Status of the RE Mechanisms

Sharing Experiences on RE Promotion

27 February 2012

Pete H. Maniego, Jr.

Chairman

National Renewable Energy Board

Outline of the Presentation

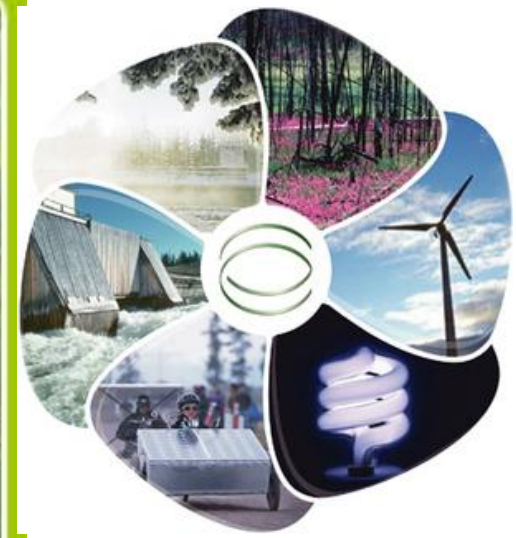
1. Renewable Act of 2008
2. The NREB, its Functions and Challenges
3. RE Mechanisms
4. Status of Implementation
5. Proposed International Support Mechanisms

RA 9513: RENEWABLE ENERGY ACT OF 2008

Accelerate the development of the country's renewable energy resources by providing fiscal and non-fiscal incentives to private sector investors and equipment manufacturers / suppliers.

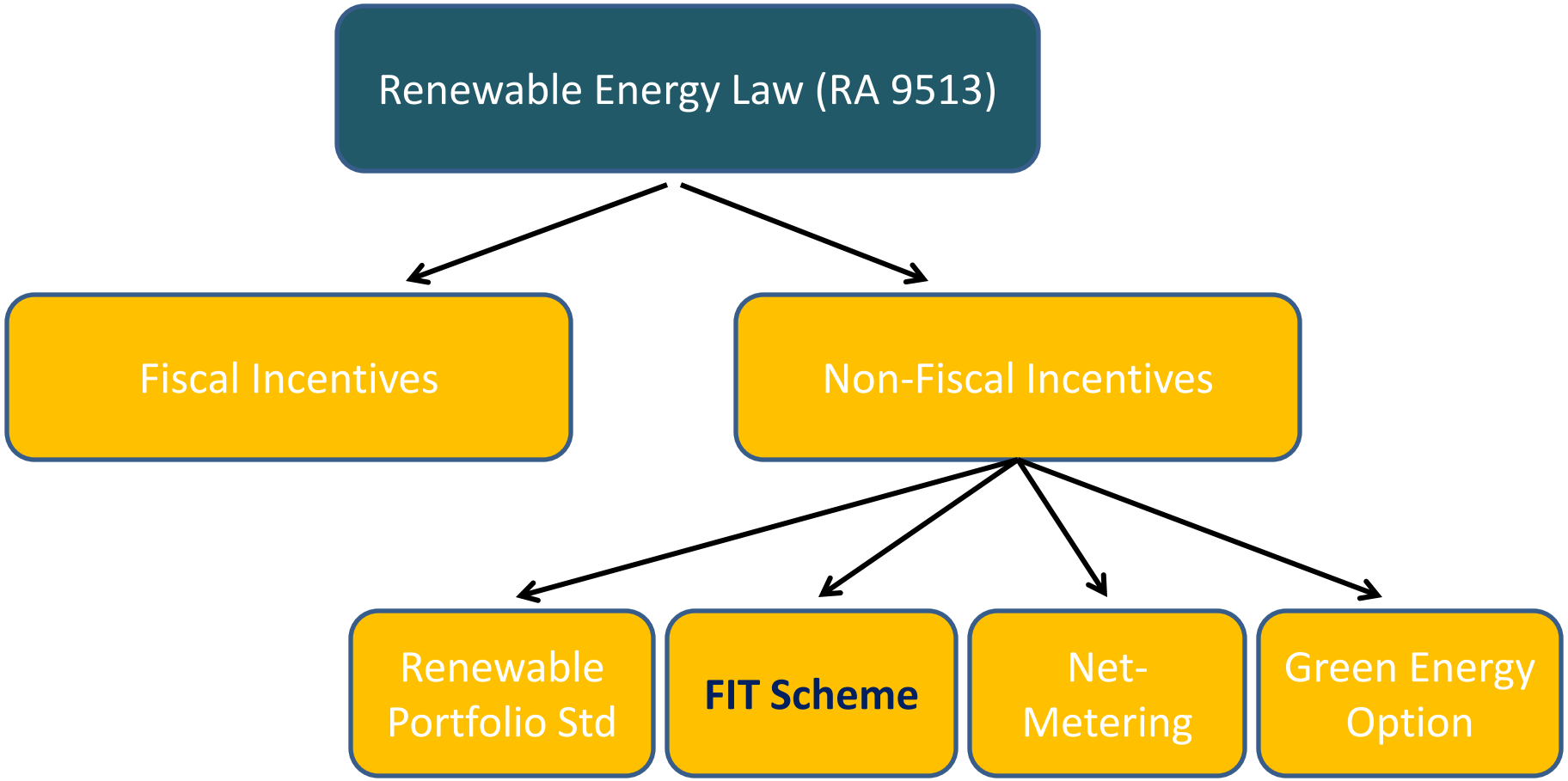
Signing of the Renewable Energy Act on 16 December 2008

RA 9513: RENEWABLE ENERGY ACT OF 2008



- One of the most comprehensive and forward looking RE law in the world
- Provides substantial fiscal and non-fiscal incentives

