



# **Briefing on Net Energy Metering (NEM)**

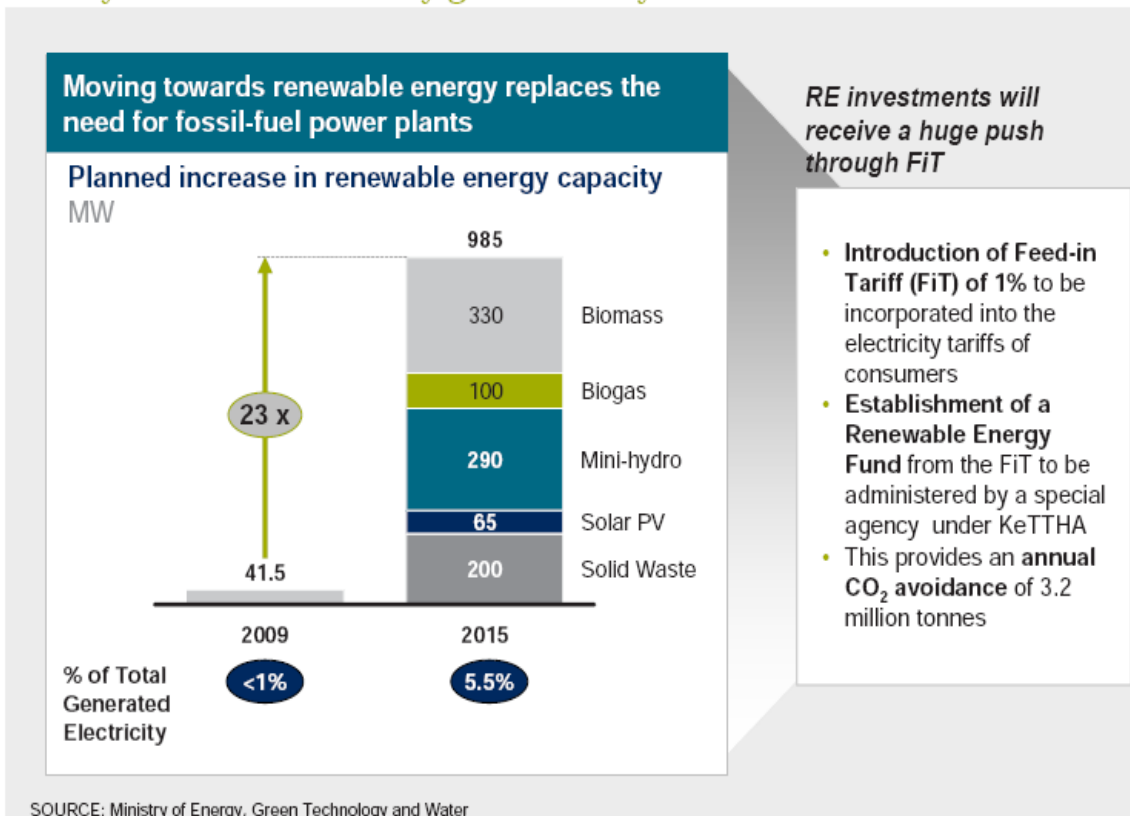
**To Y.Bhg Datuk TKSU(T) Kettha**

**13th May 2015**

**By Sustainable Energy Development Authority (SEDA)  
Malaysia**

# Original REPAP Targets

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



Year	Cumulative RE Capacity
2015	985 MW
2020	2,080 MW
2030	4,000 MW

# Malaysian National RE Targets (set in 2010)

Year	Cumulative RE Capacity	RE Power Mix (vs Peak Demand)	Cumulative CO <sub>2</sub> 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

- Before the introduction of the RE Act in 2011, there was the Small RE Producer (SREP) program and Suria 1000, which resulted in about 65 MW of grid-connected RE generation by 2011
- The RE Act relies entirely on the FiT to achieve the National RE targets
- The FiT is paid from the RE Fund, which relies on a surcharge to electricity consumers, 1 % when launched in Dec 2011, and increased to 1.6 % in Jan 2014.
- FiT expanded to include Sabah in Jan 2014

