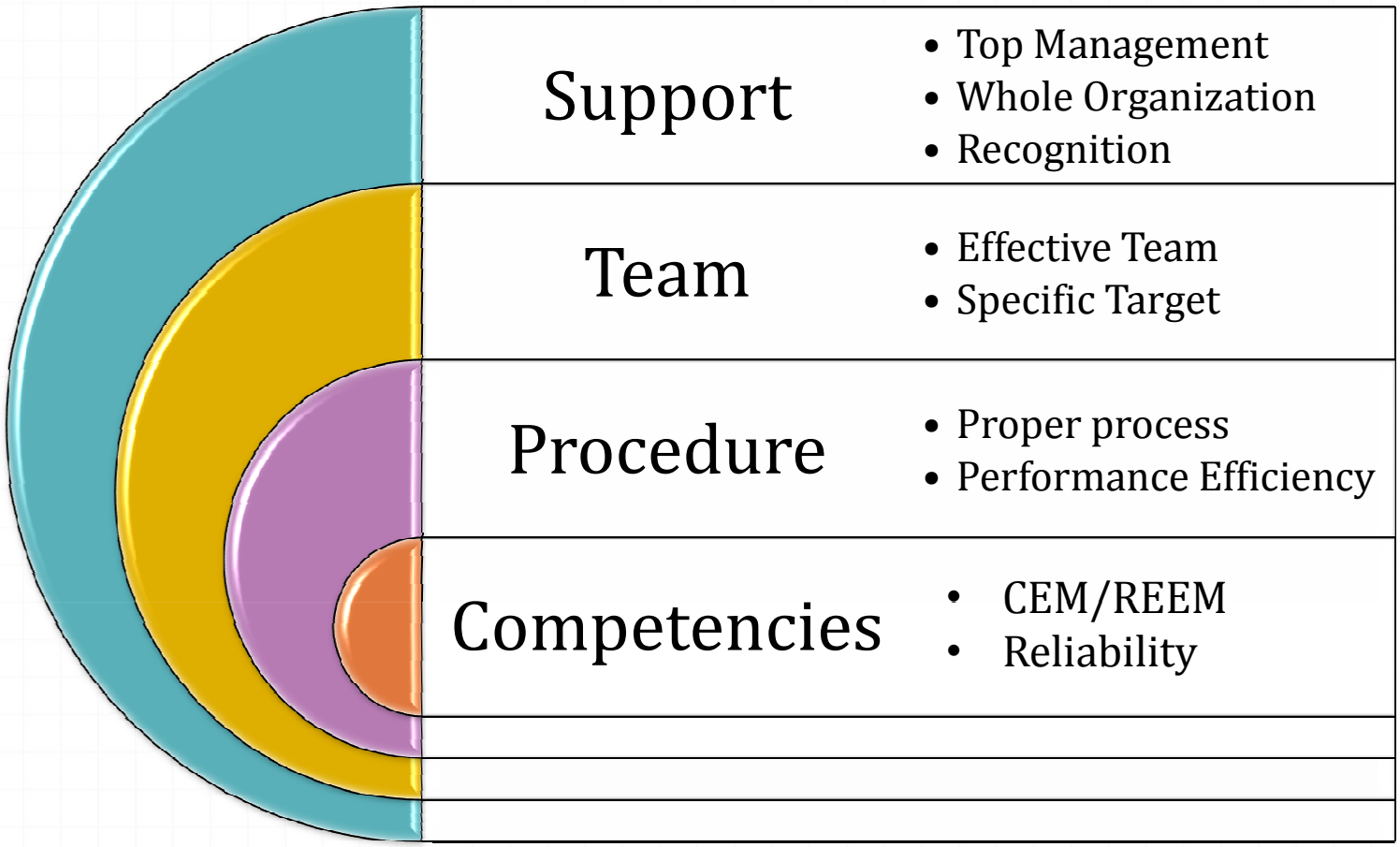
67%



56,364,438 KWH

33%

SSP2 Load Apportioning Based on Energy Audit 2011



Energy Management Strategy

Sustainable Improvement Teams

Energy Efficiency

- Refurbishment of low efficient pumps
- Replacement of conventional bulb with energy saving types
- Installation of power meters

Energy Utilization

- Utilization of peak & off peak period
- Utilization of refurbed high performance pumps
- On-Line Condition Base Monitoring for pumpsets

