Renewable Cost Data to Support Policy Making:
Design, Implementation and Best Practice Workshop

CHALLENGES IN COLLECTING RENEWABLE COST DATA IN MALAYSIA

12 September 2014

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Background

Renewable Energy Development in Malaysia

8TH Malaysia Plan (2001 - 2005)

- RE as the 5th Fuel
- Implied 5% RE in energy mix

9th Malaysia Plan (2006 – 2010)

- **Targeted RE capacity to be connected to power utility grid:**
  - 300 MW – Peninsular Malaysia; 50 MW - Sabah
- **Targeted power generation mix:**
  - 51 % natural gas, 26 % coal, 9 % hydro, 8 % oil, diesel 5 %, biomass 1 % (2010)
- Carbon intensity reduction target: 40% lower than 2005 levels by 2020

RE as of 31st December 2010

- Connected to the utility grid:68.45MW (20% from 9th MP target through Small Renewable Energy Programme (SREP)
- Off-grid**:** >400MW (private palm oil millers and solar hybrid)

SEDA Malaysia

Functions of SEDA Malaysia

SEDA Malaysia established on 1st September 2011

- Through the Sustainable Energy Development Authority (SEDA) Act 2011
- Implements the Feed in Tariff (FiT) as provided under the RE Act 2011

Functions

i. to advise the Minister & relevant Government Entities on all matters relating to sustainable energy, including recommendations on policies, laws & actions to be applied to promote sustainable energy

ii. to promote and implement the national policy objective for renewable energy;

iii. to promote, stimulate, facilitate and develop sustainable energy;

iv. to implement, manage, monitor and review the feed-in tariff system;

v. to implement sustainable energy laws and to recommend reform to such laws to the Federal Government;

vi. to promote private sector investment in the sustainable energy sector, including to recommend to the relevant Government Entities incentives in relation to taxes, customs and excise duties and other fiscal incentives applicable to such investment;

Functions of SEDA Malaysia (cont..)

vii. to carry out or arrange for the conduct of researches, assessments, studies and advisory services, collate, analyse and publish information, statistics and factors influencing or relevant to the development of sustainable energy,

viii. to disseminate such relevant information, statistics and factors to Government Entities, the public and investors or potential investors investing in sustainable energy;

ix. to conduct, promote and support research and innovation activities relating to sustainable energy;

x. to conduct, promote and support, training or other programmes relating to the development of human resources and capacity building in the sustainable energy sector;

xi. to implement measures to promote public participation and to improve public awareness on matters relating to sustainable energy;

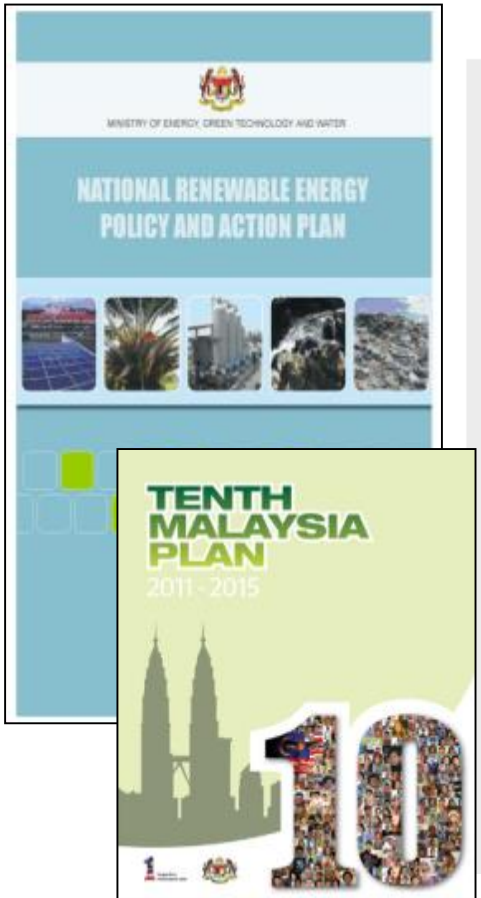
xii. to act as a focal point to assist the Minister on matters relating to sustainable energy and climate change matters relating to energy; and

xiii. to carry out any other function conferred by or under any sustainable energy law

National Renewable Energy Policy & Action Plan

Approved by GOM 2 April 2010

- 10th Jun 2010: 10th Malaysia Plan (chapter 6)
- 15th Oct 2010: National Budget 2011 (paragraph 34)
- 25th Oct 2010: Economic Transformation Programme (chapter 6)