## Planned annual RE Quota 2012-2014 on launch of FiT in Dec 2011

Year	Biogas (MW)	Biogas - Sewage (MW)	Biomass (MW)	Solid- Waste (MW)	Small Hydro (MW)	Solar PV < 1MW (MW)	Solar PV < 5MW (MW)	Total (MW)
2011/ 2012	20	10	60	20	30	10	40	190
2013	20	10	50	30	30	10	40	190
2014	20	10	50	30	90	10	40	250

# The Status Today

## STATISTIK STATUS PERMOHONAN SEHINGGA 30 APRIL 2015

PERKARA	JUMLAH	KAPASITI (MW)
Permohonan yang diterima	8,250	1,425.79
Permohonan yang diluluskan	6,752	1,063.03
Permohonan telah mencapai tarikh FiTCD	3,837	283.18
Permohonan dalam proses mencapai FiTCD	2,745	667.27
Permohonan yang ditolak	1,046	335.25
Permohonan telah dibatalkan	45	64.87
Permohonan yang menarik balik kelulusan	125	47.70
Permohonan yang masih dalam proses penilaian	452	27.50

# The Status Today

**PERMOHONAN PROJEK TBB YANG TELAH MENCAPAI TARIKH KUATKUASA  
SEHINGGA 30 APRIL 2015**

Bil.	Sumber TBB	Bil. permohonan	Kapasiti (MW)
1	Biogas	7	12.83
2	Biojisim	6	62.90
3	Hidrokuasa Kecil	5	15.70
4	Suria Fotovoltaik Individu	3,547	35.58
	Suria Fotovoltaik Komuniti	21	0.31
	Suria Fotovoltaik Bukan individu (<425 kW)	197	29.30
	Suria Fotovoltaik Bukan individu (>425 kW)	54	126.56
<b>Jumlah</b>		<b>3,837</b>	<b>283.18</b>

**Jumlah Kapasiti PV = 191.75 MW**

# Reality Check

- 2015 target of 985 MW will be far off
  - 30 April 2015 only achieved about 283 MW
  - Best case scenario for end 2015 is 400 MW, less than 50 % of target
- RE mix dramatically different from Plan
  - Instead of 65 MW PV by 2015, we already have 192 MW in early 2015
  - PV expected to touch 300 MW by end 2015
  - Other technologies much lower than planned
- With only 1.6 % contribution to RE Fund
  - 2020 target of 2080 MW will fall short
    - Planned only 1464 MW by 2020 (if all commissioned, but realistically will be closer to 1000 MW)
  - 2025 target is only 1639 MW
  - 2030 target of 4000 MW is sure to be completely off **SINCE NO NEW FiTs ARE PLANNED BEYOND 2025**
    - Therefore 2030 capacity will still be at only 1639 MW

# Enter the AMEM meeting 2014

## New RE definitions and new RE Targets

- AMEM (Asean Ministers of Energy Meeting) in 2014 made two important decisions
  - Large hydro and off-grid hybrid RE systems to be classified as RE
  - Target RE capacity for 2020 increased to 30 % of installed capacity from old target of 15 % of installed capacity by 2015
- For Malaysia, this has two important implications
  - RE installed capacity has immediately shot up from < 300 MW to almost 4000 MW, by including Temengor, Bakun, and all the other existing large hydros and off-grid systems
  - **RE target for 2020 = 30 % of 30 GW = 9000 MW**
  - Expected RE installed capacity by 2020
    - Existing large hydro & off-grid in 2015: 3700 MW
    - FiT by 2020: approximately 1000 MW
    - Expected new large hydro and off-grid RE: 800 MW
    - Total: 5500 MW
    - **Shortfall: 3500 MW**

# How to achieve RE targets: REPAP or AMEM

- Biogas, biomass and small hydro resources have finite limits
  - The planned FiT quota for biomass, biogas and small hydro will cater for most of the known resource that can be economically harnessed
  - These resources are away from load centres and most of the Grid capacity available at medium voltage would have been taken up
    - Voltage violations at the PCC (point of common coupling) due to low load, and reverse power flow to Transmission levels prevent higher injection levels even when resources are available
  - Not much more can be targeted even if RE Fund was to be expanded
- **THE ONLY RESOURCE WITH ALMOST NO LIMIT IS SOLAR PV**
  - PV capacity can be added through Net Energy Metering (NEM) or Utility Scale Solar (USS), apart from FiT
  - A proposal on NEM and Utility Scale Solar was made to JPPPET 2/2014 on 12 Nov 2014
    - YBM requested Seda to have a discussion with ST on the implementation and present at the next JPPPET
  - Joint Seda/ST workshop with all the stakeholders was held on 16-17 Feb 2015
    - All participants agreed in principle on the implementation of NEM