Energy Awareness

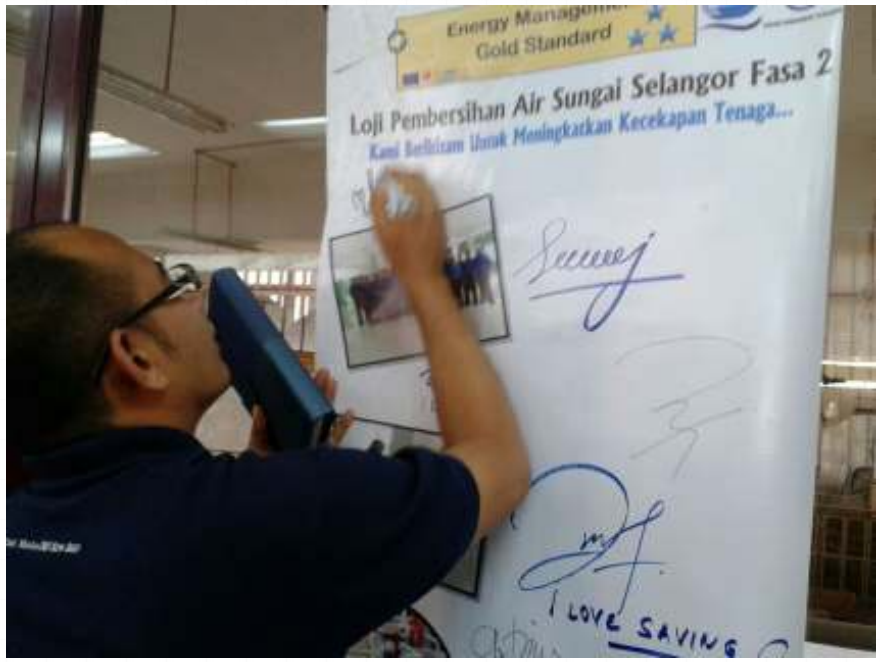
- Awarenes program
- Share info & knowledge extract from website on new developement on energy technology
- Continuous study on the performance of existing mechine/equipment

Energy Efficiency Team

Project implemented

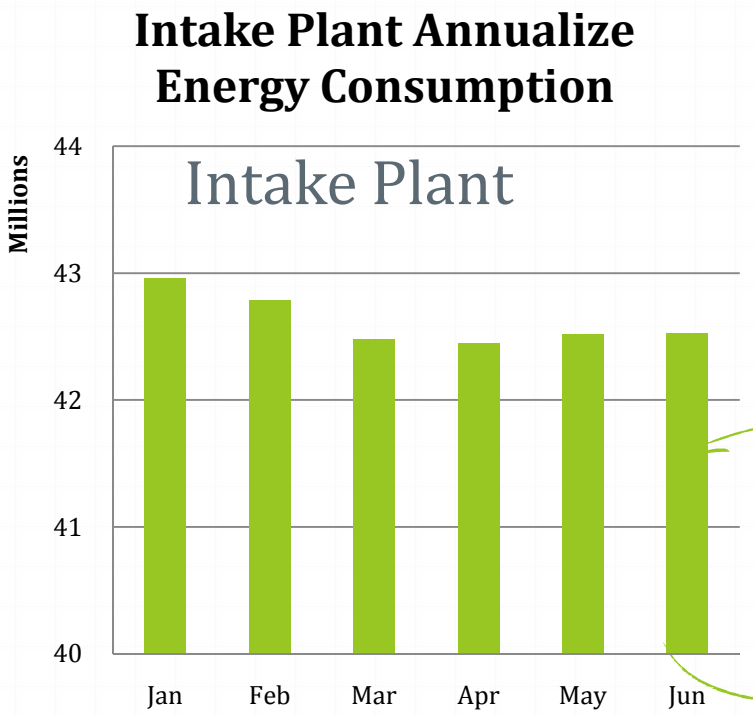
Energy Utilization Team
Control Parameters