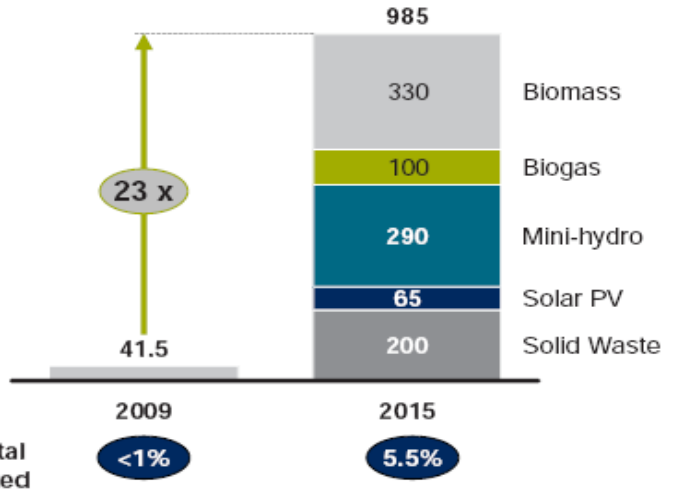


Renewable energy will increase from <1% in 2009 to 5.5% of Malaysia's total electricity generated by 2015

Moving towards renewable energy replaces the need for fossil-fuel power plants

Planned increase in renewable energy capacity

MW



RE investments will receive a huge push through FiT

- **Introduction of Feed-in Tariff (FiT) of 1%** to be incorporated into the electricity tariffs of consumers
- **Establishment of a Renewable Energy Fund** from the FiT to be administered by a special agency under KeTTHA
- This provides an **annual CO_2 avoidance** of 3.2 million tonnes

SOURCE: Ministry of Energy, Green Technology and Water

Strategic Thrusts of the National RE Policy & Action Plan

Strategic Thrust 2: Provide Conducive Business Environment for RE

Strategic Thrust 3: Intensify Human Capital Development

Strategic Thrust 1: Introduce Legal & Regulatory Framework

Strategic Thrust 5: Create Public Awareness & RE Policy Advocacy Programmes

Strategic Thrust 4: Enhance RE Research & Development

Malaysian National RE Targets

Year	Cumulative RE Capacity	RE Power Mix (vs Peak Demand)	Cumulative CO_2 avoided
2015	985 MW	5.5%-6%	11.1 mt
2020	2,080 MW	11%	42.2 mt
2030	4,000 MW	17%	145.1 mt

Note:

- Targets based on implementation of FiT
- RE capacity achievements are dependent on the size of RE fund

Concept of FiT

Concept of the Malaysian Feed-in Tariff (FiT)

- A mechanism that allows electricity produced from indigenous RE resources to be sold to power utilities at **a fixed premium price and for specific duration**.
  - ✓ Provides a conducive and secured investment environment
    - Enable to make financial institutions be comfortable in providing loan with longer period (>15 years)
  - ✓ Provides incentives to RE producers as it only pays for electricity produced
    - promotes system owner to install good quality & maintain the system
    - Provides fixed revenue stream for installed system