Incentives Under the RE Act

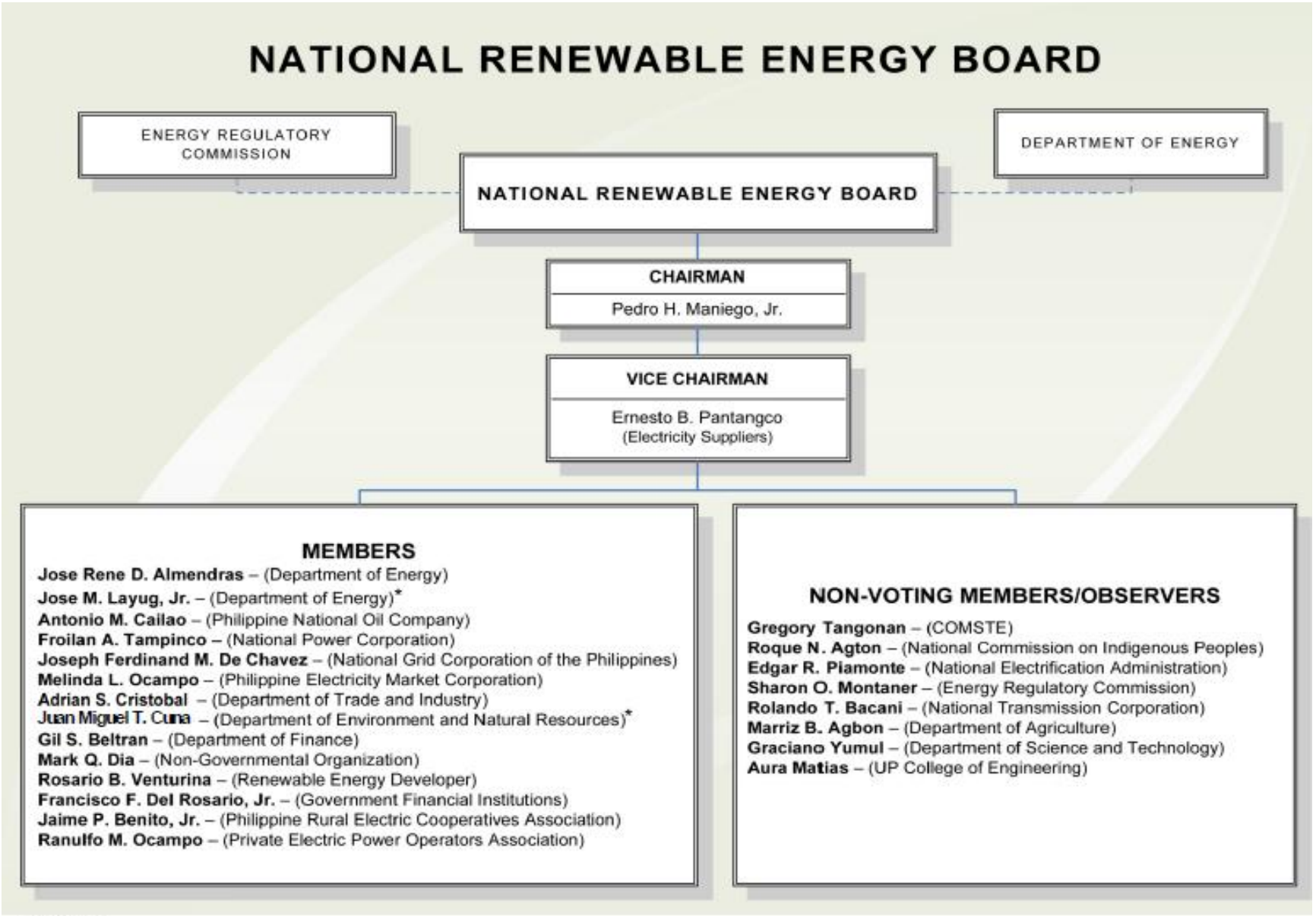


Summary of Incentives

Incentives	RE Developers	RE Commercialization
7-Year Income Tax Holiday	Yes	Yes
Duty-free Importation	Yes	Yes
VAT-free Importation	No. Tax Credit	Yes
Special Realty Tax Rate <= 1.5 %	Yes	
Net Operating Loss Carryover	Yes	Yes
10% Corporate Tax Rate after ITH	Yes	
Accelerated Depreciation	Yes	Yes
Zero Percent VAT on RE Sales & Purchases	Yes	Yes
Cash Incentive = 50% of UC for Missionary Electrification	Yes	
Tax Exemption on Carbon Credits	Yes	
Tax Credit on Domestic Capital Equipment & Services	Yes	Yes