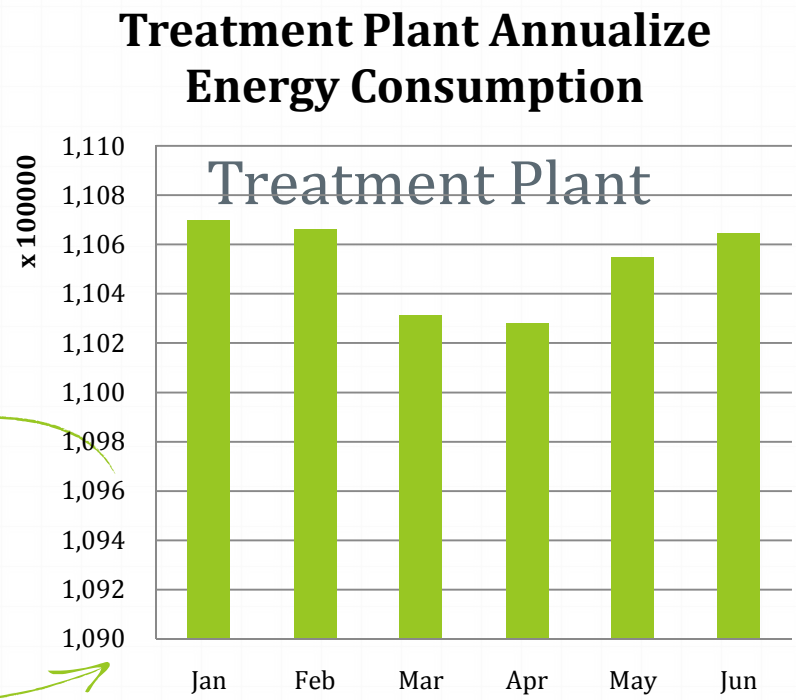
Awareness Team
Energy Corner



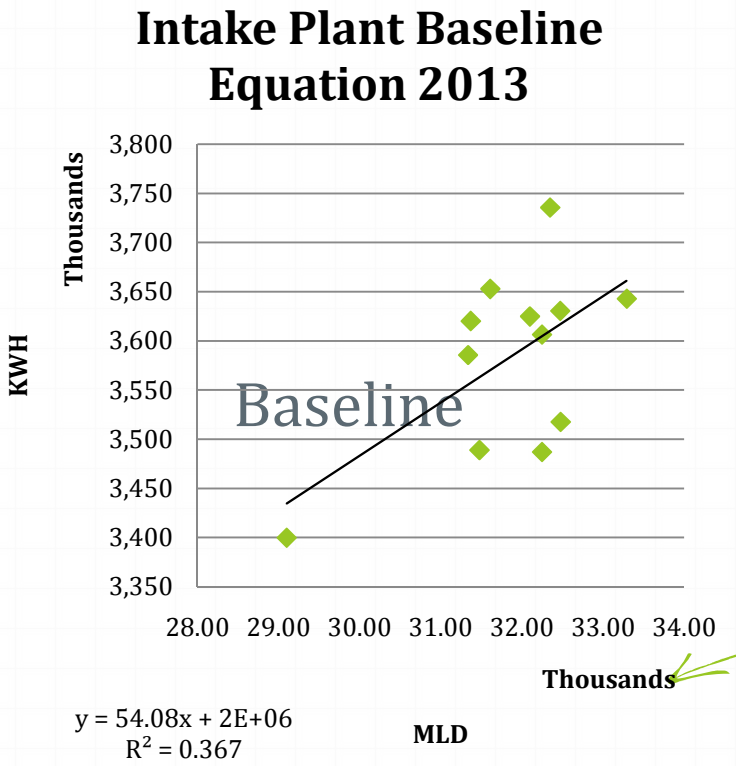
Staff and Contractors Commitment to SEMP

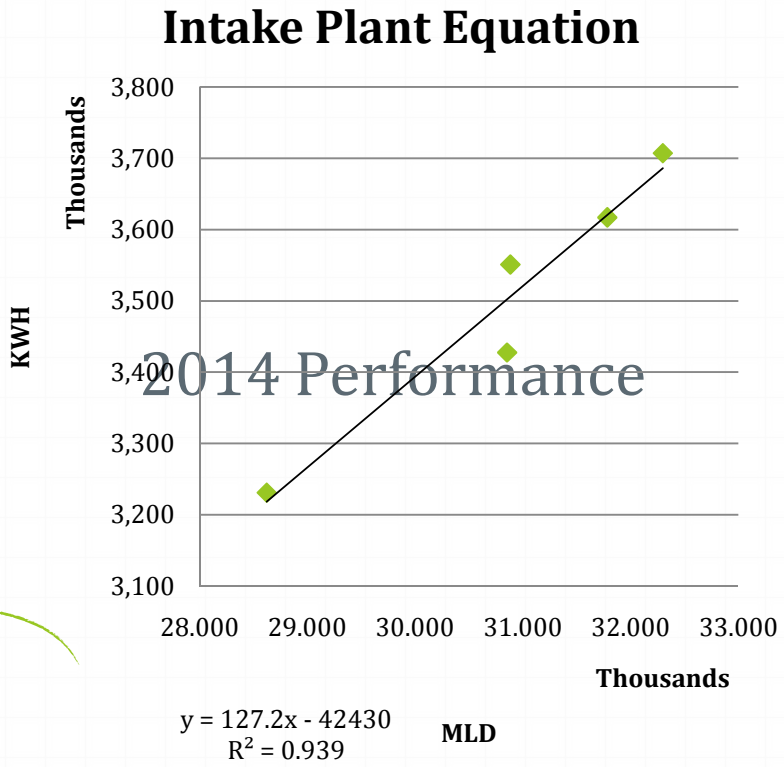
Rewarding the team:
Visit To Greentech Malaysia





