



HANDBOOK
ON THE MALAYSIAN
FEED-IN TARIFF
FOR THE PROMOTION
OF RENEWABLE
ENERGY



F O R E W O R D

Salam 1Malaysia. As a commitment towards the growth of renewable energy in the country, the Ministry of Energy, Green Technology and Water had presented before the Parliament for the first reading of the Renewable Energy (RE) Bill in December 2010. At the time of printing of this handbook, the Bill is ready for the second and third reading. Once the Bill is passed in Parliament, the new Act will enable the implementation of the Feed-in Tariff (FiT) in Malaysia, starting from the middle of 2011. Through this Renewable Energy Act, the total renewable energy capacity in the country is expected to increase significantly from 61.2 MW today to at least 985 MW by 2015, and 2,080 MW by 2020.

This handbook on the Malaysian Feed-in Tariff (FiT) is published to address the influx of enquiries that my Ministry had received over the past six months. The objective of the handbook is to provide official information on the FiT which my Ministry will implement via the Sustainable Energy Development Authority of Malaysia (SEDA Malaysia). SEDA Malaysia is anticipated to be legally established as a statutory body by April 2011, once the SEDA Bill is passed.

The Renewable Energy Bill which I hope will be openly discussed and subsequently passed by Parliament this year, will catalyse Malaysia's aspiration to become a leader in green technology, and meet our target of 40% carbon emissions intensity reduction by 2020. Renewable Energy is also a key component in the Economic Transformation Programme (ETP), in realizing our vision for Malaysia to become a high income nation.

A handwritten signature in black ink, appearing to be 'Peter Chin'.

YB Dato' Sri Peter Chin
Minister of Energy, Green Technology and Water

March 2011



P R E F A C E

This handbook has been prepared to disseminate information on the Feed-in Tariff (FiT) mechanism and its application to promote the use of Renewable Energy in Malaysia. The earlier part of the handbook comprises of the vision and objectives of the Renewable Energy Policy and Action Plan followed by information on the FiT mechanism. The FiT rates, targets and application for the FiT are on the later part of this handbook. Efforts have been made to ensure that the contents in this handbook are relevant to local situations and practices.

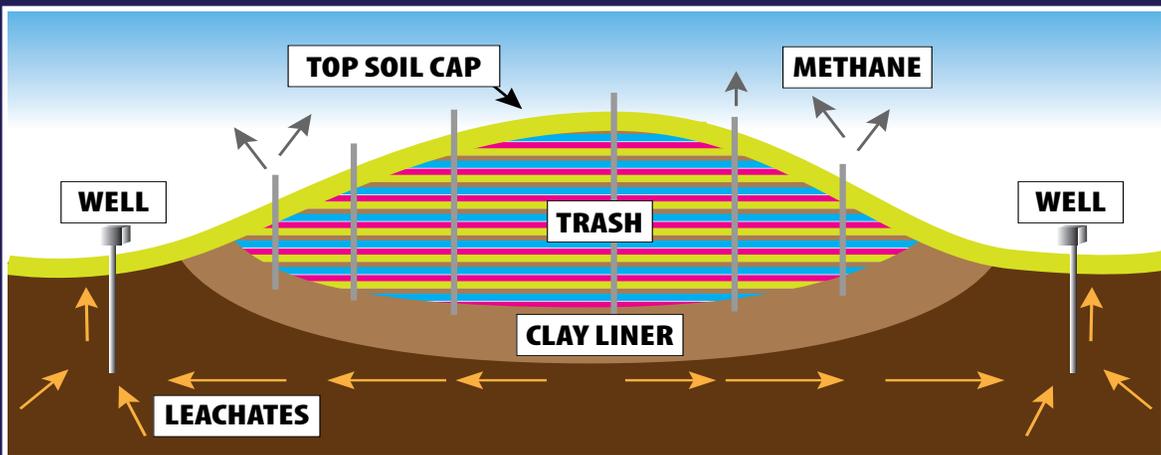
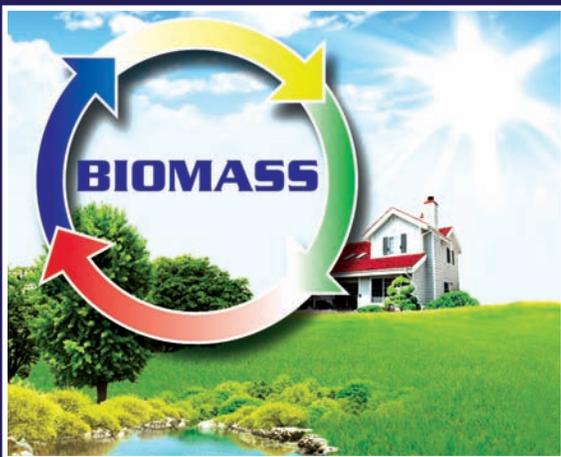
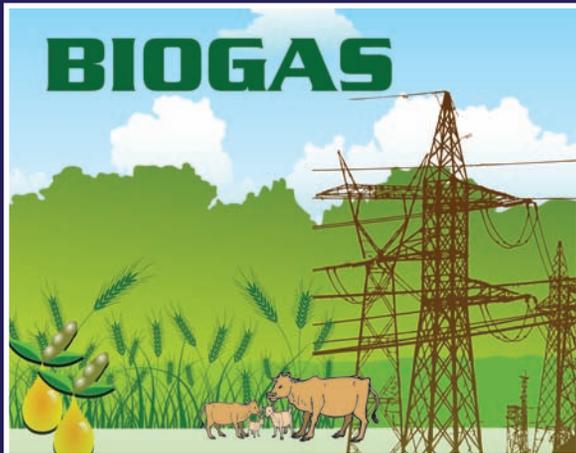
The information in this handbook had been crafted to be practical and simple to follow. Whilst every attempt has been made to ensure the accuracy and relevance of the facts and figures given in the handbook, users are advised to check and verify the application of any information, data, and Renewable Energy installation contained herein with respect to their particular situation and environment.