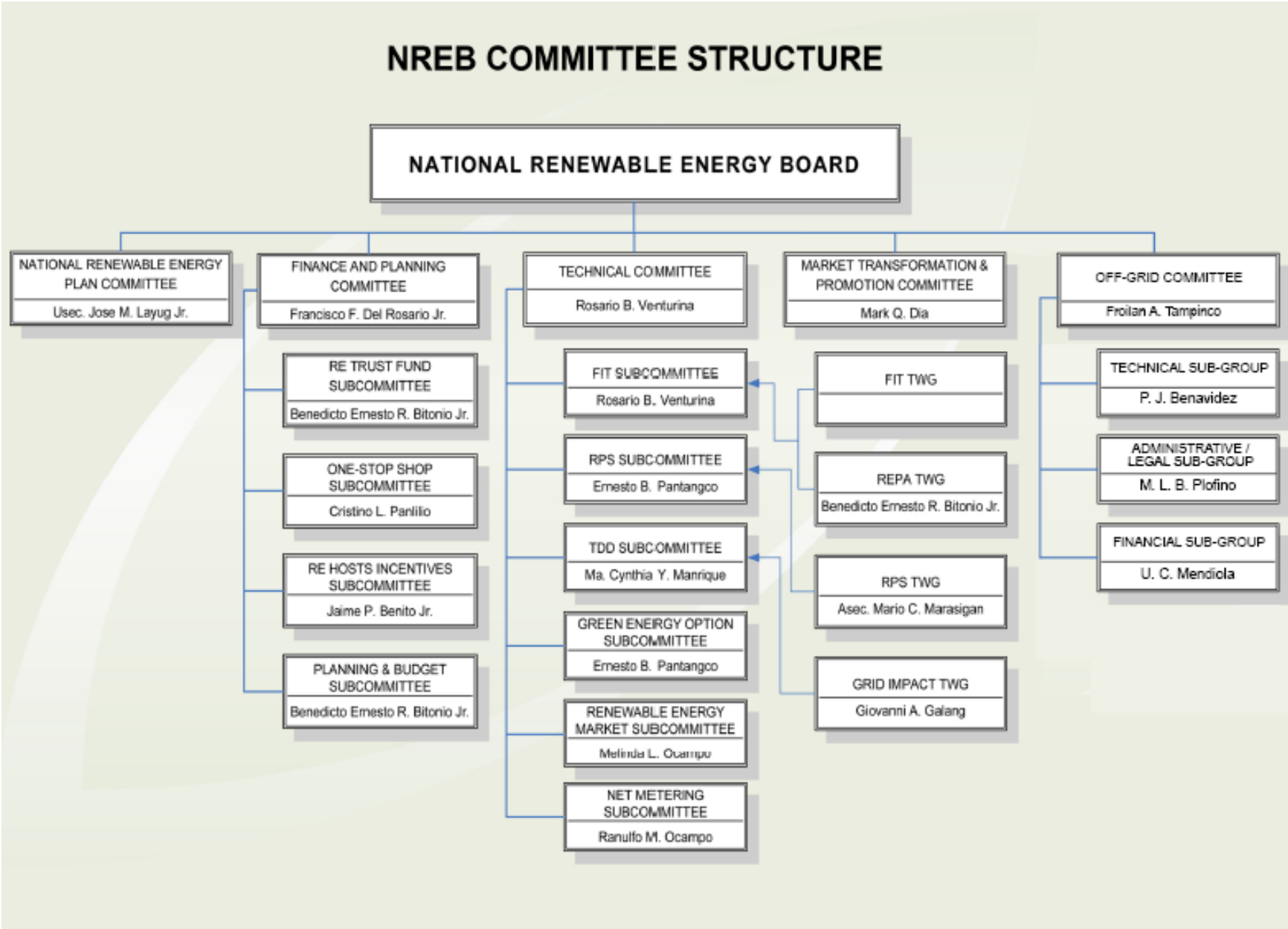
Incentives	RE Developers	Electricity Suppliers	End -users
Renewable Portfolio Standards	Yes		
Feed-In Tariff on Emerging Technologies	Yes	Yes	
Renewable Energy Market & Certificates		Yes	
Green Energy Options			Yes
Net Metering			Yes
Government waives share of proceeds on RE micro-scale Projects <= 100 kW	Yes		
Exemption from Universal Charge	Yes		
Payment of Transmission & Wheeling Charge = Average kWh rate	Yes		
Tax Rebate for RE Components	Yes		
Financial Assistance Program	Yes		
Incentives for Host Communities			Yes

NATIONAL RENEWABLE ENERGY BOARD



*Alternate

NREB COMMITTEE STRUCTURE



Major Challenge

How to balance:

- **Attracting and promoting investment in Renewable Energy**

-While-

- **Minimizing the burden to the end-users**

NREB Challenges

- **Feed-In Tariff** which would:
  - Allow RE developers to recover their investments and provide them with internationally acceptable ROI's during the FIT period,
  - Accelerate the development of competitive RE technologies, and
  - Not unduly burden the consumers with heavy pass-on charges.

NREB Challenges

- **Installation Targets** which are:
  - In compliance with the Renewable Portfolio Standards; and
  - Consistent with Philippine Energy Plan and the National Renewable Energy Program

- **Renewable Energy Portfolio Standards** which would:
  - Promote the diversification of energy supply,
  - Help reduce GHG emissions; and
  - Ensure compliance from the mandated participants

NREB Challenges

- **Green Energy Option** which would:
  - Provide End-users the option of choosing RE Resources as their source of energy

- **Net Metering** which would:
  - Give incentives to End-users to generate electricity from eligible on-site RE generating facility and delivered to the local generation grid;
    - Generate employment for installers of solar panels, micro wind turbines and other building-installed RE equipment

Renewable Portfolio Standards

Elements	Provisions under the RE Act, IRR & FIT Rules
Purpose	•To contribute to the growth of the RE industry by diversifying energy supply •To help address environmental concerns by reducing GHG emissions
Coverage	•Electric power industry participants such as generators, distribution utilities, or suppliers serving On-Grid areas on a per grid basis
Types of RE Resources	•Eligible RE resources, not limited to emerging technologies •To be identified under the RPS Rules
Annual Minimum Incremental %	•No less than one percent (1%) of annual energy demand of the mandated electricity industry participant
RPS Rules	•DOE to formulate and promulgate upon recommendation of NREB
Yearly minimum RPS requirement	•To be set by NREB in accordance with the RPS Rules

Green Energy Option

Elements	Provisions under the RE Act, IRR & FIT Rules
Definition	•A mechanism which shall provide end-users the option to choose RE Resources as their source of energy
Regulatory Framework	•DOE in consultation with NREB to establish the IRR •ERC to issue the regulatory framework
Mandated Parties	•The TRANSCO or its successor-in-interest, DUs, PEMC and all relevant parties mandated to provide the mechanisms for the physical connection and commercial arrangements
Information to End-Users	•End-user to be informed by way of its monthly electric bill how much of the monthly energy consumption and generation charge is provided by RE Facilities.

Net Metering

Elements	Provisions under the RE Act, IRR & FIT Rules
Purpose	•To encourage end-users to participate in RE generation
Definition	•Consumer-based RE incentive wherein power generated by an end-user delivered to the local distribution grid may be used to offset electric energy provided by the DU to the said end-user.
Mandate	•Upon request by the end-user, the DUs shall without discrimination enter into Net-Metering arrangements with qualified end-users
Qualified End-Users	•Entities that generate electric power from an eligible on-site RE generating facility, such as but not limited to house or office building with PV system that can be connected to the Grid
RE Certificates	•DU shall be entitled to any RE Certificate resulting from Net Metering arrangements

Renewable Energy Market

Elements	Provisions under the RE Act, IRR & FIT Rules
Purpose	•To expedite compliance with the establishment of the RPS
Market	•REM shall be a Sub-market of the WESM, where the REC trading may be made
Framework	•DOE to establish framework that will govern REM operation & direct PEMC to implement
REM Rules	•PEMC to implement changes to the WESM Rules to incorporate the rules specific to REM
Renewable Energy Registrar	•PEMC shall issue, keep and verify RE Certificates
RE Certificates	•Will be used in compliance with the RPS

