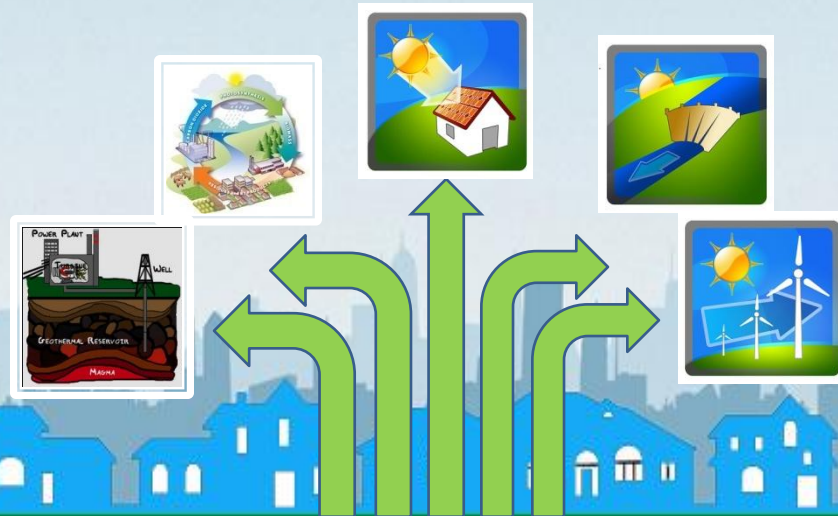


NET METERING

Fortunato S. Sibayan

*Solar and Wind Energy Management Division
Renewable Energy Management Bureau*



e - POWER MO

- e - Secure Mo
- e - Safety Mo
- e - Diskarte Mo



LEGAL FRAMEWORK

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, fabricators, suppliers.



POLICY MECHANISMS

Non-Fiscal Incentives

- **Creation of RE Market**
 - Renewable Portfolio Standard (RPS)
 - Off-Grid Development
- **Guaranteed long-term fixed price**
 - Feed-in Tariff
- **Other Market Options**
 - Net Metering
 - Green Energy Option

 Power of Choice



LEGAL BASIS

Section 7 of RA No. 9513 Implementing Rules & Regulations (IRR) defines:

- Net Metering is a **consumer-based** RE incentive scheme (**net-user only**)
- Purpose : to encourage end-users to participate in RE generation for own use
- Mandate : Upon request by distribution end-users, the DUs shall, without **discrimination**, enter into a net-metering agreements with **qualified end-users** who will be installing RE system, subject to technical and economic considerations

 Power of Choice



LEGAL BASIS

Section 10 of R.A. 9513 and Section 7 of its Implementing Rules & Regulations (IRR) provides that the Energy Regulatory Commission (**ERC**), in consultation with National Renewable Energy Board (**NREB**), shall establish the net-metering **interconnection standards** and **pricing methodology**.



 Power of Choice



LEGAL BASIS

- ❑ **ERC Resolution No. 9, Series of 2013** - A Resolution Adopting the Rules Enabling the Net-Metering Program for Renewable Energy
- ❑ Components:
 - Rules Enabling the Net-Metering Program (Annex A)
 - Net-Metering Interconnection Standards (Annex A-1)
 - Net-Metering Agreement Template (Annex A-2)
- ❑ Approved on May 27, 2013
- ❑ Effectivity on July 24, 2013

 Power of Choice



NET METERING FOR RE

- Refers to a **RE system**, appropriate for **distributed generation**, in which distribution grid user has a **two-way connection** to the grid and is only charged or credited, as the case maybe, the difference (**net**) between its **import energy** and **export energy**.

