Highlights of the Interim Mindanao Electricity Market Public Consultations

Prepared by: Philippine Electricity Market Corporation

November 2012

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EXECUTIVE SUMMARY

This document provides the highlights of the public consultations on the proposed establishment of the Interim Mindanao Electricity Market (IMEM) as a measure to immediately address the power supply situation in Mindanao. Two (2) legs of public consultations were held: the first in Cagayan de Oro City last 22 October 2012 and the second in Davao City last 14 November 2012.

In both public consultations, the DOE presented the Mindanao power situation followed by the presentation of the draft Department Circular directing PEMC to implement the IMEM. Thereafter, PEMC provided the initial design of the IMEM.

To solicit the inputs of the industry participants, open forums were held at the end of both public consultations. The following were the relevant issues raised during the open forums:

a) NPC capacity tradability
b) Impact of the IMEM on the existing Interruptible Load Programs
c) Duration of the operation of the IMEM
d) Possible mechanisms to ease the registration of DUs (e.g., lower prudential requirements)
e) Rate impact of the administration costs of the IMEM
f) Mandatory or Voluntary participation
g) Evaluation of transmission constraints
h) Appropriate bid cap level design and application (i.e., per technology or absolute)
i) Real-time imbalance correction due to forecast deviations

In addition to the public consultation on the Department Circular and market design, meetings with embedded generators were held. The discussions during the meeting mainly focused on the available capacities of the generators and loads with self-generating capacity, and existing interruptible load programs. In addition, some operational topics were discussed such as the procedure for monitoring the generation from these capacities.

HIGHLIGHTS OF THE 1st LEG OF THE PUBLIC CONSULTATION

Date: 22 October 2012

Venue: N Hotel, Kauswagan Highway, Cagayan de Oro City

PEMC Attendees:

- Carlito C. Claudio, OIC – President / Vice President – IST
- Atty. Criselda S. Martin-Funelas, Chief of Staff / VP – Legal

Corporate Planning and Communications Department

- Zigfred Niño C. Viray, Manager – Corporate Planning
- Jonathan B. de la Viña, Senior Specialist – COMD

Legal Department

- Atty. Caryl Miriam Y. Lopez, Manager – Market Governance and Operations Manager

Market Assessment Group

- Chrysanthus S. Heruela, Vice President
- Karen A. Varquez, Senior Analyst – Market Performance Evaluation

Highlights of the Mindanao Power Situation Presentation

Presenter: Department of Energy

- Mindanao is not yet connected with the Luzon-Visayas Grid.
- Mindanao grid installed capacity is at 2,022 MW with 1,616 MW dependable capacity but with available capacity of only 1,332 MW during the 2012 peak demand as of September.
- Load center of Mindanao is in the Davao Area with 31.65% (396.25 MW) share of the peak demand as of August 2012.
- Mt. Apo Geothermal Power Plant was on Forced Outage from 28 June to 20 July and from 22 July to 11 August due to problems with their control systems.
- Agus 6 and 7 was on Forced Outage from 01 to 19 September due to a fire breakout.

Highlights of the Draft Department Circular

Presenter: Department of Energy

- The draft Department Circular is entitled “Directing the Philippine Electricity Market Corporation to Establish and Operationalize the Interim Mindanao Electricity Market as an Urgent Measure to Address the Power Supply Situation in Mindanao”.
- The draft Department Circular enjoins the National Electrification Administration (NEA), National Transmission Corporation (TransCo), Power Sector Assets and Liabilities Management Corporation (PSALM), National Power Corporation (NPC), National Grid Corporation of the Philippines (NGCP), Mindanao Development Authority (MinDA), and the Electric Power Industry Participants and electricity end-users to support the PEMC in the development of the IMEM.
- The draft DC also requests the Energy Regulatory Commission (ERC) to support the regulatory requirements of the PEMC in this endeavor.

Highlights of the IMEM Presentation

Presenter: Philippine Electricity Market Corporation

- The establishment of the IMEM is one of the immediate measures identified resulting from the discussions of the energy family as organized by the DOE.
- Projections indicate supply shortfalls during peak hours on all months in 2013.
- Historical data shows the high dependency of the Mindanao grid on hydroelectric generation.
- A total of 348.9 MW was identified from potential additional supply sources to the grid. This is comprised of 165.9 MW of embedded generation and 183 MW of loads with self-generating capacity.
- Data from NEA shows that existing contracted capacities of most electric cooperatives are not enough to cover their projected 2013 power requirements. On the other hand, Private Distribution Utilities are well contracted and have enough capacity to cover their projected 2013 power requirements.
- Considerations for the development of the IMEM design are: it should be easy to set-up as to address immediate power shortage issues, it should be a transparent and efficient venue to schedule and settle supply capacities as to attract power investment, it should be supported by policies, regulation, and appropriate stakeholder education and participation as to ensure its sustainability, and it should incorporate risk mitigation mechanisms as to provide consumer protection.
- Participants of the IMEM will be generators (grid, embedded, firm, and non-firm), customers with self-generating capabilities, and customers willing to be curtailed.
- Pricing in the IMEM will be based on offers that are bid-based but with a bid cap.
- Scheduling is done day-ahead for the whole 24-hours with real-time imbalance correction.
- Supply providers in the IMEM will be paid at the market clearing price.
- 2013 Supply-Demand projection with the IMEM indicate virtually no shortfall for the entire year. Expected shortfalls are still present on November 2013 due to the concurrent planned outage of the two (2) STEAG units.
- The projected effective IMEM energy for 2013 ranges from PhP 0.03/kWh to PhP 0.77/kWh depending on the contracted level of the DU.