Off-Grid Development

Elements	Provisions under the RE Act, IRR & FIT Rules
Purpose	•To encourage RE deployment in Off-Grid Areas
Mandated Entities	•NPC-SPUG, DUs, and/or qualified third parties in Off-Grid areas in pursuance of mandate to provide missionary electrification
Obligation of Mandated Entities	•To source a minimum % of their total annual generation from available RE Resources in the area concerned
Guidelines	•DOE to determine minimum percentage upon recommendation of NREB
RE Certificates	•Eligible RE generation in Off-Grid and missionary areas shall be entitled to RECs

Feed-in Tariff

Elements	Provisions under the RE Act, IRR & FIT Rules
Payment	•Guaranteed, on a fixed rate per kWh
Coverage	•Emerging technologies- biomass, solar, run-of-river hydro, ocean and wind, excluding generation for own use •For projects which enter into commercial operations after effectivity of the FITs with certain exceptions for existing plants •On-Grid areas only
Mandated duration	•Initial FITs- 20 years; Minimum – 12 years
Connection to Grid	•Priority connection, purchase, transmission and payment by grid system operator •NGCP to determine maximum penetration limits for intermittent Res •PEMC and NGCP to implement technical mitigation & improvements to ensure reliability of transmission
Dispatch	•Priority and must dispatch

The FIT Determination Process

Proposals

- Received initial proposal from each RE association

Consultation and Evaluation

- In accordance with the ERC FIT Rules
- Obtained comments from third party consultants of the DOE
- Applied uniform financial model for all technologies
- NREB conducted consultation and verification as follows:
  - Met with developers from January 2009 to April 2011
  - Verified the figures from project submissions by developers to the DOE
  - Verified from actual cases and decisions by the ERC
- Applied international and historical benchmarking on project costs, O&M, and technical assumptions

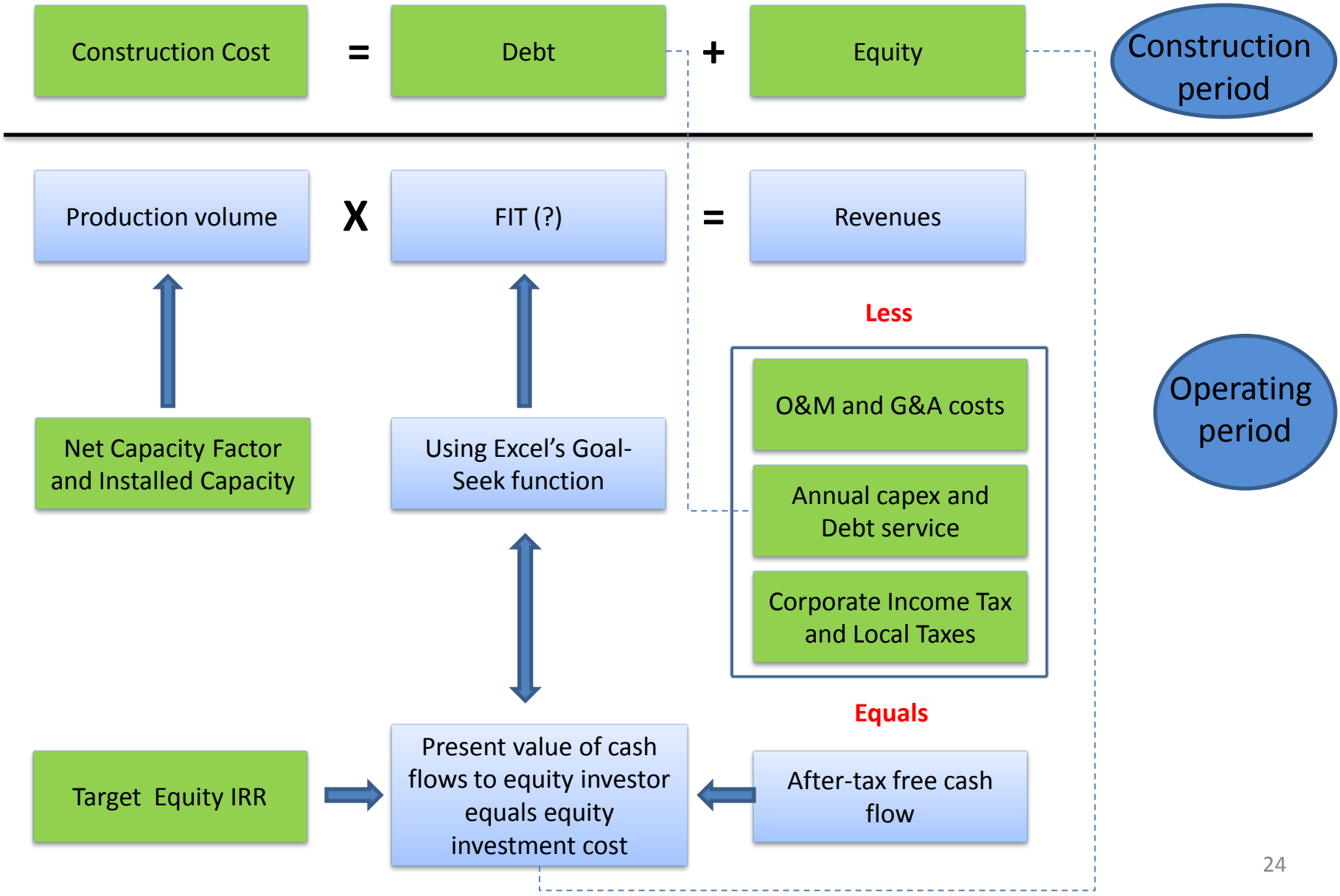
Recommendations

- In conformity with ERC Rules of Practice & Procedure on Rule-making.
- Representative project
- Single rate for each technology *initially.*
- *Differentiated FITs per technology to be submitted as a supplement to the initial Petition*
- FIT Application with ERC was submitted on 16 May 2011

Overview of the Financial Model

- The FIT calculation was conducted using a discounted cash flow (DCF) financial model in Microsoft Excel
- Assumptions for technical, construction, operations, financing, taxes and economics were used as inputs to the Financial Model
- The Financial Model computes for the Net Cash Flow, which is defined as annual revenues less principal repayment, interest expense, O&M and G&A cost, and income tax
- The Net Cash Flow is then used to compute the Equity IRR based on the assumed equity investment
- The Financial Model then calculates the Weighted Average Cost of Capital (WACC) based on assumed cost of debt and the computed equity Internal Rate of Return (IRR)
- Using the “goal seek” function of Excel, the Base FIT was derived such that the Target Equity IRR or WACC is achieved

How Did We Compute for the FIT?