The Ministry of Energy, Green Technology and Water wishes to express our gratitude and appreciation to the following for their direct contribution in the preparation of the RE Bill and the subsidiary legislations: Attorney General's Chamber (AGC), Ministry of Finance (MOF), Central & States Economic Planning Units, Ministry of Science, Technology and Innovation (MOSTI), Ministry of Natural Resources and Environment (MNRE), Ministry of Plantation, Industries and Commodities (KPPK), Ministry of Housing and Local Government (KPKT), Energy Commission (ST), the Performance Management & Delivery Unit (PEMANDU), Malaysian Investment Development Authority (MIDA), Malaysian Palm Oil Board (MPOB), Tenaga Nasional Berhad (TNB), Sabah Electricity Sdn Bhd (SESB), Akademi Sains Malaysia (ASM), RE industry players and associations, building industry and professional associations, financial institutes, institution of higher learning/research institutes, consumer associations, non-Government organizations (NGOs), members of the media and the rakyat at large.

A handwritten signature in black ink, appearing to read 'Loo Took Gee'.

Datuk Loo Took Gee
Secretary General, Ministry of Energy, Green Technology and Water

March 2011



Handbook on the Malaysian Feed-in Tariff for the Promotion of Renewable Energy

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Important Notice

The information provided in this handbook is set within the context of renewable energy. The Ministry of Energy, Green Technology and Water has compiled this information in good faith and information in this handbook may change without prior notice due to the on-going legislative process of passing the Renewable Energy Bill in the Parliament. The information provided in this handbook is indicative of our renewable energy policies to be implemented and it should not be used as the sole basis for any commercial decision on RE investments.

Renewable Energy (RE), in the context of the Renewable Energy Act, refers to electricity generated from recurring and non-depleting indigenous resources.

The Ministry of Energy, Green Technology and Water (KeTTHA) is responsible to formulate policies and strategies, as well as undertake planning for electricity supply in the country. The development of electricity supply industry (ESI) is guided by the National Energy Policy (1979), the Four Fuel Diversification Policy (1981), and the Fifth Fuel Policy (2001). On the 2nd April 2010, the Cabinet approved the National Renewable Energy Policy and Action Plan (NREPAP) that would be the cornerstone for a more aggressive renewable energy deployment in the country. The policy and objectives of the NREPAP are:

The Policy Vision

Enhancing the utilisation of indigenous renewable energy resources to contribute towards national electricity supply security and sustainable socio-economic development.

The Objectives

- i. To increase RE contribution in the national power generation mix;
- ii. To facilitate the growth of the RE industry;
- iii. To ensure reasonable RE generation costs;
- iv. To conserve the environment for future generation; and
- v. To enhance awareness on the role and importance of RE.

Under the National RE Policy and Action Plan, five strategic thrusts have been identified to achieve the five objectives. The strategic thrusts which are represented in Figure 1, are as follows:

- i. Thrust 1: Introduce an appropriate regulatory framework;
- ii. Thrust 2: Provide a conducive environment for RE businesses;
- iii. Thrust 3: Intensify human capital development;
- iv. Thrust 4: Enhance RE research and development; and
- v. Thrust 5: Design and implement an RE advocacy programme.

National RE Policy and Action Plan

Thrust 1 forms the foundation which the other remaining strategic thrusts are built upon. Strategic Thrust 1 involves the enactment of the Renewable Energy Act which mandates the implementation of the feed-in tariff (FiT) mechanism. While the FiT is instrumental in increasing energy security in the country, the remaining strategic thrusts are vital to ensure a holistic approach towards a sustainable RE socio-economic development.