Highlights of the Open Forum

Moderator: Department of Energy

Panel Members: Department of Energy, Philippine Electricity Market Corporation

Topic	Inquiry/Comment	Remarks/Answer
2nd Leg of Public Consultation	--	DOE announced that the 2nd leg of the public consultation of the Department Circular on the establishment and operationalization of the Interim Mindanao Electricity Market (IMEM) will be held in Davao on 14 November 2012
Mindanao Peak Supply	--	It was mentioned that the peak capacity available to the Mindanao grid is highly dependent on the elevation of Lake Lanao.
Hydro Allocation	--	It was recommended that the transparent and equitable allocation of hydroelectric capacity be a part of the program to address the immediate power issue in Mindanao. With this, the effect of using other technologies on the power rates is minimized on all consumers.
AMRECO Supply Initiative	AMRECO commented that the pronouncement in the IMEM presentation that their initiative did not materialize is not accurate. Although the latest bidding round failed, there are ongoing negotiations to still realize the project.	The presentation will be revised based on the update from AMRECO.
AMRECO Comment on Cheap Power Issue	AMRECO also commented that cheap power in Mindanao is not an issue as may be interpreted from the IMEM presentation. According to him, the main issue is that financial closure of proposed power plants takes a considerable amount of time, if it happens at all.	
Hydro Allocation	Furthermore, AMRECO suggested that Electric Cooperatives (EC) should have higher allocation of	

Topic	Inquiry/Comment	Remarks/Answer
	hydroelectric capacity. The rationale behind the recommendation is that, with higher utilization of hydroelectric generation, low-income barangays will be able to afford electricity. On the other hand, the industries that use the power for business can pass on the cost of utilizing the more expensive technologies for power.	
Modified Generation Planning	A presentation on a modified generation planning in Mindanao to address the current supply problems was provided by a participant. In the presentation, diesel, geothermal, and coal-fired power plants will be used as base load power plants while hydroelectric power plants will be used last. With this dispatch arrangement, the water used for hydroelectric generation will be conserved and will be available during peak demand hours. In response to the proposal, other participants inquired on the impact as to the cost, especially if diesel will be made into a base load plant.	DOE: PEMC will include a simulation on this in the presentation in the next public con. However, the blended rates would need to be reviewed because it assumed hydro as baseload. PEMC: Diesel is not considered as baseload, due to technical considerations. While PEMC is not promoting coal, a 400 MW baseload is necessary. Another option is to push through with the NGCP's project to install submarine cables to tap excess capacity from Luzon and Visayas
NPC Capacity	Can NPC capacity be traded in the IMEM?	Yes
Existing Voluntary Load Curtailment Arrangements	Will the contracts of loads that already have existing Voluntary Load Curtailment (VLC) contracts with their respective distribution utilities (DU) be voided upon the operationalization of the IMEM?	Department of Energy (DOE) will not mandate the cancellation of the contracts; on the contrary, the IMEM should accommodate the current contracts. Hence, harmonization of the IMEM to the VLC programs of DUs should be ensured.
Embedded Generation Monitoring	What would be the procedure for monitoring the generation of embedded generators that	Installation of new RTUs or meters is expected for the successful implementation of

Topic	Inquiry/Comment	Remarks/Answer
	have no synchronizing capability to the grid?	the IMEM. Furthermore, the availability of these meters will be a prerequisite to embedded generators to participate in the IMEM.
Interim Duration	How long will the IMEM operate?	The IMEM will operate for as long as the conditions in Mindanao are not suitable for its integration to the WESM.
Timetable	What is the timetable for the establishment of the IMEM?	PEMC: IMEM is a product of the experience in Luzon and Visayas. It is necessary firstly to establish the policy and rules and obtain regulatory approvals. Based on experience, it can be done in a short period of time but is highly dependent on how fast the preliminary process progresses. Implementing a full market would take longer because of its complexity. Also, established rules in the WESM may not be applicable in Mindanao. DOE: IMEM will evolve to what is needed in Mindanao. Trial operations, without financial settlement, will hopefully be in February – April 2013. Commercial Operations is targeted to start by May 2013.
Mechanisms for Ease of Registration	Will there be mechanisms to ease the registration of DUs and ECs in Mindanao to the IMEM (e.g., lower prudential requirements)?	Those details or mechanisms will be developed in the formulation of the Market Rules
Administration Costs	What is the rate impact of administration costs of the IMEM?	PEMC is still simulating the impact of administration costs to the participants of the IMEM.
IMEM Shortfall	What is the procedure to be followed if there is still a shortfall even with IMEM?	Customers will be required to follow the Load-to-Maintain matrix to be prepared by the System Operator (SO).