Initial Feed-in Tariffs (FITs) in Php/kWh

Technology	Proposed by RE Developers				NREB Approved	
	June 2010	Oct. 2010	Nov. 2010	April 2011	April 2011	Degression Rates
Biomass[1/]	9.84	11.48	9.94	8.22	**7.00**	0.5% after 2nd year
Run-of-River Hydro[2/]	7.80	7.44	7.40	6.56	**6.15**	0.5% after 2nd year
Solar[3/]	22.64	23.81	20.55	19.11	**17.95**	6% after 1st year
Wind	11.23	11.92	11.85	11.29	**10.37**	0.5% after 2nd year
Ocean	18.52	18.52	18.52	18.52	**17.65**	None

[1/] For a solid biomass project

[2/] For a project with capacity between 1MW and 10MW

[3/] For a ground-mounted project with more than 500kW capacity

Parameters and Assumptions

Particulars	ROR Hydro	Biomass	Solar	Wind	Ocean
Representative Size (MW)	6.0	8.3	10.0	30.0	16.2
Project Cost (US$ per kW)	3,565	3,039	3,400	2,758	12,637
EPC Cost (US$ per kW)	2,341	1,982	2,647	1,983	9,752
Net Capacity Factor (%)	47.0	72.0	16.0	25.0	60.0
O&M Cost (US$000/unit/year)	400	1,115	530	100	25
Fuel Cost (Php per ton)	N.A.	1,297	N.A.	N.A.	N.A.
Feed Rate (kWh / ton)	N.A.	700	N.A.	N.A.	N.A.
Equity IRR (%)	17.0	18.5	16.0	17.0	17.0
After-Tax WACC (%)	10.6	10.9	9.9	10.3	10.1
FIT (Php per kWh)	6.15	7.00	17.95	10.37	17.65

Installation Targets

- In proposing the initial FITs, NREB, in consultation with RE Developers and the DOE, considered the expected capacity for each RE resource and the completion dates as **initial installation targets.**
- The initial installation targets, subsequently revised and certified by the DOE based on NGCP Grid Impact Study, shall be achieved within three (3) years from effectivity of the FITs.

Installation Targets

- The initial installation targets are not limits or caps.
- Rather, these targets would be the basis in reviewing and re-adjusting the FIT rates in accordance with Section 7 of the FIT Rules.

Installation Targets
in MW

Technology	Proposed by RE Developers		DOE	NREB Approved (April 2011)	DOE Certification to ERC (July 2011)
	June 2010	November 2010			
Biomass	357	416	233	250	250
Run-of-River Hydro	131	131	170	250	250
Solar	235	542	20	100	50
Wind	710	710	220	220	200
Ocean	10	10	10	10	10
TOTAL	**1,443**	**1,809**	**653**	**830**	**760**

Maximize Deployment of Lower Cost RE

- NREB has calibrated the 3 year "installation targets" to maximize the deployment of more cost competitive alternatives - hydro & biomass

Technology	Proposed (MW)	NREB Approved (MW)	Increase /(Decrease)
Solar	235	50	**(78%)**
Wind	710	200	**(72%)**
Hydro	131	250	**90%**
Biomass	357	250	**(30%)**
Ocean	10	10	-
TOTAL	**1,443 MW**	**760 MW**	**(47%)**

- Beyond this, a diverse mix of technologies is critical to the power system's reliability *(e.g. Mindanao's energy mix is highly dependent on hydro; sustainability of biomass for fuel over 20 years).*

FIT Rates in Other Countries

Technology	Philippines (NREB-Approved)	*Adjusted Philippines (at Equity IRR at 8%)*	Malaysia[1]/	Thailand	Germany	Spain
Biomass	**7.00**	*5.91*	**3.31 to 3.45**	**3.74 to 4.00**	---	---
Run-of-River Hydro	**6.15**	*3.32*	**3.31 to 5.04**	**4.40 to 5.32**	---	---
Solar	**17.95**	*12.66*	**12.23 to 18.28**	**13.82**	**19.57 to 26.35**	**14.09 to 26.95**
Wind	**10.37**	*7.51*	---	**7.92 to 9.24**	**5.64**	**4.47**
Ocean	**17.65**	*12.59*	---	---	---	---

[1/] Assumed exchange rate is Php14.3915 for every Malaysian ringgit

Indicative Rate Impact of the FIT in 2014
Avoided Cost based on Average WESM Price

Technology	RE Generation (GWh) (A)	FIT Payments (Php million) (B)	Avoided Cost (Php million) (C)	Rate Impact of the FIT (Php million) (B) – (C)	Rate Impact of the FIT (Php/kWh) (D)
Biomass	1,577	10,982	8,301	2,682	0.0412
Run-of-River Hydro	1,029	6,299	5,419	880	0.0135
Solar	70	1,112	369	743	0.0114
Wind	438	4,519	2,306	2,214	0.0340
Ocean	26	464	138	325	0.0050
TOTAL	**3,140**	**23,376**	**16,533**	**6,843**	**0.1050**

Notes: 1. Rate impact of the FIT after three years of effectivity of the FITs
2. Avoided cost based on the average WESM price of Php 4.50 / kWh (2010)
3. Applying respective degression in the FITs

Indicative Rate Impact of the FIT in 2014
Avoided Cost Based on Average DU Generation Cost

Technology	RE Generation (GWh) (A)	FIT Payments (Php million) (B)	Avoided Cost (Php million) (C)	Rate Impact of the FIT (Php million) (B) – (C)	Rate Impact of the FIT (Php/kWh) (D)
Biomass	1,577	10,982	10,282	700	0.0106
Run-of-River Hydro	1,029	6,299	6,709	(410)	(0.00624)
Solar	70	1,112	456	656	0.0010
Wind	438	4,519	2,856	1,663	0.0253
Ocean	26	464	170	294	0.0045
TOTAL	**3,140**	**23,376**	**20,473**	**2,903**	**0.0442**

Notes: 1. Rate impact of the FIT after three years of effectivity of the FITs
2. Avoided cost based on the average DU Generation Cost of Php 5.25 / kWh (2011)
3. Applying respective degression in the FITs

Is the FIT All at risk of run-away costs like Spain due to over installation of RE?