Figure 1: Action Plan & Strategic Thrusts



Feed-in tariffs (FiTs) oblige *distribution licensees* (DLs) to buy from *feed-in approval holders* (FIAHs) the electricity produced from renewable sources and sets the *FiT rate*. The DLs would pay for each unit of the renewable electricity supplied to the electricity grid for a specific *duration*.

By guaranteeing access to the grid and setting a favourable price per unit of renewable electricity, the FiT mechanism would ensure that RE becomes a viable and sound long-term investment for companies, industries, and also for individuals. The key concepts under the FiT mechanism are as follows:

Distribution licensees: Companies holding the licence to distribute electricity (e.g. TNB, SESB, NUR).

Feed-in Approval Holder: An individual or company who holds a feed-in approval issued by SEDA Malaysia, and the holder is eligible to sell electricity from renewable resources.

FiT rate: Fixed premium rate payable for each unit of electricity sold to distribution licensees. The FiT rate differs for different RE technologies and installed capacities. Bonus FiT rate applies when the criteria for bonus conditions are met.

Indigenous: Renewable resources must be from within Malaysia and are not imported from neighbouring countries.

Duration: Period of which the renewable electricity could be sold to distribution licensees and paid with the FiT rate. The duration is 16 years for biomass and biogas, and 21 years for small hydro and solar PV. The duration is decided based on characteristics of the renewable resources and technologies.

Rationale for Feed-in Tariff

In designing an effective policy mechanism to drive RE deployment in Malaysia, the following criteria need to be considered carefully:

- A simple approach which does not depend on a combination of many support mechanisms;
- Promotes maintenance and continued operation of the systems;
- Offers long term support, allowing for secured environment to promote domestic and foreign investments;
- An approach that is effective and efficient;

The Ministry of Energy, Green Technology and Water had conducted a thorough study on the effectiveness of major RE policy instruments practised globally. The findings of the study showed that FiT is the most effective RE policy mechanism in promoting and sustaining RE growth. The findings were drawn from past experiences learnt from other countries and studies from international energy policy experts. These renowned experts have studied and concluded that the FiTs have been proven to be the best support mechanisms to rapidly increase the share of renewable energy production and use (Mendonca, Jacobs & Sovacool 2010; World Future Council 2011).

Success Story: Germany leads as a role model in nationwide implementation of the FiT policy. The FiT has generated over 300,000 renewable energy employment in Germany and the trend indicates employment to increase to 400,000 by 2020 (REN21 2010). The German renewable energy industry has a turnover of over € 30 billion of which a large share is due to RE technology exports.

Advantages of FiT: FiT addresses two primary economic issues faced by many countries: employment and gross national income via RE industry growth. The two secondary issues addressed by FiT are: energy security and climate change mitigation. The FiT also provides solutions to tertiary issues concerning social health, empowering and providing fairer wealth distributions to citizens and the community, and environment conservation. All this is achieved without putting a strain on the Government's budget and spending. Table 1 shows some of the economic, political, social and environmental advantages of the FiTs.

Table 1: Advantages of the FiTs

Economic	<ul style="list-style-type: none"> i. Green jobs creation ii. Create FDIs and DDIs for manufacturing and export iii. Hedge against conventional fuel price volatility iv. Provide RE investor security v. Drive economic development vi. Create stable conditions for market growth vii. Simple, transparent policy structure helps encourage new start-ups and innovators
Political	<ul style="list-style-type: none"> i. Demonstrate commitment to RE deployment ii. Increase energy security and autonomy iii. Promote a more decentralized and democratized form of electricity system iv. Create mechanism for achieving RE and emissions-reduction targets v. Increase the stakeholder base supporting RE policies
Social	<ul style="list-style-type: none"> i. Fairer wealth distribution and empower citizens and communities ii. Increased public support for renewables through direct stake and increased exposure to renewables iii. Encourage citizen and community engagement in activities protecting climate and environment iv. Make RE a common part of the landscape and cityscape
Environmental	<ul style="list-style-type: none"> i. Reduce carbon emission and pollutions ii. Encourage energy efficiency measures iii. Reduce dependency on fossil fuels

(Source: Mendonca et al 2010)

Positive Impact of Feed-in Tariff

Compared to other renewable energy policies, the Feed-in Tariff mechanism has the highest number of countries adopting it. By early 2010, there were at least 50 countries and 25 states/provinces adopting the feed-in tariff policy instrument. In contrast, only 50 states/provinces/countries are implementing the renewable portfolio standard (RPS), and even much lesser numbers ascribing to other policies such as capital subsidies, investment tax credits, tradeable certificates, and others (REN21 2010).