Topic	Inquiry/Comment	Remarks/Answer
Capacity Nomination Protocol	--	There was a discussion on the new protocol for the reporting of available system supply by the NGCP. Under the new protocol, NGCP will publish the load curtailment levels based on NPC capacities at 1300H of Day D-1. The customers will then have until 1400H to nominate capacities to TMI to address their shortfall. TMI then nominates its capacity that will be dispatch at Day D to NGCP at 1500H. At 0900H of Day D, NGCP then publishes the new load curtailment levels which already considers the available capacities of all grid generators. It was highlighted that TMI is not centrally dispatched and is not available for everybody because its schedule is dependent to nominations by DUs.
Regulating Reserve	--	The System Operator requested that regulating reserve requirements be considered in the simulations as it is necessary for the reliability of the grid
2013 Projections Request	It was requested that hydroelectric contribution to the grid supply be presented in the projections so that the participants may observe the variations in hydroelectric supply.	Scenarios will be presented in the next public consultation.
2013 Projections Request	It was further requested that a worst-case scenario with the projected occurrence of the El Niño phenomenon in 2013 be presented so that the participants will also be informed of what they could expect during the summer of	Scenarios will be presented in the next public consultation.

Topic	Inquiry/Comment	Remarks/Answer
	2013.	

Highlights of the Meeting with Embedded Generators

Moderator: Department of Energy

Topic	Inquiry	Remarks/Answer
Generating Capacity	--	Crystal Sugar mentioned that they have upped their supply to FIBECO to 10 MW from 7 MW. Additionally, they now also have a 2 MW diesel generator that they could also offer to FIBECO or the grid if the IMEM is operationalized.
Generating Capacity	--	Crystal Sugar mentioned that their supply is seasonal; that is, they could supply the 10-12 MW from October to May while they could only supply 2 MW from June to September.
Generation Rate	--	Crystal Sugar mentioned that they are only charging PhP 2.12/kWh for their production because they are only running on commercial testing mode. They are not contracting their capacity because they want to avail of the Feed-in Tariff and are currently waiting for their certificate of eligibility.
Generating Capacity	--	Del Monte remarked that their self-generating capability now is only up to 2.4 MW as 3.3 MW has been decommissioned. They also provided that they can only run their 2.4 MW for a whole day and that they can synchronize their generator to the grid.
ILP Experience		Del Monte mentioned that they are currently under the ILP of CEPALCO but they do not agree with the rates since it only covers fuel. SM CDO, on the other hand, was happy with the rates since it was more than its

Topic	Inquiry	Remarks/Answer
		estimate. All other SM's are available to give ILP service.
Generating Capacity	--	SM CDO mentioned that they can only operate in isolated mode and only for 4 hours at maximum rating (6 MW). They also provided information on SM's other generation assets: 7.5 MVA in SM General Santos, 9 MVA in SM Lanao, and 7.5 MVA in SM Davao.
IMEM Design	Will the bid cap be per technology or absolute?	Those details will be developed along with the formulation of the Market Rules.
Uncontracted Capacity	--	STEAG mentioned that they have 10 MW uncontracted capacity that they could offer to the IMEM. SPPC then mentioned that they also have uncontracted capacity (5 MW) that they could offer to the IMEM.
Data Update	--	Since there were numerous updates on the capacities of potential supply providers in the IMEM, DOE stated that the participants may expect an e-mail from them requesting for data.

HIGHLIGHTS OF THE 2nd LEG OF THE PUBLIC CONSULTATION

Date: 14 November 2012

Venue: The Apo View, J. Camus Street, Davao City

PEMC Attendees:

- Pres. Melinda L. Ocampo
- Atty. Criselda S. Martin-Funelas, Chief of Staff / VP – Legal

Corporate Planning and Communications Department

- Robinson P. Descanzo, Vice President
- Zigfred Niño C. Viray, Manager – Corporate Planning
- Clares Loren C. Jalocon, Asst. Manager – COMD
- Jonathan B. de la Viña, Senior Specialist – COMD

Legal Department

- Atty. Caryl Miriam Y. Lopez, Manager – Market Governance and Operations Manager

Market Assessment Group

- Chrysanthus S. Heruela, Vice President
- Elaine R. de Guzman-Gonzales, Manager – Market Data and Analysis
- Karen A. Varquez, Senior Analyst – Market Performance Evaluation

Highlights of the Mindanao Power Situation Presentation

Presenter: Department of Energy

- Mindanao grid installed capacity is at 2,022 MW with 1,616 MW dependable capacity.
- Load center of Mindanao is in the South East with 34% (432 MW) share of the peak demand as of August 2012.
- Presentation of the existing power plants in Mindanao grouped per region shows that capacities are concentrated in Region X (1,133.8 MW installed capacity).
- Power statistics from the past few days (09-12 November) shows curtailment levels in the 300 – 400 MW range.
- Mt. Apo Geothermal Power Plant was on Forced Outage from 28 June to 20 July and from 22 July to 11 August due to problems with their control systems.
- Agus 6 and 7 was on Forced Outage from 01 to 19 September due to a fire breakout.
- STEAG Coal-Fired Power Plant was on Maintenance Outage from 06 October to 04 November (Unit 1) and 29 October to 10 November (Unit 2). The overlap in the outage is for the maintenance of the common facilities of the two units.
- Updated list of power projects as of September 2012 shows a total of 588 MW of committed capacity and 527 MW of indicative capacity.
- Bubunawan HEPP was damaged by Typhoon Sendong is currently undergoing rehabilitation. Completion of the rehabilitation is targeted at December 2013.