- "In Spain 2,500 MW of Solar PV from 2006 to 2008 from a base of 88 MW" – can this happen to the Philippines?

- Under the FIT Rules, the "installation targets" set by NREB for the initial FIT period of 3 years would serve as a governor or trigger mechanism to adjust the FITs downwards or upwards.

- As part of the FIT submission, **degression rates** were also included.
  - 6% reduction for Solar – One year after FIT rates apply
  - 0.5% reduction for all others – Two years after FIT rates apply

Advantages of Implementing FITs NOW

- As there have not been any major projects harnessing renewable energy in the past two decades due to lack of incentives and support mechanisms prior to the RE Act, the country is already on a "catch-up" mode in the development of RE.
  - In 2010, RE accounted for around 50% of new electricity capacity added globally and investment was estimated at US$ 211 billion.
  - Commercial wind power is now utilized in 83 countries and solar in more than 100 countries.
  - Worldwide, jobs created in RE industries exceeded 3.5 million in 2010.
- Now is the most appropriate time to approve the FITs when the country's demand for electricity is increasing annually and supply is limited, thus giving RE developers in the country ample room to participate in the energy industry and provide much needed supply.

Advantages of Implementing FITs NOW

- Compared to fossil fuel plants which tend to be volatile in the world market, FITs would be relatively stable and predictable throughout its implementation period.
- Being fixed during the mandated period and subject only to inflationary and foreign exchange adjustment, the FIT regime would provide stability to electricity rates.
- In contrast→ fossil fuel plants are subject not only to inflationary and Forex adjustment on their fixed costs, but also to "pass-through costing" on their fuel costs.
- With the coal tariff rate ranging from at Php 6+ to 8+/kWh now, the weighted average FIT of Php 7.44/kWh in 2014 is projected to be lower than coal rates.
- Even at a 5% increase p.a., coal tariff will reach Php 9.26/kWh by 2014.

Advantages of Implementing FITs NOW

- RE projects have long gestation periods and would take two to three years to construct from financial closing date.
- The proposed FITs for Run-of-River Hydro and Biomass RE sources are already lower than the recently approved base coal tariff rates. By the time, the Wind power plants go online in 2014 and 2015, their degressed FITs are expected to be lower than coal tariff rates at that time.
- After the weighted average FIT reached Grid Parity by early 2021, the installed RE power facilities would actually contribute to the reduction of electricity costs until the end of the FIT duration by 2030.

Advantages of Implementing FITs NOW

- As compared to fossil fuel plants which tend to be volatile in the world market, FITs would be relatively stable and predictable throughout its implementing period.
- Being fixed during the mandated period and being subject only to inflationary and foreign exchange adjustment, the FIT regime would provide stability to electricity rates.
- In contrast-- fossil fuel plants are subject not only to inflationary and Forex adjustment on their fixed costs, but also to "pass through costing" of their fuel costs.
- With the approved coal tariff at Php 8+/kWh as of October 2011, the projected weighted average FIT of RE power of Php 7.44/kWh in 2014 is already lower .
- Even at 5% increase p.a., coal tariff will reach Php 9.26/kWh by the end of 2014.

Status of FIT Implementation

- Renewable Energy Law (R.A. No. 9513) passed by Congress on 28 July 2008
- RE Act signed into law by President on 16 December 2008
- RE Act became effective on 31 January 2009
- Feed-In Tariff Rules approved by the Energy Regulatory Commission(ERC) on 12 July 2010
- The National Renewable Energy Board filed the FIT Petition filed on 16 May 2011
- Expository Presentations and Pre-Trial Conference before ERC already completed
- Evidentiary hearings scheduled from December 2011 onwards

Status of FIT Implementation

- One of the intervenors, the Foundation for Economic Freedom, filed a Petition for Certiorari with prayer for temporary restraining order against ERC with the Court of Appeals
- NREB has completed its presentation and offer of evidence in January 2012
- Intervenors to present their evidence and witnesses in February 2012. Ongoing.
- Completion of hearings- depends on ERC and the intervenors and decision of the CA
- Approval - 2nd Quarter of 2012 (?)

Timetable for RE Mechanisms

Mechanism	Agency	Target Date
1. Feed-In Tariff		
a) Rules	ERC	Done
b) Submission of FIT Petition to ERC	NREB	May 16, 2011
c) Public Consultation & Hearings	ERC	Ongoing
d) Approval	ERC	
e) Effectivity	ERC	
2. Renewable Portfolio Standards		
a) Rules- being finalized	DOE	1st Quarter 2012
b) RPS - minimum % to be imposed	NREB	2nd Quarter 2012
c) Approval	DOE	
d) Effectivity	DOE	
3. Net Metering		
a) Guidelines Including Pricing Methodology	NREB	1st Quarter 2012
b) Public Consultation	ERC	90 days
c) Approval	ERC	3rd Quarter 2012
d) Effectivity	ERC	
4. Green Energy Option		
a) IRR	NREB & DOE	1st Quarter 2012
b) Public Consultation	DOE	90 days
c) Approval	DOE	
d) Effectivity	DOE	
5. Renewable Energy Market		
a) Change in WESM Rules	PEMC	Study is on-going
b) Approval	DOE	
c) Effectivity	DOE	
d) Renewable Energy Registrar	PEMC	
6. Off-Grid RE Development		
a) Rules on Application of Non-Fiscal Incentives	ERC/NPC-SPUG	1st Quarter 2012
b) Public Consultation	ERC	90 days
c) Approval	NPC-SPUG	