SSP2 Annualize Consumption





Period	Intake Plant (KWH)	Treatment Plant (KWH)
Jan – June 2013	21,623,283	55,047,771
Jan – June 2014	21,155,935	54,984,654
Saving	467,348	64,117

SSP2 Intake Plant

The challenges

Energy Management
Gold Standard

AEMAS

PUNCAK NIAGA

TOWARDS CERTIFICATION FOR 1 STAR RATING

EMT

ENERGY MANAGEMENT TEAM (NRO)

LOJI PEMBERSIHAN AIR SUNGAI SELANGOR FASA 2 (SSP2)

"Kami Beriltizam Untuk Meningkatkan Kecekapan Penggunaan Tenaga"

Story 4:

MALAYSIAN MOSAICS BERHAD (5371-V)

Level	Energy Policy	Organization	Motivation	Information System	Marketing	Investment
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TARGET PROFILE

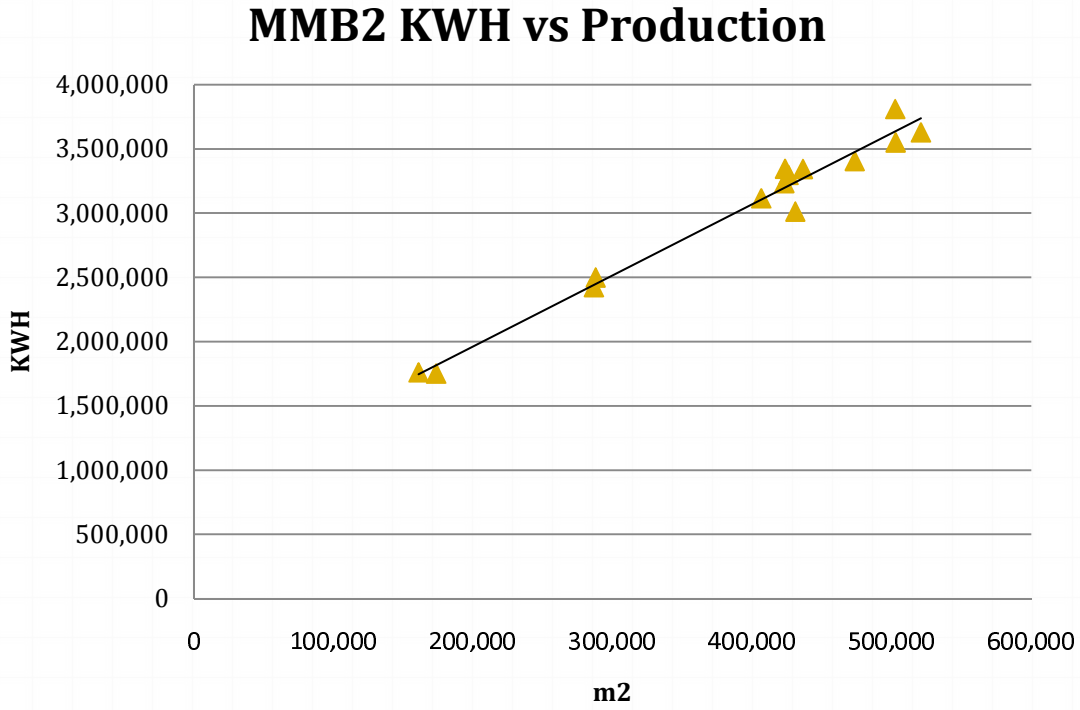