Highlights of the Draft Department Circular

Presenter: Department of Energy

- The draft Department Circular is entitled “Directing the Philippine Electricity Market Corporation to Establish and Operationalize the Interim Mindanao Electricity Market as an Urgent Measure to Address the Power Supply Situation in Mindanao”.
- The draft Department Circular enjoins the National Electrification Administration (NEA), National Transmission Corporation (TransCo), Power Sector Assets and Liabilities

Management Corporation (PSALM), National Power Corporation (NPC), National Grid Corporation of the Philippines (NGCP), Mindanao Development Authority (MinDA), and the Electric Power Industry Participants and electricity end-users to support the PEMC in the development of the IMEM.

- The draft DC also requests the Energy Regulatory Commission (ERC) to support the regulatory requirements of the PEMC in this endeavor.

Highlights of the IMEM Presentation

Presenter: Philippine Electricity Market Corporation

- The establishment of the IMEM is one of the immediate measures identified resulting from the discussions of the energy family as organized by the DOE.
- Projections indicate supply shortfalls during peak hours on all months in 2013. Furthermore, projections with El Niño indicate deficiencies on almost all peak hours of the day and also in significant number on off-peak hours during the summer months (March to May).
- Historical data shows the high dependency of the Mindanao grid on hydroelectric generation.
- A total of 348.9 MW was identified from potential additional supply sources to the grid. This is comprised of 165.9 MW of embedded generation and 183 MW of loads with self-generating capacity.
- Data from NEA shows that existing contracted capacities of most electric cooperatives are not enough to cover their projected 2013 power requirements. On the other hand, Private Distribution Utilities are well contracted and have enough capacity to cover their projected 2013 power requirements.
- Considerations for the development of the IMEM design are: it should be easy to set-up as to address immediate power shortage issues, it should be a transparent and efficient venue to schedule and settle supply capacities as to attract power investment, it should be supported by policies, regulation, and appropriate stakeholder education and participation as to ensure its sustainability, and it should incorporate risk mitigation mechanisms as to provide consumer protection.
- Participants of the IMEM will be generators (grid, embedded, firm, and non-firm), customers with self-generating capabilities, and customers willing to be curtailed.
- Pricing in the IMEM will be based on offers that are bid-based but with a bid cap.
- Scheduling is done day-ahead for the whole 24-hours with real-time imbalance correction.
- Supply providers in the IMEM will be paid at the market clearing price.
- 2013 Supply-Demand projection with the IMEM indicate virtually no shortfall for the entire year. Projections with El Niño, however, indicate that shortfalls can still be expected during the summer months especially during peak hours. Expected shortfalls are still present from both cases on November 2013 due to the concurrent planned outage of the two (2) STEAG units.
- The projected effective IMEM energy for 2013 ranges from PhP 0.004/kWh to PhP 0.897/kWh without El Niño and PhP 0.001/kWh to PhP 2.167/kWH with El Niño depending on the contracted level of the DU.

Highlights of the Open Forum

Moderator: Department of Energy

Panel Members: Department of Energy, Philippine Electricity Market Corporation

Topic	Inquiry/Comments	Remarks/Answer
Participation	Will the IMEM be mandatory or voluntary?	The determination on whether participation is mandatory or voluntary is a policy decision and that the Department of Energy is yet to finalize these details.
Market Settlement	What price will the supply providers be paid at?	The initial settlement design of the IMEM is uniform pricing. Hence, dispatched suppliers will be paid at the market clearing price
Transmission Constraints	Have possibilities of constraints on the transmission system been evaluated?	The subject of transmission constraints have been discussed in the meetings prior to the public consultation and that the System Operator has assured the group that it is not expected to be a problem
Cost Recovery Mode	--	The Energy Regulatory Commission (ERC) remarked that the participation mode (i.e., voluntary or mandatory) would affect the cost recovery of the IMEM. ERC pointed out that recovering the cost from the gross pool would mean also charging DUs that have contracted appropriately
Bid Cap Design	SUKELCO noted the implications of the bid cap level. That is, if the bid cap is too low then suppliers with operating costs above the bid cap will be discouraged from participating in the market; on the other hand, if the bid cap is too high then suppliers with low operating costs will experience windfall profits. Subsequently, SUKELCO suggested that a regulated cost-based offer to the market may be more preferable.	One of the goals of a market is to promote competition in the industry. If the bidding prices of suppliers are regulated then there is essentially no competition. As a result, the suppliers would then be more inclined to just engage in bilateral contracts since the price would also be fixed.
Other DOE Initiatives	What are status of the other initiatives of the Department of Energy (e.g., Pulangui	Usec. Asirit proceeded to present the status of their other initiatives. Presented

Topic	Inquiry/Comments	Remarks/Answer

	dredging) to improve the power situation in Mindanao besides the establishment of the IMEM?	initiatives are as follows:
		• Close monitoring of the daily operations of the Mindanao power system and intervene as necessary;
		• Maximize the dispatch of 200MW TMI power barges
		• Repair of the Pulangi IV and uprating of Agus 6 Units 1 and 2
		• Short term measures are as follows:
		  ○ Transfer of power barges from Visayas to Mindanao
		  ○ Rehabilitation of PB104
		  ○ Operate the Iligan Diesel Power Plant
		  ○ Utilization of embedded generation
		  ○ Creation of a one-stop shop
		• Long term measures are as follows:
		  ○ Revisit the economic viability of the Visayas-Mindanao Interconnection Project
		  ○ Balo-i Flood Control Project
		  ○ Dredging of Pulangi IV
		  ○ Development of Mindanao Energy Plan
		  ○ Study the competitive electricity market for Mindanao