# The nature of PV

## Advantages

- Short construction time, low project risk, easy financing
- Does not need land, can be installed on roofs – residential, commercial or industrial
- Installed near load centres
  - Easy grid connection
  - Reduced network losses
- Cost reduction over time

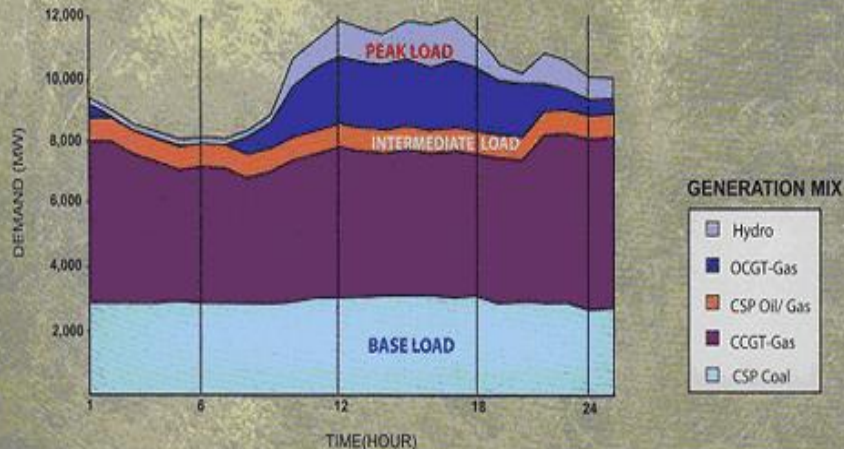
## Disadvantages

- Available only during daylight hours
- Intermittent
  - Only if one system
  - If aggregated over a few hundred systems, all the intermittencies are smoothed out

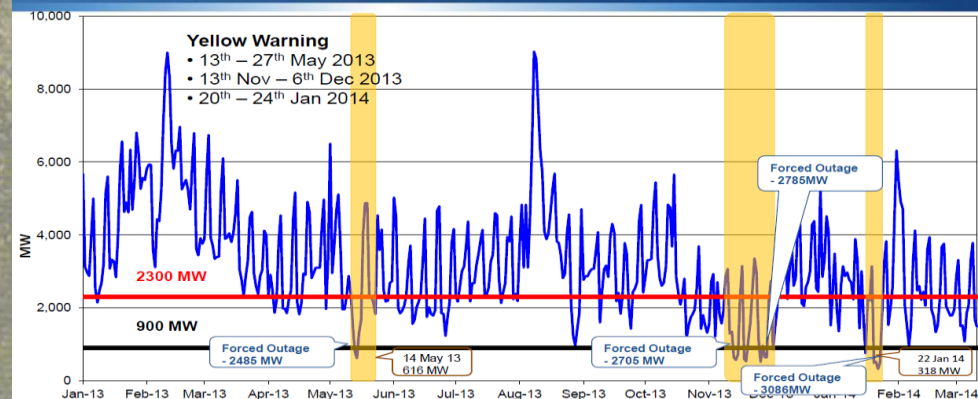
# Increasing the share of RE through PV

- Peninsula peak load is between about 11 am to 4 pm
- This is when PV power is also at peak
- Using Rule of Thumb, at any time between 11 am to 4 pm, at least 50 % of installed PV capacity will be available at any instant
- Therefore we can reduce the Operating Reserve by that amount
- Not only savings in energy, but also capacity payments since it may be possible not to extend the PPA of some old OCGT and CCGT plants
- Savings for the Nation also due to reduced use of subsidized gas

Typical Daily Weekday System Load Profile



Operating Reserve



- For 2013, system did not meet Operating Reserve criteria of 2300MW on 94 days due to multiple forced outages.
- Yellow warning were issued on three occasions when OR were 900 MW.