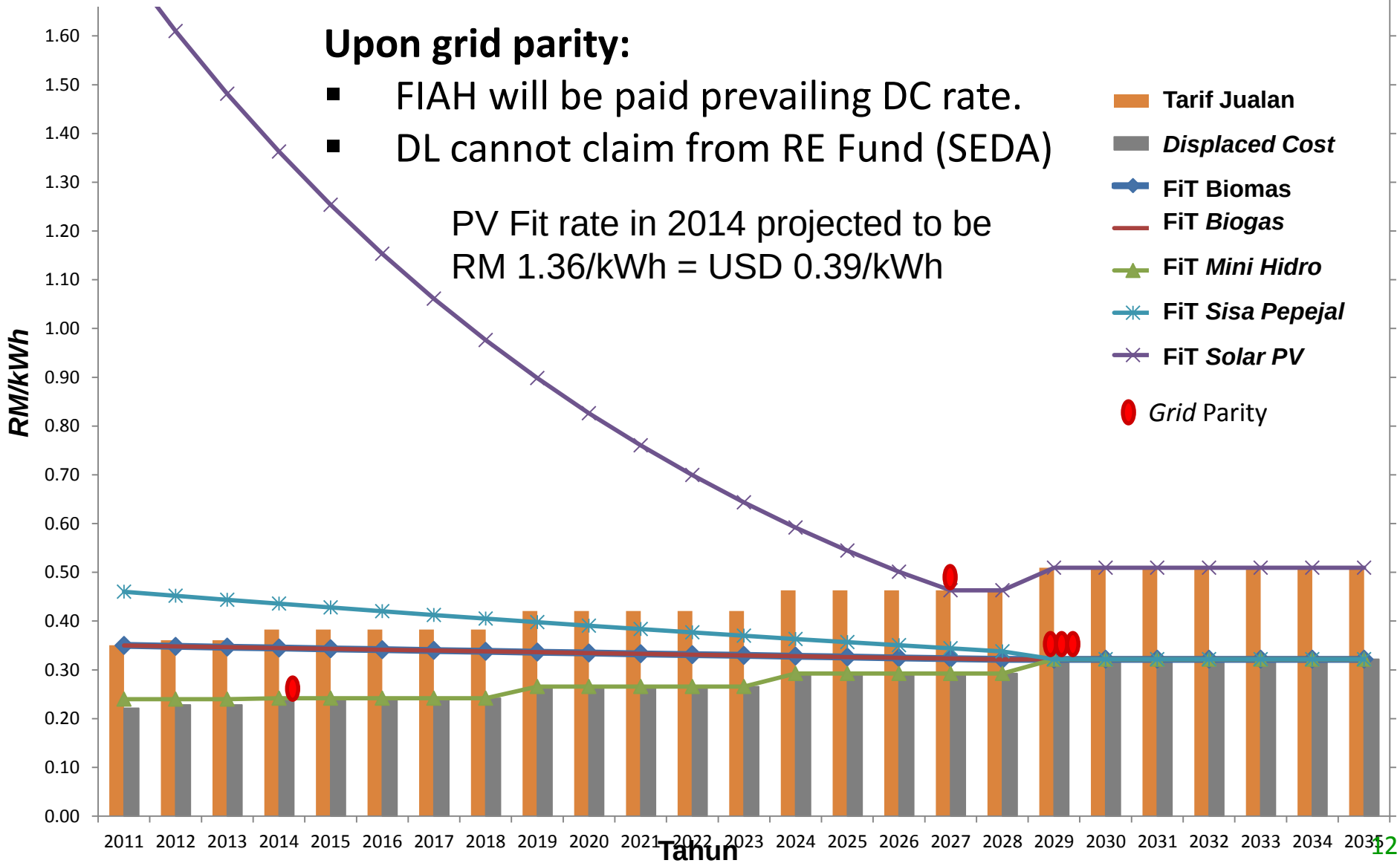
- *degression* – annual reduction of tariffs for FiT rates for each technology/ RE source based on reduction in RE cost
  - ✓ Indirectly promotes reduction of RE costs by the producer, whilst increasing system efficiency
  - ✓ Higher portfolio in energy mix

Projected Degression & Grid Parity (as at 2010)

Upon grid parity:

- FIAH will be paid prevailing DC rate.
- DL cannot claim from RE Fund (SEDA)