Need for International Support

Moral Imperative

- The poor are most vulnerable to, though least responsible, for global warming
- Stewardship towards creation requires collective effort towards preservation of creation's integrity

Impact of Climate Change in the Philippines

- **Extreme Weather Events**
  - On 26 September 2009, Tropical Storm Ondoy inundated Central Luzon with 450 mm of rain over a 12 hour period, leaving over 300 people dead. Typhoon Pepeng quickly followed Ondoy in 3-9 October 2009, crossing over Central and Northern Luzon, with winds of up to 230 kph and cumulative rainfall of over 1,000 mm. The official death toll from these two disasters combined was 936, with 84 missing and 736 injured.
  - Typhoons Pepeng & Ondoy alone caused damages and losses equivalent to 2.7% of GDP equivalent to US$ 4.3 B.

Impact of Climate Change in the Philippines

- **Extreme Weather Events**
  - Typhoon Sendong which hit Mindanao in December 2011 left 1,453 dead with thousands still missing, 719,485 persons displaced, and damages amounting to Php 1.14 B (US$ 27 M).
  - According to Margareta Wahlstrom, head of the UN International Strategy for Disaster Reduction, a total of 33 natural calamities ravaged the Philippines in 2011. It is number one in the list of countries in terms of recorded calamities. China even with its much bigger land area is a far second with 21.

What makes a FiT fair?

Reduce burden on the consumer, particularly the poor

- Support reasonable rate-setting
- Pay part of the premium

Encourage participation of **small local enterprises**

- Support clear FIT structure
- On-Lending?

Encourage a **domestic development strategy**

- Technical assistance

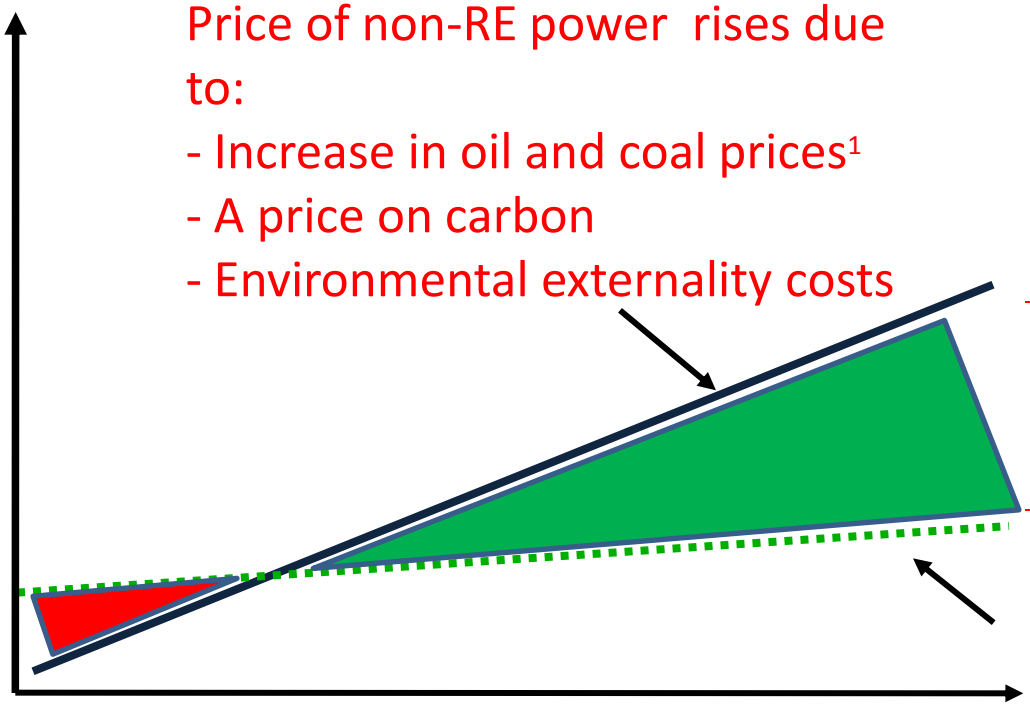
Encourage **energy access**

- Ensure eligibility for small projects (off-grid?)

Encourages **participation of civil society**

- Capacity building

FIT Support until Grid Parity is Reached



FIT All is an Investment to prepare for wider RE deployment

*[1]For a coal plant, a US$10 increase in the price of coal results in a ~**21 Centavo / kWh** increase in its electricity price. Panay Power Plant approved tariff at Php 8.00 /kWh.*

Innovative Models

- Global Energy Transfer Feed-in Tariff (**GET FiT**)
  - Developed by Deutsche Bank in response to request from the UN Secretary General
  - Advanced FiT provides supporting payments for above market premiums
  - Light house PPAs as pre-FIT regulatory mechanisms
  - Mini-grids or Off-Grid – performance based FiT design for decentralized multi-user energy generation in rural areas