# Increasing the share of PV through NEM

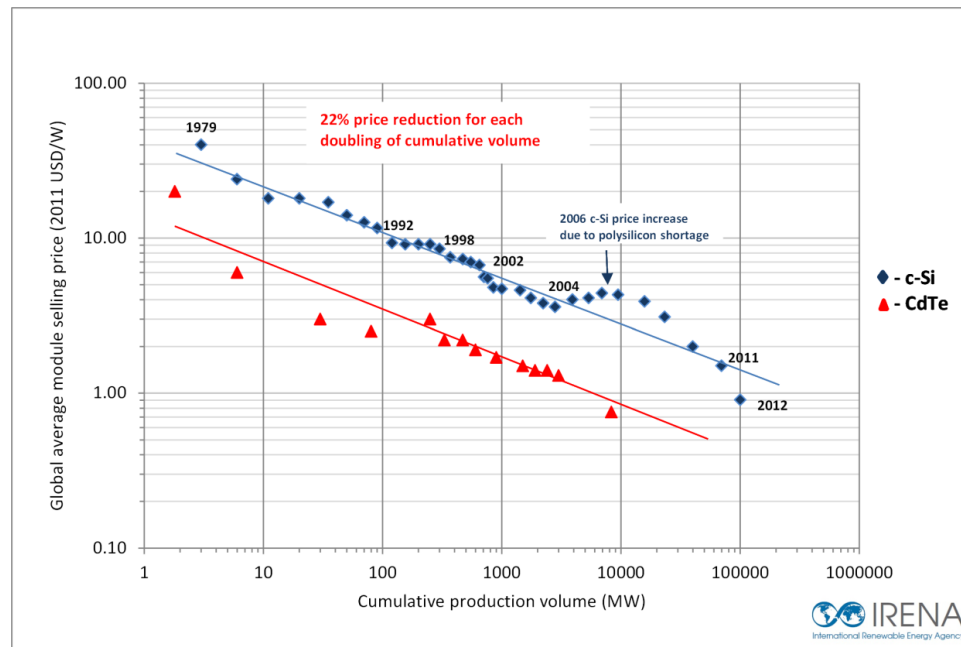
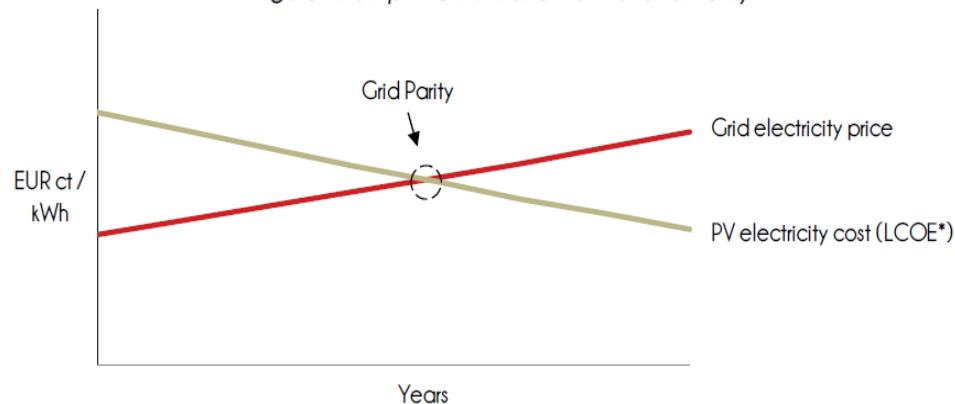
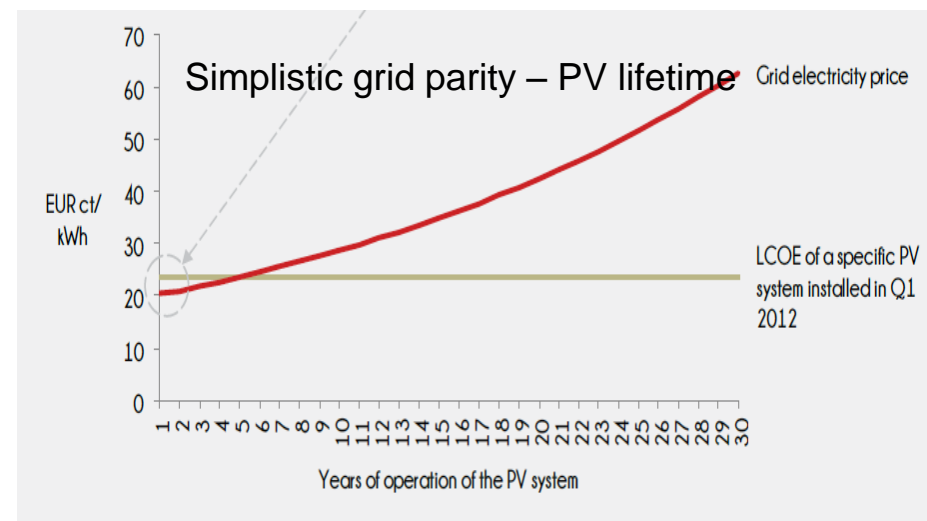