Previous studies on renewable energy policies have concluded that FiTs are more effective compared to other RE policy mechanisms (see the following section on Verification of FiT's Effectiveness). Mendonca and his colleagues (2010) cited the four main reasons for FiT superiority as follows:-

- ii. FIT is able to drive down capital cost and achieve RE technology price reduction much faster compared to other RE policies.
- ii. FIT promotes a diversified portfolio of technologies and industrial sectors. Unlike some other RE policies which instigate price competition among RE technologies, FiT encourages harmonious growth of a variety of RE technologies which are in congruence with the country's indigenous renewable energy resources.
- iii. FIT minimizes electricity cost in two ways: the guaranteed tariff lowers the risk of RE investment and, therefore reduces the cost of capital investment. In addition, the degression feature of the FiT reduces opportunistic windfall profits and encourages efficiency, as well as lowers manufacturing costs over time.
- iv. FIT encourages market competition among manufacturers in lowering RE technology pricing, leading to better market conditions for RE investors to build and deploy RE projects.

1) *Stern, N. (2007): The Economics of Climate Change - Stern Review, Part IV: Policy Responses for Mitigation*

The Stern Report on the financial costs of global climate change was published by the former chief economist of the World Bank, Nicolas Stern. Part IV of the report (Policy Responses for Mitigation) gives a short overview of the existing incentives for renewable energy projects and differentiates between price-based (e.g. FiT Laws) and quantity-based (e.g. Tradable Green Certificates) support mechanisms. It argues that both have proven to be effective in the past “but existing experience favours price-based support mechanisms” (p. 366) and a comparison of tradable quotas and feed-in tariffs reveals that the latter achieves “larger deployment at lower costs” (p. 366).

2) *Federal Environmental Agency (2006): Monitoring and evaluation of policy instruments to support renewable electricity in EU Member States - Final Report*

The report compares feed-in tariffs and quota systems (Tradable Green Certificates (TGCs) / Renewable Portfolio Standards (RPS)). In this respect, the report concluded that “feed-in tariffs (FiTs) have been successful in triggering a considerable increase of RE technologies in almost all the countries in which they have been introduced and where their effectiveness was not significantly hampered by major barriers (administrative barriers, grid access, etc.)” (p. 88). In addition, the report states that “the risk premium required by investors can be minimised by the high level of price security given by feed-in tariffs, thus lowering the overall costs for consumers and assuring relatively homogenous premium costs for society over time” (p. 88).

3) *United Nations Development Programme (2008): Promotion of Wind Energy – Lessons Learned From International Experience And UNDP-GEF Projects, Chapter 1: Public Policies*

The report stated that “feed-In tariff policies have been very effective in Germany, Spain and Denmark, leading to the world’s first, second and fifth installed wind energy capacities. France and Portugal have also used Feed-in Tariffs to become fast growing wind energy countries with 810MW and 695MW respectively, installed in 2006. This resulted in them to occupy 10th and 9th place in terms of installed capacity” (p. 16).

Critical Success Factors for Feed-in Tariff

FiT is considered a successful RE policy instrument as it is the only policy that maintains minimal transaction costs, promotes RE diversification and manageability of electricity prices in the long run. However, the success of FiT in any country depends on several critical factors:

- i. Access to the grid is **guaranteed** – utilities are legally obliged to accept all electricity generated by RE producers.
- ii. Local approval procedures are **streamlined and clear**.
- iii. FiT rates must be **high enough** to produce a return on investment, plus reasonable profit (not excessively) to act as an incentive.
- iv. FiT rates should be **fixed for a period** (typically 20 years) to give certainty and provide businesses with clear investment environment.
- v. Adequate "**degression**" for the FiT rates to promote cost reduction to achieve "grid parity"
- vi. Adequate **fund** should be created to pay for the FiT costs and guarantee the payment for the whole FiT contract period.
- vii. The design of the FiT must be **customized** to suit contextual conditions of the country.
- viii. Implementation by a competent body in a professional manner that includes constant **monitoring, progress reporting and transparency**.

Capping of the FiT: In many countries where the FiT is enacted, caps on RE installed capacities are highly discouraged as these caps limit RE growth and constrain its impact (Hans-Josef 2009). The avoidance of such caps is possible in countries where electricity tariff is deregulated. However, in a regulated electricity market such as in Malaysia, the funding source for FiT is limited to a fixed percentage imposed on the utility's electricity revenue. Therefore, caps are essential to ensure that there would be adequate fund to pay for the FiT costs. Once the electricity market in Malaysia is deregulated, or when FiT has been operating for a considerable period of time, then removal of the caps would be conceivable.