Debt of Electric Cooperatives	BUSECO remarked that the term “some electric cooperatives” is too broad as it could imply that about half of the cooperatives have outstanding debts to PSALM. BUSECO recommended that the exact number be placed to prevent any misconceptions.	Usec. Asirit cited the improved collection efficiency of LASURECO and MAGELCO

Topic	Inquiry/Comments	Remarks/Answer
Real-Time Imbalance Correction	--	First Gen suggested considering the instances when there is a sudden increase in cost-effective generation (e.g., hydroelectric, wind) in the formulation of the dispatch rules of the IMEM.
NPC Capacity	Will NPC/PSALM be able to offer their capacity to the market given that some of their contracts are expiring at the end of the month?	They would still contract their capacities to the DUs and would not have excess capacity that is for the market.
Reserve Market	Will the DOE consider implementing a reserve market in Mindanao?	The reserve market, which requires a separate approval from the ERC, will have to be implemented in Luzon and Visayas first.

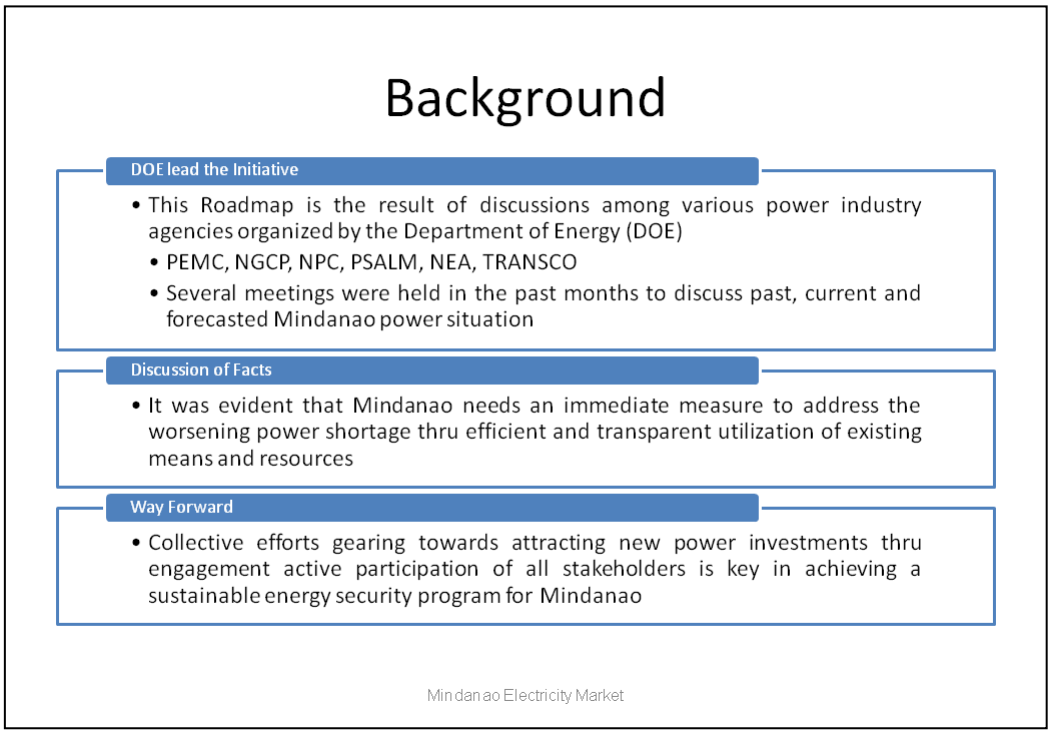
Highlights of the Meeting with Embedded Generators

Moderator: Department of Energy

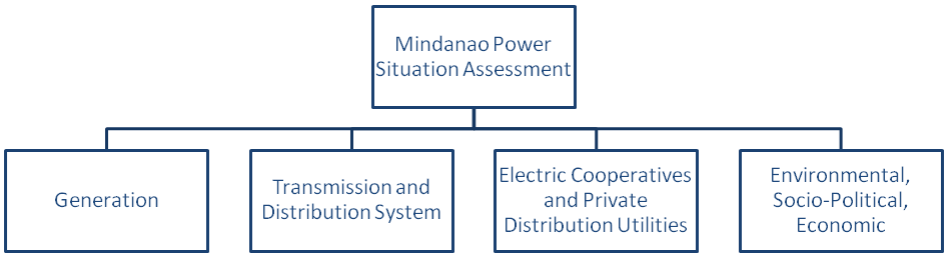
Topic	Inquiry	Remarks/Answer
Interruptible Load Payment Treatment	--	CEPALCO was inquired on their treatment of the payment to interruptible loads. CEPALCO answered that they consider the payment to ILDs as generation cost.
Current ILD Compensation Issue	--	The issue on the constant rate to all ILDs was raised especially on the conversion ratio. It was mentioned that the current rate is based on 0.28 L/kWH conversion ratio but other generator sets actually have a 0.30 L/kWh conversion ratio. CEPALCO remarked that there are also generator sets that have a 0.25 L/kWh conversion ratio that are getting paid at 0.28 L/kWh.
CEPALCO Interruptible Load Program	--	CEPALCO mentioned that they currently have 20 MW in their Interruptible Load Program (ILP). The 20 MW is comprised of five (5) customers. CEPALCO further

Topic	Inquiry	Remarks/Answer
		mentioned that it is not efficient to dispatch low rated generator as efficiency decreases along with the maximum rating of a generator set.
Davao Light Interruptible Load Program	--	Davao Light noted that they currently have 70 MW in their Interruptible Load Program. All of these were utilized during the height of load curtailment in Mindanao.