 Power of Choice



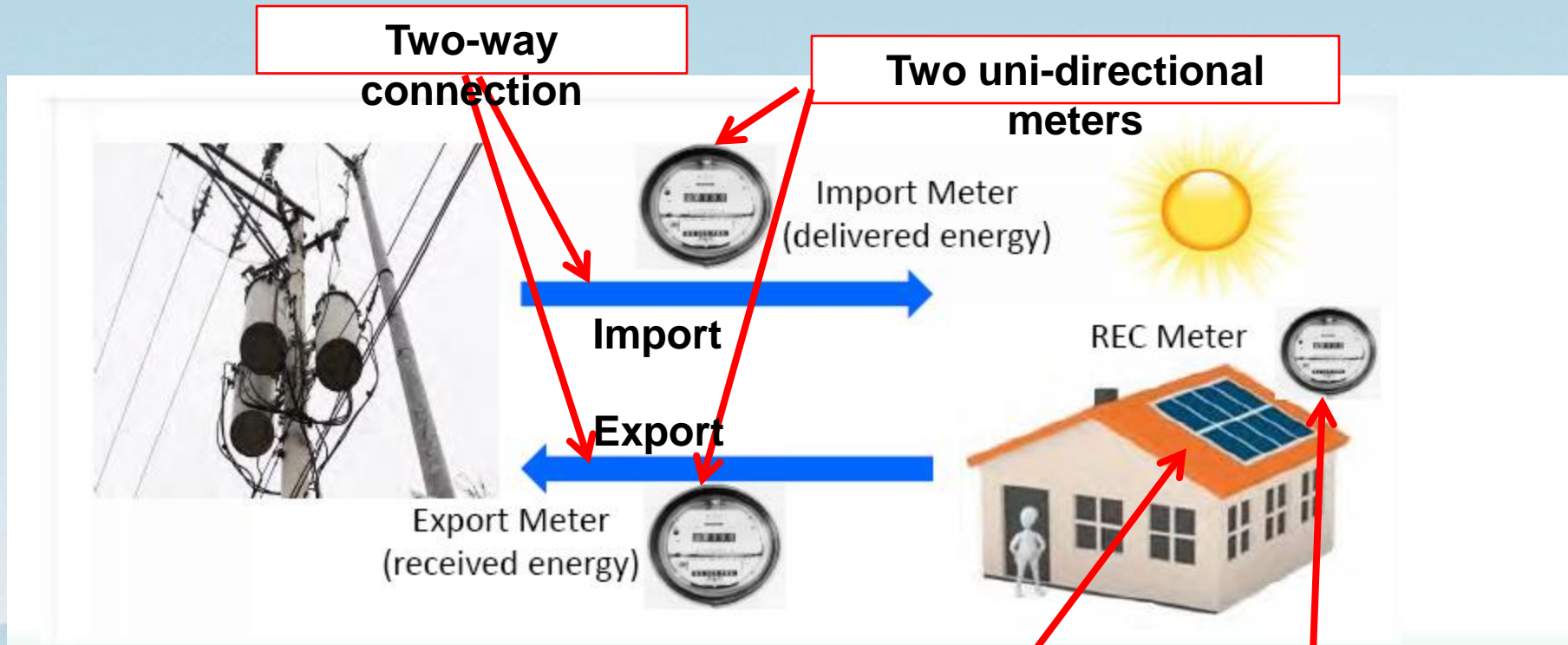
DISTRIBUTED GENERATION

- Refers to a system of small generation entities supplying directly to the distribution grid, any one of which shall not exceed **one hundred kilowatts (100 kW)** in capacity, as defined in Section 4(j) of R. A. No. 9513.