The question everyone wants to know is “who pays for the FiTs”? The most common method for funding the FiT involves sharing the costs amongst the end-users (electricity consumers). This method would result in a very small increase in price of electricity paid by the electricity consumers, but at the same time the consumers could benefit from revenues derived from the RE generation. In this respect, FiT is not a subsidy but a cost pass-through mechanism for renewable power generation.

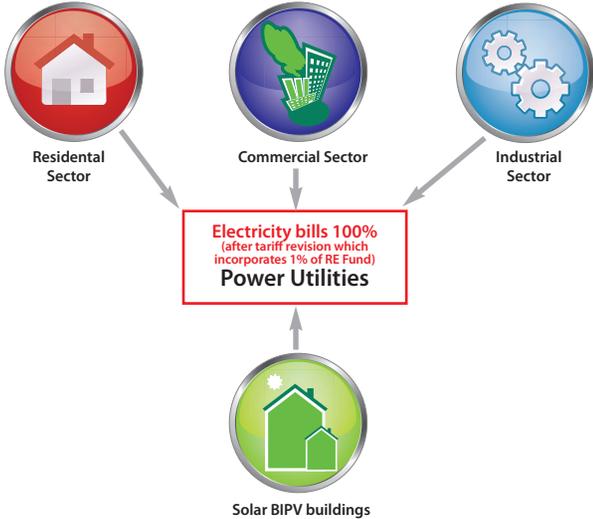
The FiT in Malaysia is not financed from tax revenue. Instead, the FiT will be financed by a RE Fund which is derived by passing the FiT cost to final electricity consumers. However, the passing of this cost is limited to only 1% of the total electricity revenue generated by the utilities (e.g. TNB). Nonetheless, 56% of the utility’s customers who consume less than 200 kWh (equivalent to RM 43.60) per month will be exempted from contributing to this RE fund. Therefore, the heavy consumers of electricity would contribute more to the RE fund. This is essentially a polluter’s pay concept – the ones who pollute the most, pays the most to the RE Fund. This form of fund collection has been proven to be an effective tool in overcoming current economic and financial crisis as it does not utilise public funds. The spin-off from this RE Fund mechanism is a greater acceptance for the consumers to adopt energy efficiency measures to reduce their electricity consumptions.

Financial Governance of the RE Fund: The management of the RE Fund will be under the supervision of SEDA Malaysia. The RE Fund can only be used for the purpose of disbursing the FiT payment claims made by the distribution licensees, and to cover any administrative expenses relating to the FiT implementation. The FiT payment claim by the distribution licensees is depicted in Step 4 of Figure 2, which shows the steps in the RE Fund process flow. Measures on financial governance of the RE fund include transparency in disclosing and publishing of financial reports on funding receipts, funding disbursement to Feed-in Approval Holders, and the administrative fees payable to the distribution licensees and SEDA Malaysia. The accounts of the RE Fund will be presented to Parliament on annual basis, as mandated under the Renewable Energy Act.

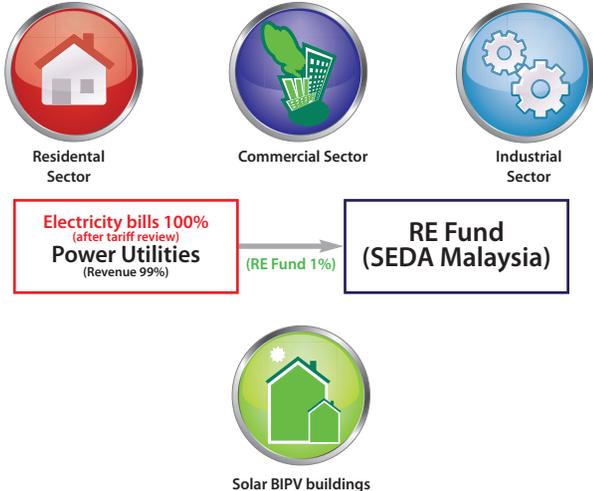
Funding for Feed-in Tariff

Figure 2: RE Funding Flow for FiT

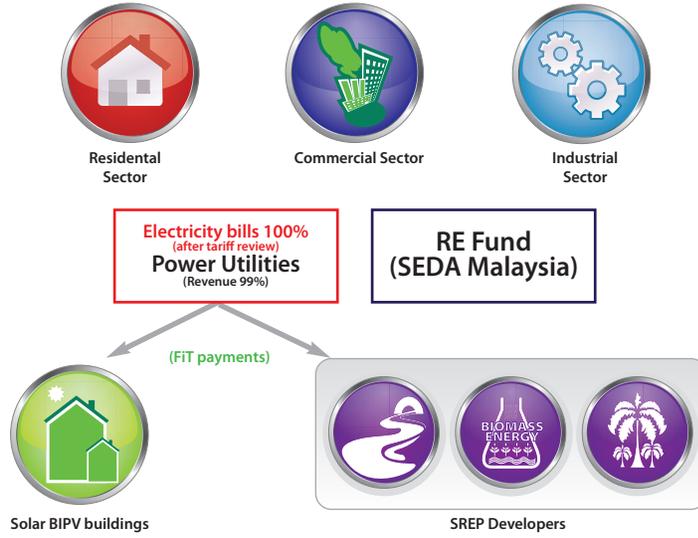
Step 1: Electricity consumers pay electricity bills to distribution licensees (e.g. TNB)