PV Fit rate in 2014 projected to be
RM 1.36/kWh = USD 0.39/kWh



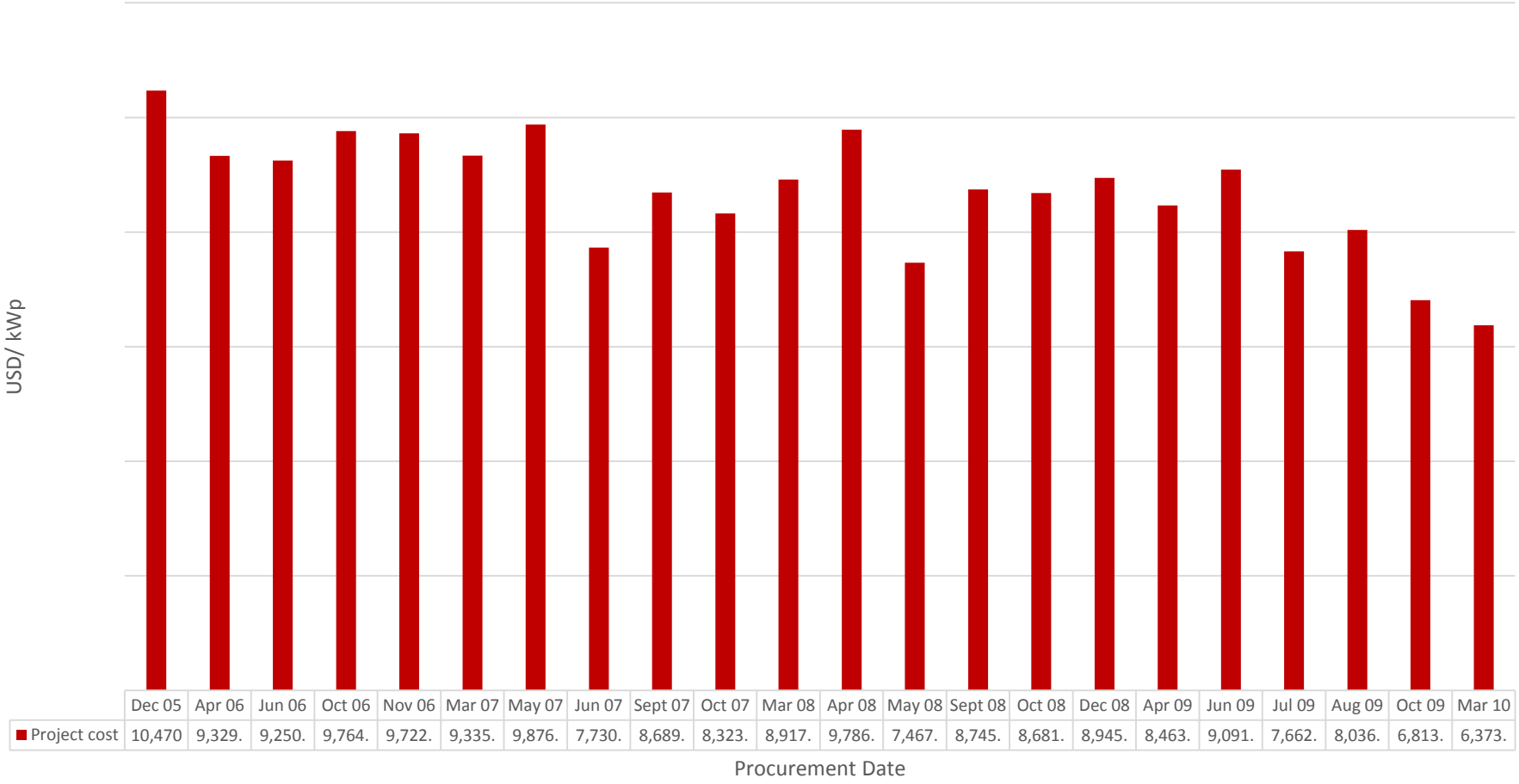
Feed-in Tariff Rates (2014)

Technology / Source	FiT Duration	Range of Basic FiT Rates (USD/kWh)	Average Annual Degression
Biomass (palm oil waste, agro based)	16	0.0896 – 0.1028	0%
Biomass (Solid waste)	16	0.0896-0.1028	0%
Biogas (landfill / agri waste)	16	0.0929-0.1061	0%
Small Hydro	21	0.0767 – 0.0800	0%
Solar PV (individual)	21	0.3312 – 0.3395	10%
Solar PV (non-individual)	21	0.2040 – 0.3395	10%
Geothermal	21	-	-

PV Price and Costing

PV System Cost (2005-2010)

PV System Cost before the introduction of Feed in Tariff Mechanism in Malaysia
(Average Local BIPV Price [USD]/ kWp)



	Dec 05	Apr 06	Jun 06	Oct 06	Nov 06	Mar 07	May 07	Jun 07	Sept 07	Oct 07	Mar 08	Apr 08	May 08	Sept 08	Oct 08	Dec 08	Apr 09	Jun 09	Jul 09	Aug 09	Oct 09	Mar 10
Project cost	10,470	9,329.	9,250.	9,764.	9,722.	9,335.	9,876.	7,730.	8,689.	8,323.	8,917.	9,786.	7,467.	8,745.	8,681.	8,945.	8,463.	9,091.	7,662.	8,036.	6,813.	6,373.