 Power of Choice



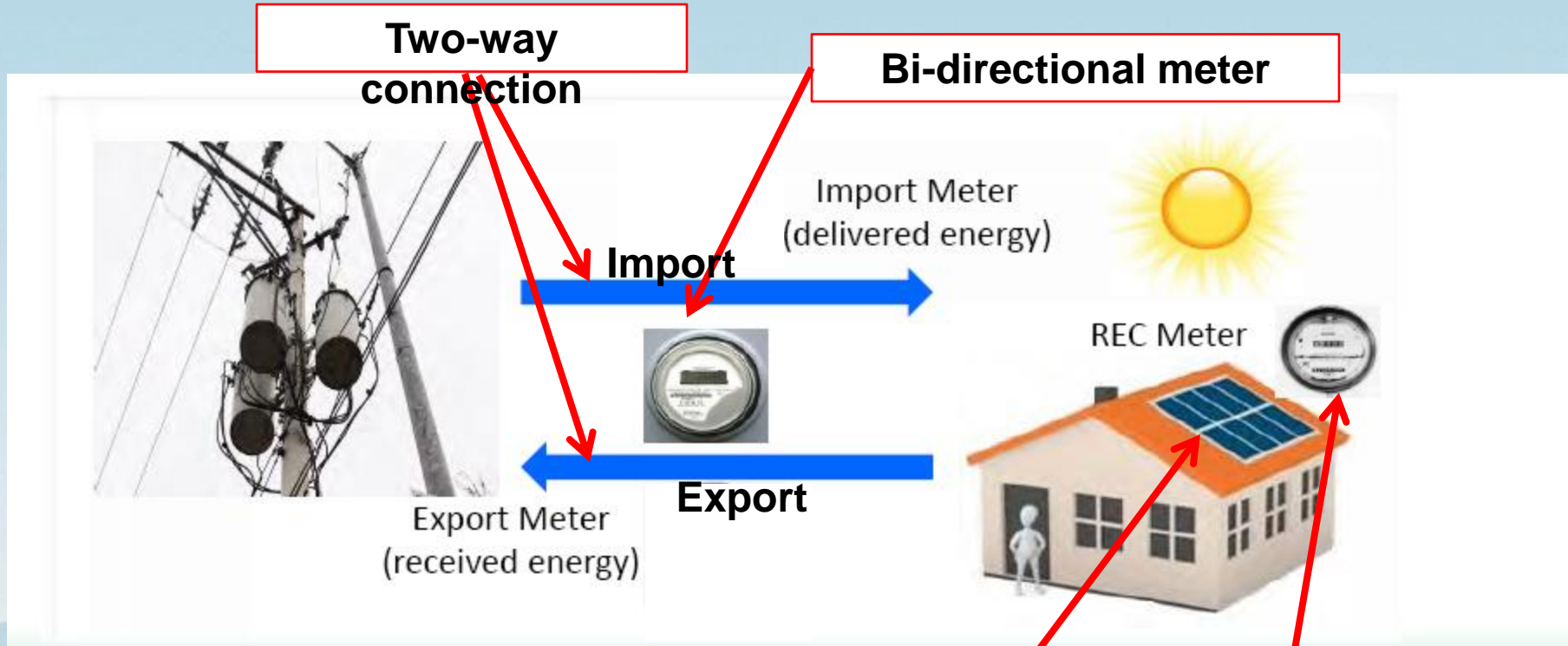
INTERCONNECTION SET-UP



Max. Capacity = 100 kW
Situated within the premises of a qualified end-user (QE)

Third meter

NET METERING SETUP



Max. Capacity =100 kW
Situated within the
premises of a qualified
end-user (QE)

Second meter

Scope, Applicability, & Qualification

- ❑ Applicable to **on-grid** RE systems
- ❑ End-user should be in **good credit standing** in the payment of electric bills to the distribution utility (DU).
- ❑ RE systems such as **wind, solar, biomass** or **biogas** energy systems or such other RE systems capable of being installed within the **qualified end-user's premises** are eligible to participate in the net metering program.

 Power of Choice



Scope, Applicability, & Qualification

- The RE System must be compliant with the standards set in the Philippine Electrical Code (**PEC**), Philippine Distribution Code (**PDC**), Distribution Services and Open Access Rules (**DSOAR**) and the Net-Metering Interconnection Standards (**NMIS**).



 Power of Choice



Pricing Methodology

- ❑ **Interim** (temporary/provisional) **pricing** for export energy is the DU's monthly charge based on its **blended generation cost**.
- ❑ This cost shall be automatically included in the DU's total generation cost to be recovered from all its customers as part of the **adjusted generation rate** pursuant to Section 2 of ERC Resolution No. 19, Series of 2009

 Power of Choice



Pricing Methodology

Export rate

P4.9101/kWH



Generatio
n

Transmissio
n

Distribution

SL: P0.85

DSM: P2.7843

Subs: P0.1071

Tax: P0.1381

UC: P0.1175

= P9.4291/kWH

P4.9101

+

P0.522

+

Import
rate

 Power of Choice



Net Metering Charge

- ❑ Net metering charge is equivalent to PhP/customer/month supply and metering rates; plus the ERC-approved PhP/kWh metering rate based on export energy.
- ❑ DUs may file for a different net metering charge, if necessary.

 Power of Choice



Billing Charge

Billing Charge:

PhP for import energy

Less: PhP export energy

PhP credited in previous month

Net/Difference in PhP (+ or -)

If positive: QE shall pay this amount to DU

If negative: DU shall credit this amount to QE's next bill

 Power of Choice



HOW TO OPTIMIZE A NET METERING CONNECTION?