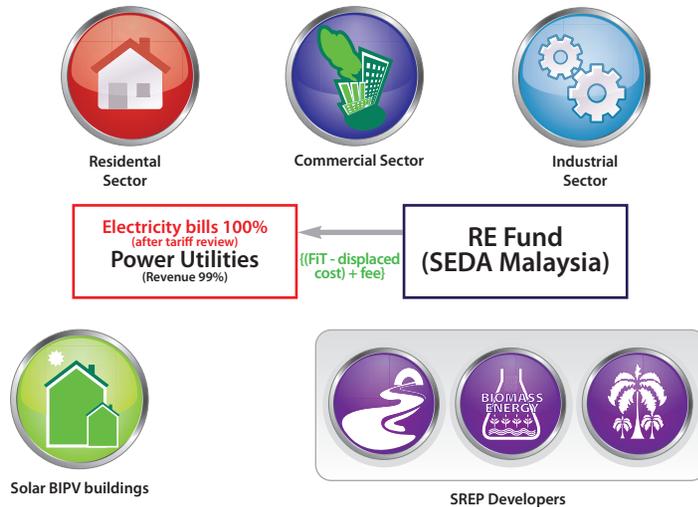
Step 2: One percent of electricity revenue is channelled from distribution licensees to RE Fund which is managed by SEDA Malaysia



Step 3: Distribution licensees make FIT payment to FIAHs



Step 4: Distribution licensees claim from RE Fund, the positive sum of differential between FIT payments and the prevailing displaced cost, including an administrative fee.



Features of Feed-in Tariff

The FiT rates are categorized by *RE technologies, installed capacities* and *bonus FiT rates*. The FiT rates for some RE technologies will decline each year according to their respective degression rates. The FiT rate for each RE installation is determined by the *Commercial Operation Date* (COD). The duration of the FiT is effective once the COD has been achieved.

The key features of the FiT are as follows:

RE technologies: biomass (inclusive of municipal solid waste), biogas (inclusive of landfill/sewage), small hydro and solar photovoltaic. The rationale for selecting these RE technologies are based on proven technologies and technical potentials under the local environment.

Degression Rates: The level of the FiT rate applicable to RE systems installed in the future will decrease with time, according to annual degression rates. The degression occurs at the start of each new calendar year. Thus, RE systems that are commissioned in later years will have lower FiT rate. However, the FiT rate within the duration of the REPPA will not degress anymore. The basis of degression rate is that the cost of RE technologies, just like any other technologies, is expected to drop as the technologies mature. The degression rate therefore reflects the maturity and the existing cost reduction potential of each RE technology.

REPPA: REPPA stands for the Renewable Energy Power Purchase Agreement which is a legal contract between the potential FiAHs (RE developer) and DLs (eg. TNB, SESB, etc). REPPA is dependent upon on the RE technology and installed capacity.

Installed capacity: For all RE technologies, the maximum installed capacity is 30 MW. The FiT rate for any RE technologies will decline as installed capacities increase due to cost optimisation from economies of scale.

Bonus FiT rates: Additional FiT rates will be given for those RE systems that satisfy the conditions for bonus criteria.

Commercial Operation Date: The date when the RE system is officially connected to the electricity grid.

The FiT rates for the different RE technologies are shown in the Appendix. The quota for FiT is shown in Table 2 .

Other RE technologies: Initially, solar thermal, wind, and geothermal, will not be offered under the FiT, as the technical potential of these resources have yet to be ascertained empirically. However, the Minister is empowered to change the Schedule of the RE Act, whereby the basis of inclusion of other RE technologies in the Act rests with the resources and technical potentials, as well as the economic viability of the RE projects under the local condition.

FiT Rate designed to facilitate Grid Parity: The feed-in tariff in Malaysia is designed with the main objective of achieving grid parity, which will happen when the subsidy for fossil fuel is gradually removed, and/or when all external costs of fossil fuel power generation are taken into consideration, or when RE technologies become cheaper. Grid parity occurs when the cost of generating renewable electricity is equivalent (or lower) than the cost of generating electricity from conventional fossil fuel and/or nuclear energy. Once grid parity is achieved, FiAHs would be paid based on the prevailing displaced cost for the remaining REPPA duration.