Figure 4: Simplistic Illustration of PV Grid Parity



Note: \* Levelized Cost Of Electricity  
 Source: Eclareon Analysis



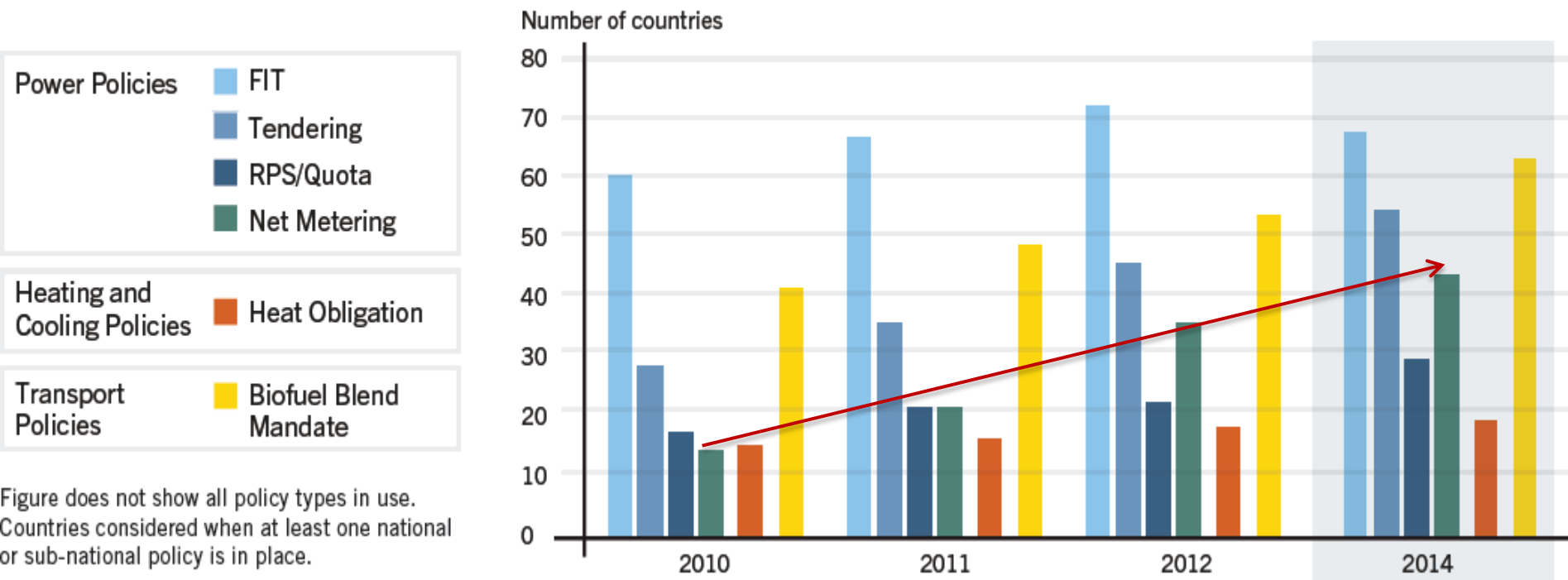
# Potential for Net Energy Metering (NEM)