- It shall displace relatively high consumer rate (**import cost**) of the DUs , that is:
- Annual gross benefit of the project is equivalent to the **annual savings** generated. It is computed by **multiplying** the **annual total generation** with the **import cost**
- Type of usage : **Net user on a monthly basis**
 - Capacity (kWp) can supply the **minimum daytime consumption** even during low irradiation months (July to January);
 - generation during the high irradiation months is **less than** the maximum daily energy requirement
- The system is used to **displace** the minimum daily energy requirement.

 Power of Choice



SAMPLE CALCULATION

- Site is Manila (NAIA)
- The system is to be used 12/7 annually;
- Daily minimum electricity (daytime) need : **10 kWh/day**
- Minimum Irradiation : **4.5 kWh/m²**
- Global Irradiation : **1 kWh/m²**
- Optimum capacity (kWp) : **3 kWp**
- Annual generation at 16% capacity factor : **8,410 kWh**
- Installed Cost/kWp : **P70,000.00/kWp x 3 = P210,000.00**
- Economic life : **20 years**
- 100% loan at annual interest rate of 10% payable in 5 years
- Annual amortization : **P55,397.47**
- Displaced cost (MERALCO consumer price of electricity) : **P11.00/kWh**
- Projected annual savings : **P46,253.00**
- NPV : **P647,896.00**
- Project IRR : **14%**
- Breakeven Year : **7th year**
- The levelized cost of electricity (LCOE) : **P1.41/kWh**

 Power of Choice



SAMPLE CALCULATION

- Site is Manila (NAIA)
- The system is to be used 12/7 annually
- Daily minimum electricity (daytime) need : **1 kWh/day**
- Minimum Irradiation : **4 kWh/m²**
- Global Irradiation : **1 kWh/m²**
- Optimum capacity (kWp) : **350 Wp**
- Annual generation at 16% capacity factor : **490.56 kWh**
- Installed Cost/kWp :
 $P100,000.00/kWp \times .35 = P35,000.00$
- Economic life : **20 years**
- 100% loan at annual interest rate of 10% payable in 1.5 years
- Annual amortization : **P23,645.84**
- Displaced cost (MERALCO consumer price of electricity) :
P11.00/kWh
- Projected annual savings :
P5,396.16
- NPV : **P41,034.00**
- Project IRR : **11%**
- Breakeven Year : **8th year**
- The levelized cost of electricity (LCOE) for 20 years : **P0.94/kWh**

 Power of Choice



Net Metering Interconnection Standards

Annex A-1



 Power of Choice



Interconnection Standards

- ✓ General Guidelines
- ✓ Application for Interconnection
- ✓ System Parameters
- ✓ System Protection
- ✓ Operations & Maintenance
- ✓ Metering
- ✓ Testing and Commissioning