ANNEX A MINDANAO ELECTRICITY ROADMAP PRESENTATION IN CDO CITY



Mindanao Power Situation



Mindanao Situation

Generation Capacity

- Insufficient generation and reserve capacity during peak demand periods
- Aging and deteriorating power plants
- No incentive for embedded generation facilities and voluntary load participants
- Government is not allowed to enter into new power supply obligation under EPIRA
- Some private sector initiatives to address supply problem did not materialize (e.g. AMRECO's bid to solicit 300 MW baseload power requirement)
- Last major private sector initiated supply project was the 232 MW STEAG coal plant last 2006

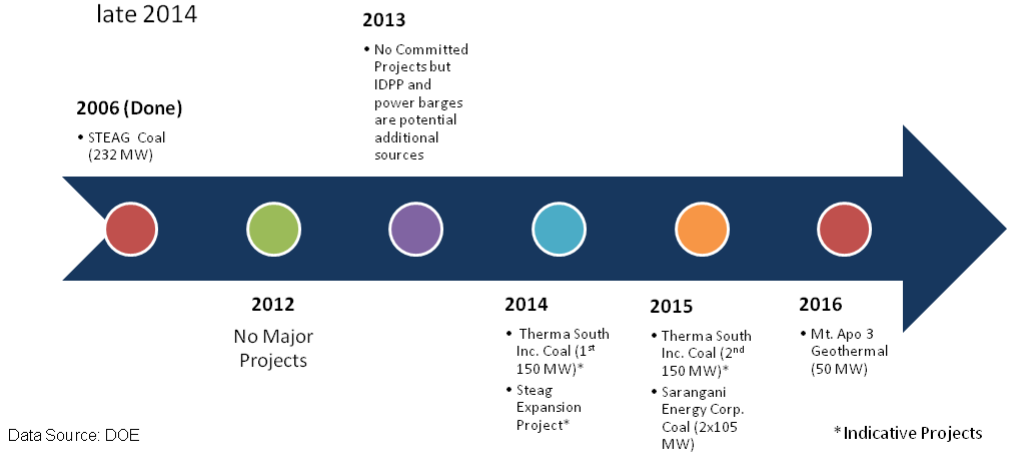
Main Grid Generators

Technology	Facility Name	Dependable Capacity (MW)	Installed Capacity (MW)
Hydroelectric	Agus 1	52	80
	Agus 2	135	180
	Agus 4	156	158
	Agus 5	55	55
	Agus 6	155	200
	Agus 7	27	54
	Pulangui 4	200	255
	TOTAL HYDRO	**780 (53%)**	**982 (57%)**
Diesel	Power Barge 104	16	32
	SPPC	50	59
	WMPC	100	113
	TMI Power Barges	200	200
	TOTAL DIESEL	**366 (25%)**	**404 (23%)**
Geothermal	Mount Apo Geo	**102 (7%)**	**109 (6%)**
Coal	Mindanao Coal	**210 (14%)**	**232 (13%)**
	TOTAL MINDANAO GRID	**1,458 (100%)**	**1,727 (100%)**

Data Source: DOE

Generation Projects

- Earliest major private sector initiated supply project to come on-stream only in late 2014