The RE Act accommodates for changes in the future and such changes may apply to inclusion of new RE technologies and revision of degression rate for the FiT.

RE Capacity Targets under Feed-in Tariff

Table 2: Cumulative RE Capacity Targets (MW)

Year	Biogas	Biomass	Solid Waste	Small Hydro	Solar PV	TOTAL
2011	20	110	20	60	9	219
2012	35	150	50	110	20	365
2013	50	200	90	170	33	543
2014	75	260	140	230	48	753
2015	100	330	200	290	65	985
2016	125	410	240	350	84	1,209
2017	155	500	280	400	105	1,440
2018	185	600	310	440	129	1,664
2019	215	700	340	470	157	1,882
2020	240	800	360	490	190	2,080
2025	350	1,190	380	490	455	2,865
2030	410	1,340	390	490	1,370	4,000

Application form: Application for FiT can be done both manually and online via SEDA Malaysia's official website. Application forms will be made available on the authority's website and printed copies will be made available at SEDA Malaysia's office.

Jumping the FiT queue: There is no preferential treatment for FiT applications. Instead all FiT applications will be treated fairly and equally through a transparent application process. An online FiT application system is expected to be available from Q3 2011.

Monopolizing of RE Quota: During submission of application for the FiT, an eligible producer will be required to submit their work plan. Once the Feed-in-Approval is granted, SEDA Malaysia will monitor closely each project until COD is achieved. This close monitoring is required in order to prevent FIAH from monopolizing the RE quota. This monitoring is important as once a FiT application has been approved, the RE fund will automatically be deducted and allocated to the approved FiT applicant (FIAH). The RE quota is revised with the reduced RE Fund availability.

In order to avoid any monopolizing of RE quota, SEDA Malaysia's online system will track the RE project's milestone via the submitted work plan. If any delays are detected, a notice will be sent to the FIAH to request for an explanation of the delay. If the FIAH fails to respond satisfactorily, then the FiA will be revoked. When that happens, the fund committed to the FIAHs will be released, and this will return the allocated quota to the system. This is to prevent any abuse of the FiT system and to allow other interested parties opportunity to apply for the FiT.

Existing Fiscal and Financial Incentives: FIAH is entitled to fiscal incentive on respective merits in addition to the FiT.

Offence and Penalty: Any falsification of information, failure to comply, attempts to contravene or obstruct the RE Law by the FIAH or DL is considered an offence and upon conviction shall be liable to a penalty.

Administration of Feed-in Tariff

The FiT will be administered and managed by Sustainable Energy Development Authority of Malaysia (SEDA Malaysia). SEDA Malaysia is a statutory body to be formed under the SEDA Act once the Bill is passed in Parliament.

The official website of SEDA Malaysia will be <http://www.seda.gov.my> and is envisaged to be available by April 2011. Until then, all FiT communications will be carried out under the website of MBIPV Project, <http://www.mbipv.net.my>.

SEDA Malaysia office will be located at:

Level 9, No. 29, Lot 4C11
Jalan P4B, Persiaran Perdana
62570 Presint 4
Putrajaya, MALAYSIA

SREP refers to the Small Renewable Energy Power Programme started in May 2001 by the (then) Ministry of Energy, Communications and Multimedia (now known as Ministry of Energy, Green Technology and Water).

Conversion of SREP to FiT: SREP holders are eligible to convert their SREP to FiT once the latter has been implemented. But the existing SREP holders will need to apply for the FiT and re-sign a new REPPA. Thus, they are required to terminate their existing REPPA signed under the SREP programme. However, the conversion of SREP to FiT is not compulsory. Any SREP developers who wishes to remain under SREP is free to do so.

Consequences On duration: The existing SREP holders' duration for FiT will be adjusted accordingly, taking into account the number of years their plants have generated electricity for commercial sale to the distribution licensee. For example, if the biomass plant has been operating under SREP programme for 5 years from COD, then upon conversion from SREP to FiT, the duration for REPPA under FiT will be reduced by 5 years. In this case, the original duration for biomass under FiT is 16 years, but the reduction of 5 years will result in a revised duration of 11 years only.

Consequences On Energy Payment Rate: Upon conversion, the qualified FiT rate for the RE plant will be based on the COD date. Each new calendar year will reduce the existing FiT rates by their respective degression rate (as shown in the FiT Rates tables in the Appendix). However, once COD is achieved, the FiT rate is not affected by the degression.

The Socio-Economic Impact of Feed-in Tariff on Malaysia by 2020

Impact on Green Employment: A minimum of 52,000 jobs are expected to be created to construct, operate and maintain RE power plants.