MAY 2013

JAN 2013

CURRENT PROFILE @ 2012

Energy Management Matrix

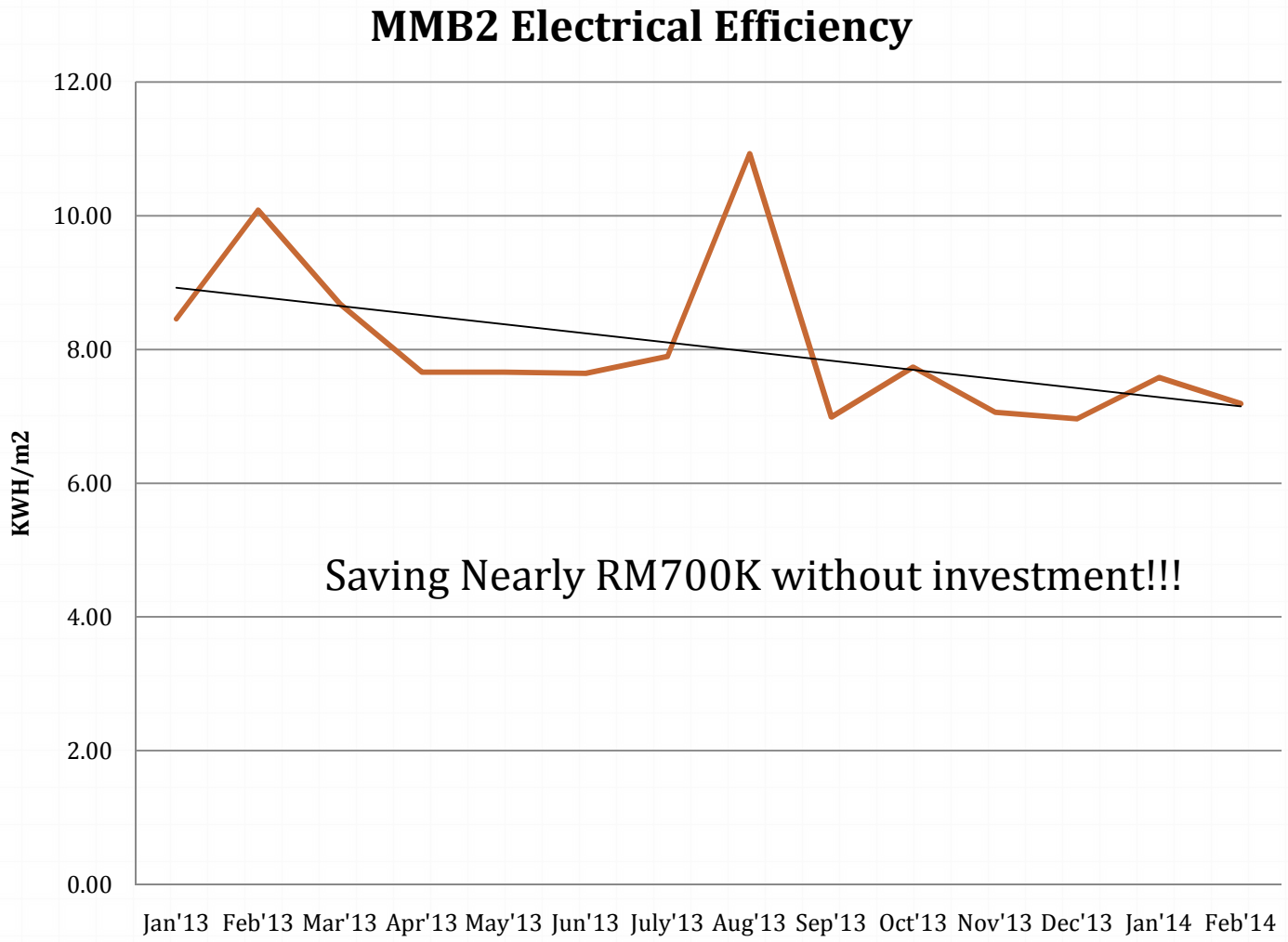
Electricity Bill RM15Mill/year
NG Bill RM 16 Mill/year



Baseline: R2 = 0.7

2013 R2 = 0.9733

Saving in 2013

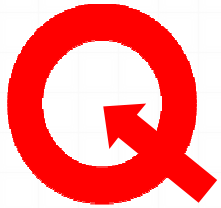


Challenge

- Plant focal persons
- Change in Production capacity
- Management Support

Conclusion

- Different Organizations requires different strategy
- EMGS provides the framework for good energy management
- Energy Management is not about equipment replacement only
- Energy Management is about EFFICIENT CULTURE DEVELOPMENT



Thank you

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