Source: MBIPV Project

Installed System Prices (IEA-PVPS)

INDICATIVE INSTALLED SYSTEM PRICES IN IEA PVPS REPORTING COUNTRIES IN 2013

GRID CONNECTED SYSTEM COST (USD/W)				
COUNTRY	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	GROUND MOUNTED
CHINA	-	1.2	-	-
JAPAN	3.9	3.44	3.2	2.6
KOREA	2.9 TO 3.9	2.3 TO 2.9		
MALAYSIA	2.38	2.18	2.12	1.94
THAILAND	2	1.9	1.71	1.9 TO 3.1
GERMANY	2.3 TO 2.6	1.9 TO 2.3	-	-

Source: IEA-PVPS T1-25:2014

Installed System Prices (2012-recent)

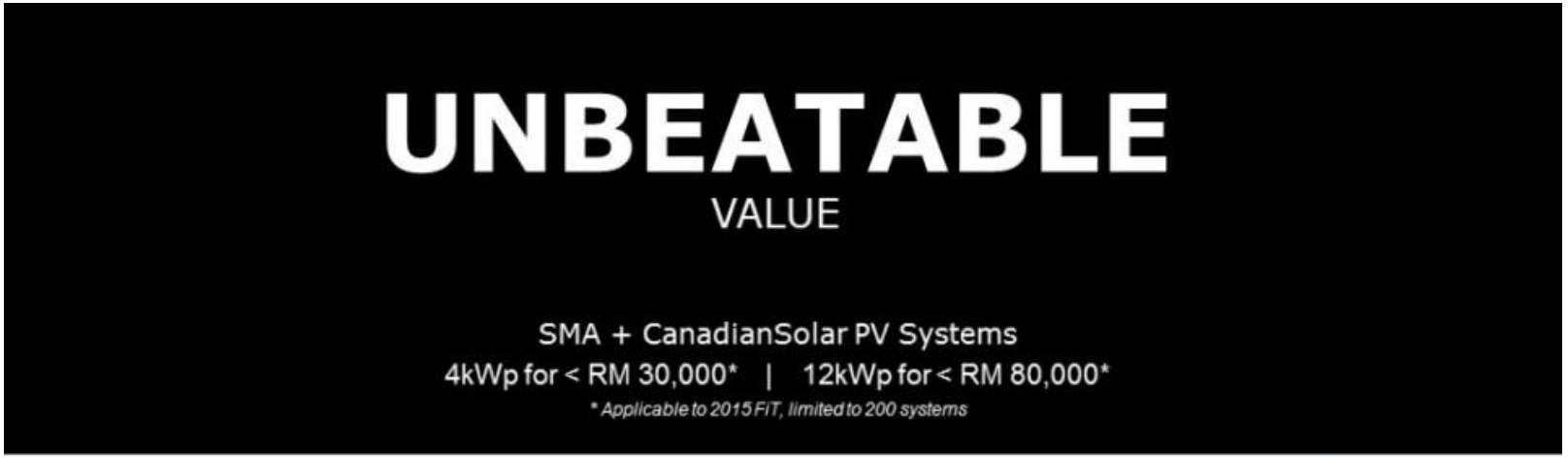
Average Installation Cost for On Grid PV Project in Malaysia (USD/kW)						
Year	<4kW	<12kW	<24kW	<72kW	<1MW	<5MW
	Individual		Non individual			
2012	3,770	3,553	3,083	3,000	2,817	-
2013	3,166	3,166	3,416	2,472	2,416	2,093
2014	3,000	2,833	2,833	2,638	2,300	1,966

Note:

- As estimated by market research, input by MPIA (Malaysian Photovoltaic Industry Association), interviews with service providers, developers, etc.
- All cost inclusive of BOS, soft costs and labor cost

However, for 2015 ……..

- Some enterprising service providers like the one below have started dramatically reducing prices
  - 4 kW < USD 8700 or 1 kWp = USD 2175
  - 12 kWp < USD 23,200 or 1 kWp = USD 1933
- Apart from Worldwide system price reductions, reasons for price drops include
  - Seda policy to train and certify PV service providers (number of service providers have risen from 20 to 150 between 2012 and 2014
  - Learning curve