- As PV prices continue to fall, and electricity tariffs rise, it will make sense for more consumers to reduce their bills and hedge further increases in tariffs by installing PV on their rooftops, either on their own, or through PV leasing companies
- Any loss to the utility due to reduction in sales will be compensated by reduction in utility costs due to reduced T&D losses as well as some reduction in operating reserve during peak periods
  - After a certain capacity is achieved (say 500 MW), new entrants to NEM can be charged a monthly fee by the utility to remain connected to the Grid
- The nation will gain due to reduction in use of subsidized gas, as well as some energy security and autonomy
- Therefore, from commercial aspects alone, there is a strong case for high penetration of PV under NEM mechanism

# Number of countries with Net Metering

Up from 13 countries in 2010 to 43 countries in 2014

**Figure 28.** Number of Countries with Renewable Energy Policies, by Type, 2010–Early 2014



Source: REN 21 2014

# Countries having NEM Policies

## Net metering programs world-wide



Europe	Americas	Americas	Asia	Middle East	Africa
Albania	Barbados	Costa Rica	Japan	Jordan	Tunesien
Belgium (regional)	Chile	Grenada	Philippines	Palestine	Cap Verde
Czech Republic	Guatemala	Jamaica	Singapore	Lebanon	South Africa
Denmark	Canada (regional)	St. Lucia	South Korea	Syria	Egypt
Greece	Mexico	Micronesia	Thailand		Lesotho
Italy	USA (43 States)	Honduras,	India		
Malta	Peru	Guatemala	Pakistan		
Switzerland	Dominican Republic		Sri Lanka		
Portugal	Panama				
Spain	Uruguay				
Cyprus	Brazil				
Latvia					
Ukraine					

# Implementation of NEM in Malaysia

Proposed 500 MW for a start

- Utility consumers allowed to install PV systems on their roof for self-consumption, with the balance being exported to the Grid, and net-off from their monthly bills
- To kick start the process, the first 500 MW of installations can be 'simple Net Metering' where the exported units are simply subtracted from the consumption bill
- Alternatively, the exported units can be compensated at displaced cost
- After the 500 MW target is reached, new NEM entrants would have to pay a monthly fee to remain connected to the Grid, the fee to be determined through a Study on the costs of Grid connection absorbed by the utility

# How to implement

- SEDA Act 2011 (Functions of the Authority)
  - 15(e) to implement sustainable energy laws and to recommend reform to such laws to the Federal Government
- Therefore, if agreed by Kettha, SEDA can prepare a Guideline on the implementation of the NEM
- Existing SEDA Rules and Guidelines, such as T&O, and T&C Procedure will continue to apply, so quality and safety issues will be taken care of
- Application to be made to Seda for a nominal application fee (proposed RM 1/kW)
- Approved NEM applicants must be existing utility customers
  - NEM customer signs a standardized addendum to existing supply contract

# Details on implementation of NEM

- Open to residential, commercial and industrial customers
- Only for rooftop PV
- Limited to 12 kW for residential and 75 % of MD for commercial and Industrial or 1 MW, whichever is lower
- Any interconnection costs, changes to metering, etc., to be borne by the customer
- The Distribution Licensees also allowed to participate in Net Metering
  - E.g. TNB can install on the office or PMU rooftops
- After 500 MW has been reached, new NEM customers will have to pay a monthly fee to the DL

# Some observations on NEM

- Many customers have already installed or are in the process of installing rooftop PV for self-consumption
- Without a NEM Policy in place, these PV systems may have quality and safety issues, to the building occupant, as well as the Grid
- The Government can offer NEM as an alternative to customers disgruntled with the rise in tariffs
- Properly authorized PV systems will be able to offer Grid support and some ancillary services as well
- We cannot treat RE as a pest which will go away if we ignore it

# Utility Scale PV

- PV plants awarded by a bidding process
  - Rate expected to be lower than FiT rate, probably about 50 sen/kWh at today's PV prices
- Plant capacity to be limited to 50 MW or less and spread throughout the Peninsula to mitigate intermittency issues
- Plants connected to Transmission voltages and meeting Grid Code requirements
- PV power will help meet peak demand, making it competitive with OCGT, or even unsubsidized CCGT
- If utility cost does in fact rise, the cost will be passed through using the ICPT (Imbalanced Cost Pass Through) mechanism, so no effect to utility finances
  - The actual effect may be the opposite, so tariffs may be adjusted downward due to lower costs rising from use of PV power
- Proposed 1000 MW by 2020
  - 500 MW COD in 2017
  - 500 MW COD in 2019

# Thank you

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