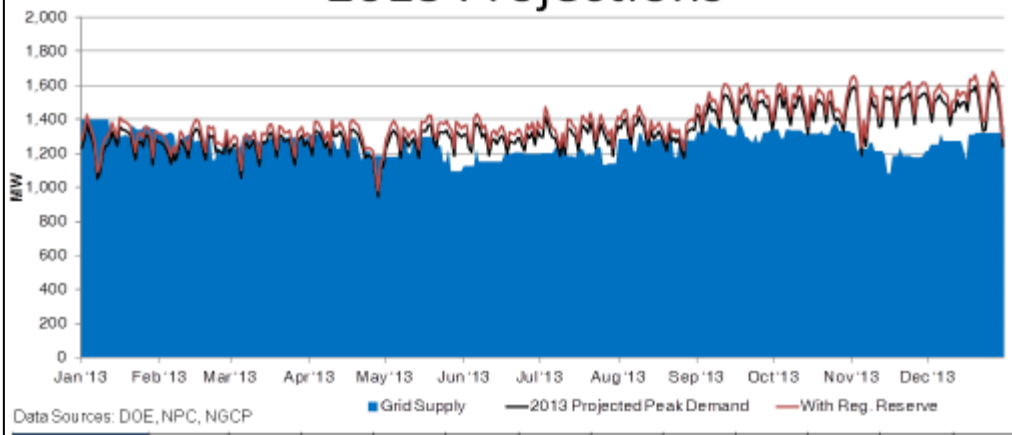


Data Source: DOE

*Indicative Projects

Mindanao Electricity Market

2013 Projections

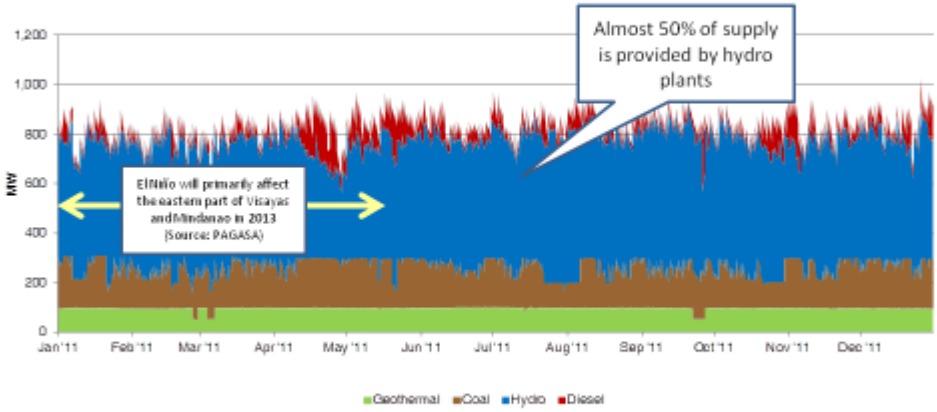


Data Sources: DOE, NPC, NGCP

Month	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
Offpeak/Peak	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P
Lowest Grid Supply Margin	148	(51)	57	(141)	126	(35)	32	(101)	(69)	(233)	(51)	(226)	(7)	(216)	44	(154)	(46)	(247)	(15)	(256)	(147)	(448)	(65)	(337)
Peak Demand	1,256	1,374	1,238	1,348	1,228	1,319	1,272	1,343	1,271	1,366	1,284	1,376	1,336	1,418	1,346	1,419	1,453	1,545	1,426	1,548	1,441	1,591	1,463	1,615
Grid Def. (Hrs.)	0	10	0	32	0	6	0	69	10	175	9	238	1	224	0	110	2	241	1	213	26	294	7	252

O=10PM-9AM, P=10AM-9PM

Historically, Mindanao is Hydro and Weather Dependent



Data Sources: NGCP

Mindanao Electricity Market

Potential Additional Supply Sources

Distribution Utility	Facility	Dependable Capacity (MW)	Fuel Type
CEPALCO	MINERGY 1 &2	45	Diesel
	FGBPC	1.6	Hydro
	BUBUNAWAN	4.9	Hydro
	SOLAR PV	1	Solar
	CABULIG	8	Hydro
DLPC	SIBULAN	36	Hydro
	TALOMO	4.5	Hydro
	BAJADA DPP	48	Diesel
CLPC	COTABATO LIGHT	9.9	Diesel
FIBECO	Crystal Sugar	7	Biomass
	Total Embedded	**165.9**	
Various	Self-Generating Facilities within DU	183	ILD
	TOTAL	**348.9**	

*Majority of these supplies are already contracted and the system cannot access them despite being available

Source: DOE, PSALM

Mindanao Electricity Market

Potential Voluntary Load Participants

No.	Company Name	Installed Capacity (MW)
1	DOLE Philippines, Inc.	12.6
2	Philippine Sinter Corporation	7.5
3	Asia Brewery Inc. (Cagayan De Oro)	7.0
4	SM City-Cagayan de Oro	6.0
5	SM City-Davao	6.0
6	LTS Malls, Inc./ NCCC Mall - Davao	5.9
7	Del Monte Phils., Inc.	5.7
8	Coca-Cola Bottlers, Inc. – CCBPI – NMD (Davao)	5.5
9	Fit Mart Mall, Inc.	5.3
10	Philippine International Development, Inc. (PHIDCO)	4.8
11 to 1,121	Various	116.7
	TOTAL	183.0

Source: PSALM

Mindanao Situation

Transmission and Distribution System

- Isolated from the Luzon-Visayas Transmission Grid
- Some aging equipment and facilities for both transmission and distribution system
- Difficulty in securing Right of Way for line repair and projects

Distribution Utilities/Electric Cooperatives

- Creditworthiness of off-takers
  - Total debt of **PhP8,847,936,357.28** of some Mindanao Electric Cooperatives from NPC as of June 2012
- Challenging imposition of disconnection procedure to defaulting distribution utility
- Medium-term power supply contracts of ECs are not enough to cover actual needs

Mindanao Electricity Market

Electric Cooperatives

Region	EC	2013 Projected Peak Load (MW)	2012 Peak Contracted Cap. (MW)			
			NPC/PSALM	TMI	Embedded	TOTAL
IX	ZAMCELCO	**106.3**	75.0	18.0	--	**93.0**
	ZAMSURECO I	**38.4**	21.4	5.0	--	**26.4**
	ZAMSURECO II	**24.2**	12.8	4.0	--	**16.8**
	ZANECO	**36.5**	27.1	9.0	--	**36.1**
X	MOELCI I	**9.4**	6.3	2.0	--	**8.3**
	MOELCI II	**27.6**	16.3	3.0	--	**19.3**
	MORESCO I	**27.8**	24.0	--	--	**24.0**
	MORESCO II	**23.9**	13.5	--	9.4	**22.9**
	FIBECO	**29.9**	23.8	--	10.0	**33.8**
	BUSECO	**26.7**	14.9	5.0	--	**19.9**
	CAMELCO	**3.9**	2.7	1.0	--	**3.7**
	LANECO	**14.4**	8.2	--	3.0	**11.2**
XI	DANECO	**87.0**	50.7	15.0	13.0	**78.7**
	DASURECO	**35.9**	27.1	12.0	--	**39.1**
	DORECO	**21.1**	10.2	8.0	--	**18.2**