 Power of Choice



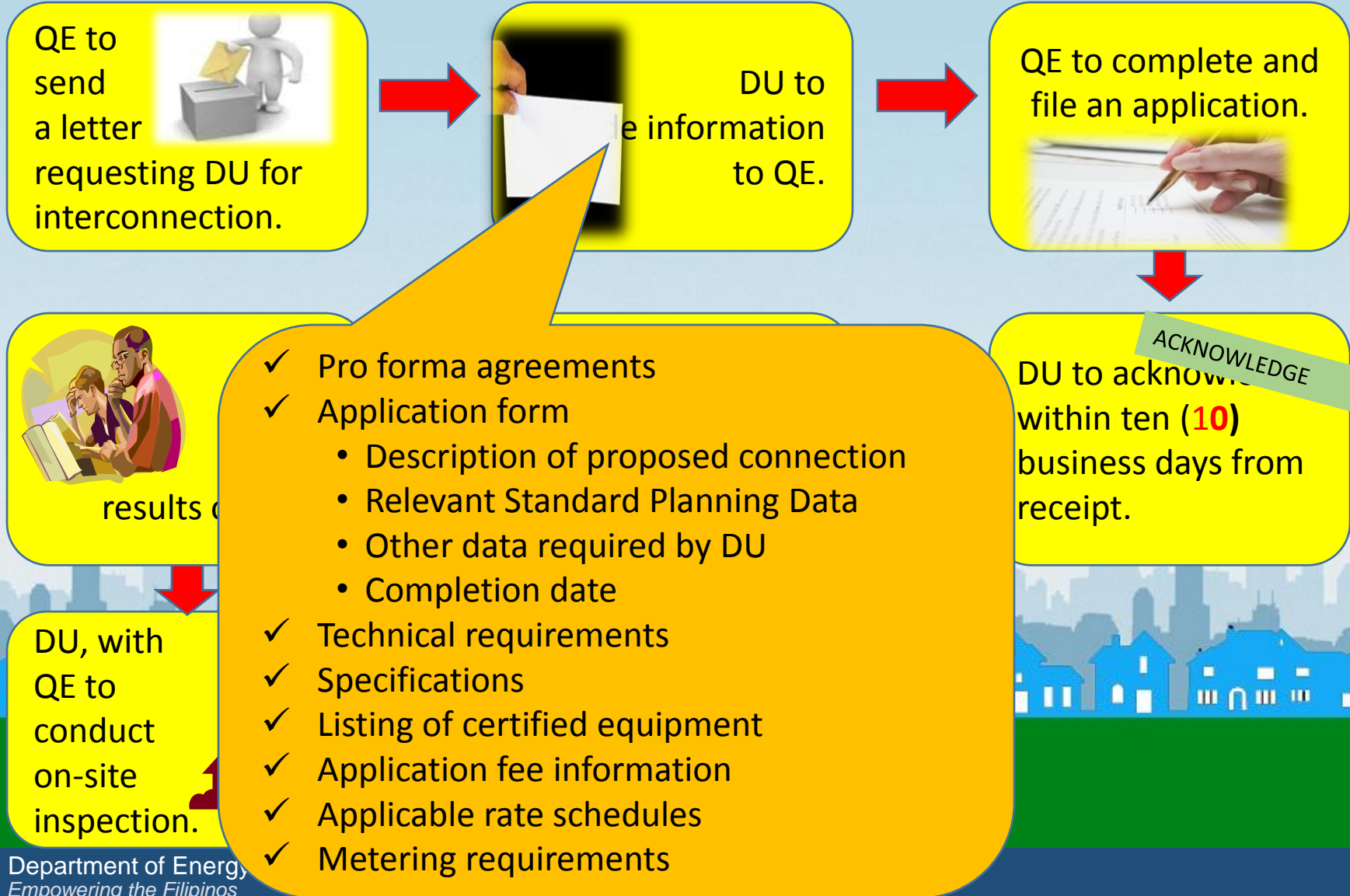
General Guidelines

- ✓ Design, installation, operations and maintenance shall be in consultation with the DU, since all specifications shall be of DU's standards.
- ✓ System requirements shall be met at the Connection Point.
- ✓ The DU shall only allow interconnection of RE facilities with **up to 100kW** capacity per QE account.
- ✓ The DU shall conduct inspections and shall remove the generation from DU system at any time due to maintenance, test, repair and emergency conditions.
- ✓ QE to be liable for any damages of the DU should the QE execute changes to the RE facilities without first informing the DUs.

 Power of Choice



Application for Interconnection



System Parameters

- ✓ **Voltage Level** - should be the same level as the DU with automatic method of disconnecting.
- ✓ **Frequency** – 60 Hz with automatic method of disconnecting.
- ✓ **Power Quality**
 - Limitation of direct current (DC) injection – not to inject direct current greater than 0.5% of the full load rated output current at connection point.
 - Flicker severity – not to exceed 1.0 unit for short term (ST) and 0.8 units for long term (LT).
 - Harmonics – within limits in Sec. 3.2.4 of Philippine Distribution Code (PDC)
- ✓ **Power Factor** – not less than 85% lagging measured at the Connection Point.

 Power of Choice



System Protection

- ✓ **Synchronization** – QE to provide synchronizing devices with typical limits in the Net Metering Standards.
- ✓ **Islanding** – QE system should detect islanding and disconnect within **2 seconds** from formation.
- ✓ **Integration with DU's Distribution System Grounding** – shall be grounded in accordance to Philippine Electrical Code (**PEC**).
- ✓ **Protective Control Devices**
 - Disconnect device – visible for use by the DU within 10 feet from connection point.
 - Protective relays – protective relays provided in Net Metering (NM) Standards
 - Reclosing – immediate disconnection from the DU system when the system is down.