SOLAR PV RATES EVOLUTION

Renewable energy installation having an installed capacity of	2012 (USD/kWh)	2013 (USD/kWh)	2014 (USD/kWh)	Annual Degression (2014)	Proposed Degression Rate 2015
1.up to and including 4 kilowatts	0.4100	0.3772	0.3395	10%	10%
2.above 4 kilowatts, and up to and including 12 kilowatts	0.4000	0.3680	0.3312	10%	10%
3.above 4 kilowatts, and up to and including 12 kilowatts	0.4100	0.3772	0.3312	10%	10%
4. above 24 kilowatts, and up to and including 72 kilowatts	0.3933	0.3147	0.2832	10%	15%
5. above 72 kilowatts, and up to and including 1 megawatt	0.3800	0.3040	0.2736	10%	15%
6. above 1 megawatt , and up to and including 10 megawatts	0.3167	0.2533	0.2280	10%	20%
7. Above 10MW and up to and including 30MW (non individual	0.2833	0.2267	0.2040	10%	20%

SOLAR PV BONUS RATES EVOLUTION

Renewable energy installation having any one or more of the following criteria in addition to basic rate	2012 (+USD)	2013 (+USD)	2014 (+USD)	Annual degression (2014)	Proposed Degression Rate 2015
1. use as installation in building or building structures	0.0867	0.0797	0.0718	10%	20%
2. use as building materials	0.0833	0.0767	0.0690	10%	**20%**
3. use of locally manufactured or assembled solar photovoltaic modules	0.0100	0.0167	0.0167	0%	0%
4. use of locally manufactured or assembled solar PV inverters	0.0033	0.0167	0.0167	0%	0%

Data Collection Process

Data Collection Process

- MEGTW collects and reports annual data on renewable energy statistics
- MNRE reports annual data on $C0_2$ emission
- EC reports annual data on energy balance statistics (Renewable and non renewable)

Data Collector Agencies

- Projected return on investment
- RE training program
- Preliminary project costing (E-FiT system)
- Study on wind and other new RE resources
- Co2 emission

- Renewable regulations
- Financing assistance for RE
- Share of RE in energy mix

SEDA Malaysia & Green Tech Corp

- Tariff and displaced cost
- On grid and off grid performance

Energy Commission

- Electricity regulations
- National Performance of Electricity Supply
- National Energy Balance
- Energy market structure
- Piped gas distribution statistic

- Actual capacity and generation of RE
- Peak and off peak period
- Costing for non renewable plant (DL)
- Installation cost for renewable plant

Distribution Licensees (i.e. TNB, SESB, etc) and privates companies

Malaysian Investment Development Authority, MITI

- RE cost at port entry
- VAT exemption
- Volume of RE equipment's (sales and import)
- Investment Tax Allowance and Pioneer Status
- Volume of technology transfer and investor

NO **ONE STOP SHOP** TO FIND RENEWABLE ENERGY RELATED DATA AND INFORMATION

Issues & Challenges

Issues and Challenges

1. Scattered data and information stemming from;
   - No firm mechanism in place to compile renewable energy cost data at the national level
   - Data and Information not consolidated within organizations (i.e. MIDA, RMC, IRB, etc.)
   - Data and information classified as confidential and/or subject to secrecy laws (i.e. tax auditing & payment)

With the result that RE cost data and information being gathered is not reported and published

2. Gaps in data and information due to communication
   - Data is available but agencies aren't aware of it or how to find it
   - Data holders not publishing or promoting their information
   - Lack of open exchange between various stakeholders

Issues and Challenges

3. Accessibility of data and information
    - No proper platform developed to make the data easily accessible and reachable (whilst P&C is still protected) in a form suited for business and policy decision making

Will affect decision making process, i.e. to review the degression rate based on prevailing and future costing

4. Structure of information
- No single repository data format developed appropriate for recipient.

Unstructured info, will require time to be digested to suit business and policy maker requirement.

Way Forward

Way Forward

- **Improve data collection method to support the revision of degression rates for renewable projects**
  - Questionnaire, interviews and stakeholders engagement workshop will be implemented to complement the existing renewable cost database under E-FiT system, will help to facilitate and consolidate the scattered data and information from various agencies in Malaysia
  - Long term subscription to international report and publication on renewable cost, to keep up with rapid changing of RE cost, especially solar PV
  - To find the right balance in tariff setting so that the IRR expectation of all parties are taken care of

- **Need for a comprehensive, holistic and regularly updated database** in Malaysia and the region to promote RE deployment

- With the **support of the GSE and IRENA** can help Malaysia **to build the renewable energy database** and give guidance in the whole process of collection, consolidation and reporting of data and information
- Such a database can be shared with other countries in **South East Asia**

Thank you

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