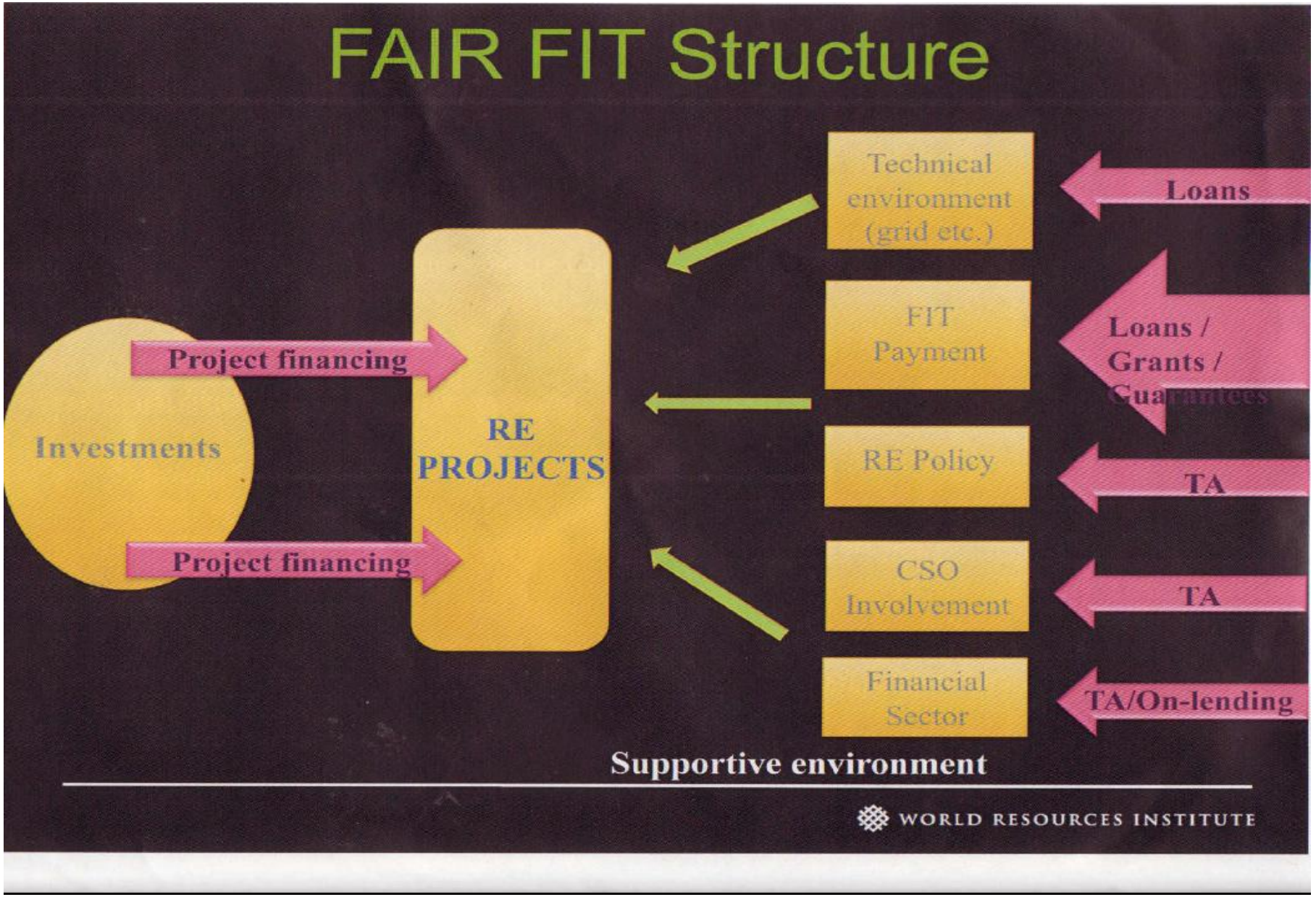
Innovative Models

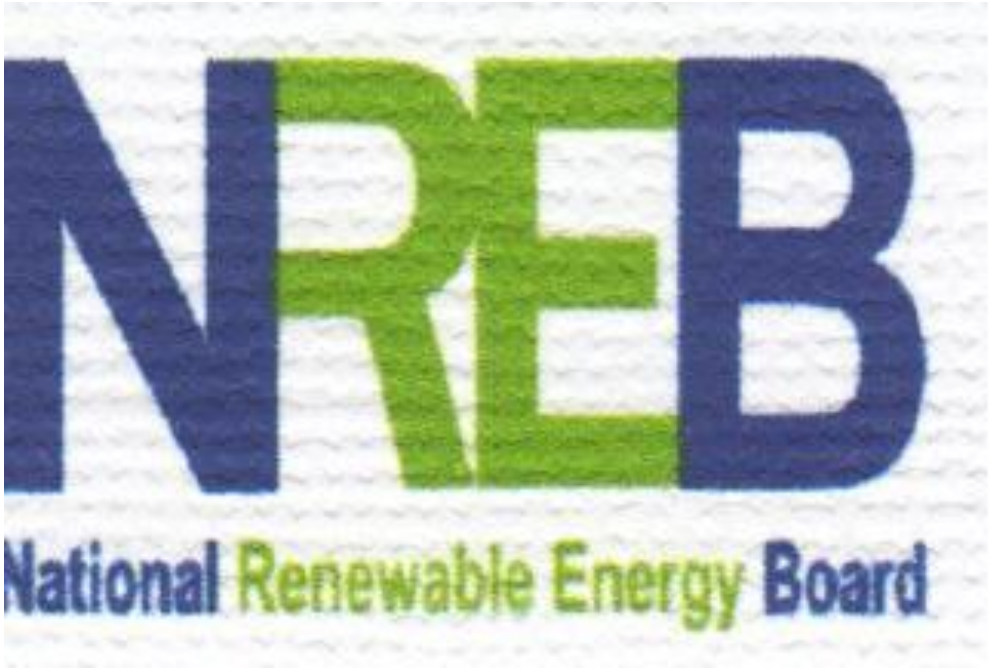
- Indonesia FiT Fund
  - Developed by FMO and NL Agency of the Netherlands to support geothermal development in Indonesia
  - Payments are structured to “close the gap” between PPA contracts awarded to the generators and the rates needed to meet ROI expectations
  - Indexed to fossil fuel prices
    - As fuel prices rises over time, the payment to the generator would eventually exceed the fixed flat amount guaranteed by the fund.

Innovative Models

- Green Africa Power (**GAP**)
  - Utilize official development funds to provide guarantees and payments to “close the gap” for RE projects in exchange for CERS

- Notes:
  1. None of these models are operational
  2. No longer classified as an LDC, CERs of Philippine CDM projects registered post 2012 will not be eligible in EU anymore. Extension is highly recommended


FAIR FIT Structure
Technical environment (grid etc.)
FIT Payment
RE Policy
CSO Involvement
Financial Sector
Loans
Loans / Grants / Guarantees
TA
TA
TA/On-lending
Investments
Project financing
Project financing
RE PROJECTS
Supportive environment
WORLD RESOURCES INSTITUTE



Thank You!