 Power of Choice



Operations & Maintenance

- ✓ Facility should operate in parallel with the DU.
- ✓ QE must inform the DU if it is going to synchronize.
- ✓ If the DU system is down, the facility should automatically disconnect.
- ✓ QE to provide DU with contact numbers.
- ✓ QE shall maintain the facility in a safe manner as approved by the DU.

 Power of Choice



Metering

- ✓ MSP shall own and shall be responsible for the operations and maintenance of the meter in accordance with Sec. 2.11 of Distribution Services and Open Access Rules (**DSOAR**).
- ✓ QE to provide space for the metering facilities.
- ✓ Metering facilities shall be installed in an accessible and visible area for reading and testing of both QE and DU.

 Power of Choice



Testing & Commissioning

- ✓ Commissioning test shall be conducted after the interconnection system is installed.
- ✓ DU has the right to witness the testing and commissioning.
- ✓ RE facility shall be equipped with whatever equipment is required to perform the test.

Commissioning Test shall include the following:

- ✓ **Verification and inspections**
- ✓ **Production Test**
 - **Response to abnormal voltage**
 - **Response to abnormal frequency**
 - **Synchronization**
- ✓ **Unintentional islanding functionality test**
- ✓ **Cease-to-energize functionality test**



Net Metering Agreement

Annex A-2



Net Metering Agreement

- ✓ Parties: DU and Qualified End-user (QE)
- ✓ Mirrors the provision in the Rules Enabling the Net-Metering Program (i.e. Compliance Standards, Interconnection Set-Up, DU Inspection, Meter Readings, Pricing and Other Charges).
- ✓ To be submitted to ERC, DOE & NREB within 5 days from execution.
- ✓ Deemed approved and effective upon submission to ERC.

 Power of Choice



GOVERNMENT INITIATIVE

DOE Project: **Net Metering Demonstration in Private Academic Institutions**

Objective : Displace daytime load

Target Area : Metro Manila

Consumer Electricity Rate : PhP 11.50

Financing Scheme : PV Suppliers at no initial cost to the school

Payment Scheme : PhP 9.500/kWh for 14 years

Status :

- **Three (3) schools**

1. La Consolacion College : 133 kWp

2. MLQU : 96 kWp

3. St. Scholastica College : 96 kWp

Total Capacity : 325 kWp

 **Power of Choice**



WHERE ARE WE NOW?

**92% is in
MERALCO**

UPDATE ON NET-METERING AS OF 30 JUNE 2017

| DUs | NO. OF CUSTOMERS | Capacity (kWp) |
|--------------|------------------|----------------|
| MERALCO | 843 | 5366.89 |
| VECO | 31 | 184.06 |
| CEBECO III | 1 | 3.00 |
| CEBECO I | 5 | 84.00 |
| DLPC | 13 | 188.20 |
| AEC | 9 | 48.82 |
| BATELEC I | 1 | 10.00 |
| PELCO II | 6 | 39.00 |
| LEYECO V | 2 | 6.00 |
| PANELCO | 1 | 100.00 |
| OEDC | 2 | 16.73 |
| Total | 914 | 6046.70 |



giz

RTA copy



NET-METERING REFERENCE GUIDE

How to avail solar roof tops and other renewables
below 100 KW in the Philippines

www.renewables-made-in-germany.com



NREB
National Renewable Energy Board

Supported by
 Federal Ministry
of Economics
and Technology

on the basis of a decision
by the German Bundestag

WHERE ARE WE NOW?

- ❖ ERC - engaged a consultant to conduct a net-metering study (on pricing methodology) on July 2016
- ❖ The ERC came out with proposed amendments to the Net-Metering Rules in August 2016

 Power of Choice



WHERE ARE WE NOW?

- ❑ The following were the current issues covered in the proposed Amendments:
 1. Whether or not the **lifeline rate** should apply to Qualified End-users.
 2. Whether the mechanism of merely accumulating the credits of **net exports** on the customer bill, is reasonable.
- ❑ The ERC will consolidate all amendments based on the study and the comments gathered.

 Power of Choice



Thank You!

e-Diskarte Mo!

#KuryenteMo #eGenerateMo



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