Impact on Business Revenue: A minimum of RM 70 billion of RE business revenues is projected to be generated from RE power plants operation, which will generate tax income of minimum RM 1.75 billion to Government. In short, the revenue from FiT is considered a taxable income.

Impact on Loan Value: A minimum of RM 19 billion worth of loans is estimated to be generated for RE projects, which will provide banks with new sources of revenues.

Impact on CO₂ avoidance: The FiT can, on a cumulative basis, avoid 42 million and 145 million tonnes of CO₂ from the power generation sector by 2020 and 2030, respectively. This can be achieved when the country generates at least 2,080 MW and 4,000 MW (see Table 2) of RE capacities by 2020 and 2030, respectively, through the FiT.

Impact on Externality Cost on CO₂ avoidance: Minimum of RM 2.1 billion in savings of external cost is expected to be generated to mitigate CO₂ emissions (total 42 million tonnes avoided from 2011 to 2020, on the basis of RM 50 per tonne of external cost).

Impact on Country's Image: Malaysia is perceived as a country with a global social responsibility and bears its share to mitigate climate change. In addition, the Government is perceived as being responsible to ensure energy security and autonomy, so the country's economy is resilient and sustainable in the long run.

- Hans-Josef Fell. 2009. *Feed-in Tariffs for Renewable Energies*.
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<http://www.mbipv.net.my/dload/National%20RE%20Policy%202010%20-%20ExecSum.pdf>
- Official website for Sustainable Energy Development Authority (SEDA) Malaysia.
<http://www.seda.gov.my/> (effective April 2011)
- Official website for World Future Council on Feed-in Tariffs: a policy solution for renewable energy. [http://www.futurepolicy.org/renewable energy.html](http://www.futurepolicy.org/renewable%20energy.html)
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<http://www.parlimen.gov.my/files/billindex/pdf/2010/DR432010E.pdf>.

APPENDICES: Feed-in Tariff Rates

Table 3: FiT rates for Biogas

Capacity of renewable energy installation	FiT rate (RM per kWh)	Effective period	Annual degression rate
Installed capacity up to and including 4 MW	0.32	16 years	0.50%
Installed capacity above 4 MW, and up to and including 10 MW	0.30	16 years	0.50%
Installed capacity above 10 MW, and up to and including 30 MW	0.28	16 years	0.50%
Additional for use of gas engine technology with electrical efficiency of above 40%	+0.02	16 years	0.50%
Additional for use of locally manufactured or assembled gas engine technology	+0.01	16 years	0.50%
Additional for use of landfill or sewage gas as fuel source	+0.08	16 years	1.80%

Table 4: FiT rates for Biomass

Capacity of renewable energy installation	FiT rate (RM per kWh)	Effective period	Annual degression rate
Installed capacity up to and including 10 MW	0.31	16 years	0.50%
Installed capacity above 10 MW, and up to and including 20 MW	0.29	16 years	0.50%
Installed capacity above 20 MW, and up to and including 30 MW	0.27	16 years	0.50%
Additional for use of gasification technology	+0.02	16 years	0.50%
Additional for use of steam-based electricity generating systems with overall efficiency of above 14%	+0.01	16 years	0.50%
Additional for use of locally manufactured or assembled gasification technology	+0.01	16 years	0.50%
Additional for use of municipal solid waste as fuel source	+0.10	16 years	1.80%

Table 5: FiT rates for Small Hydro

Capacity of renewable energy installation	FiT rate (RM per kWh)	Effective period	Annual degression rate
Installed capacity up to and including 10 MW	0.24	21 years	0%
Installed capacity above 10 MW, and up to and including 30 MW	0.23	21 years	0%

APPENDICES: Feed-in Tariff Rates

Table 6: FiT Rates for Solar Photovoltaic

Capacity of renewable energy installation	FiT rate (RM per kWh)	Effective period	Annual degression rate
Installed capacity up to and including 4 kWp	1.23	21 years	8%
Installed capacity above 4 kWp, and up to and including 24 kWp	1.20	21 years	8%
Installed capacity above 24 kWp, and up to and including 72 kWp	1.18	21 years	8%
Installed capacity above 72 kWp, and up to and including 1 MWp	1.14	21 years	8%
Installed capacity above 1 MWp, and up to and including 10 MWp	0.95	21 years	8%
Installed capacity above 10 MWp, and up to and including 30 MWp	0.85	21 years	8%
Additional for installation in buildings or building structures	+0.26	21 years	8%
Additional for use as building materials	+0.25	21 years	8%
Additional for use of locally manufactured or assembled solar photovoltaic modules	+0.03	21 years	8%
Additional for use of locally manufactured or assembled solar inverters	+0.01	21 years	8%