Source: PSALM, NEA

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ARMM	LASURECO	31.0	25.8	--	--	25.8
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CARAGA	ANECO	52.2	39.9	15.0	--	54.9
	ASELCO	27.3	11.6	8.0	--	19.6
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Mindanao Electricity Market

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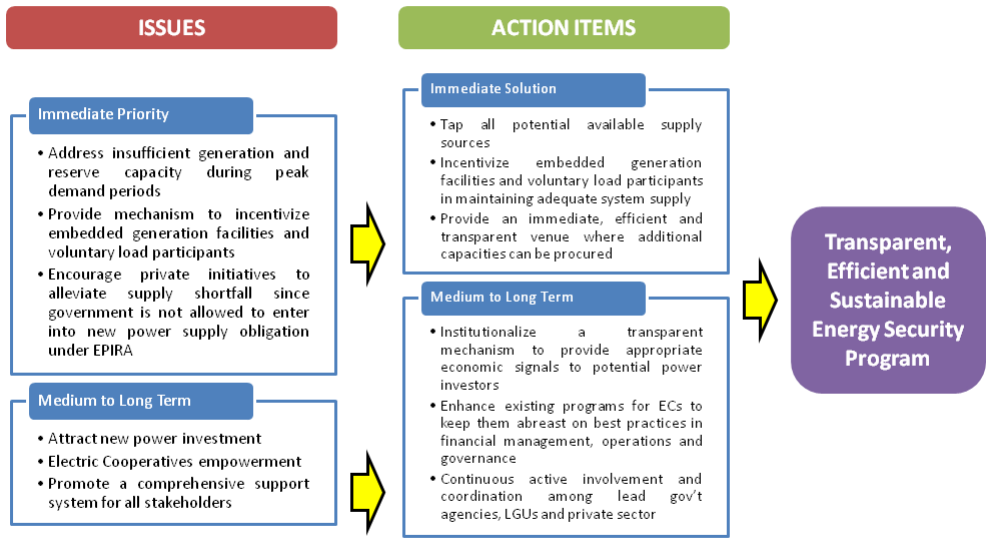
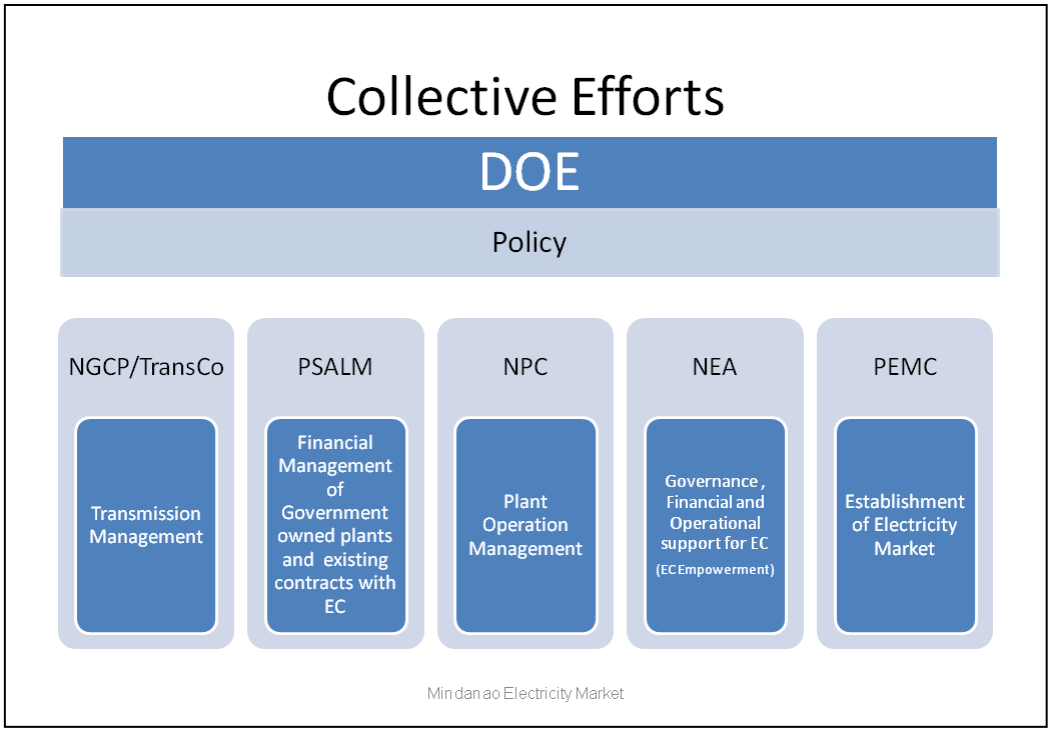
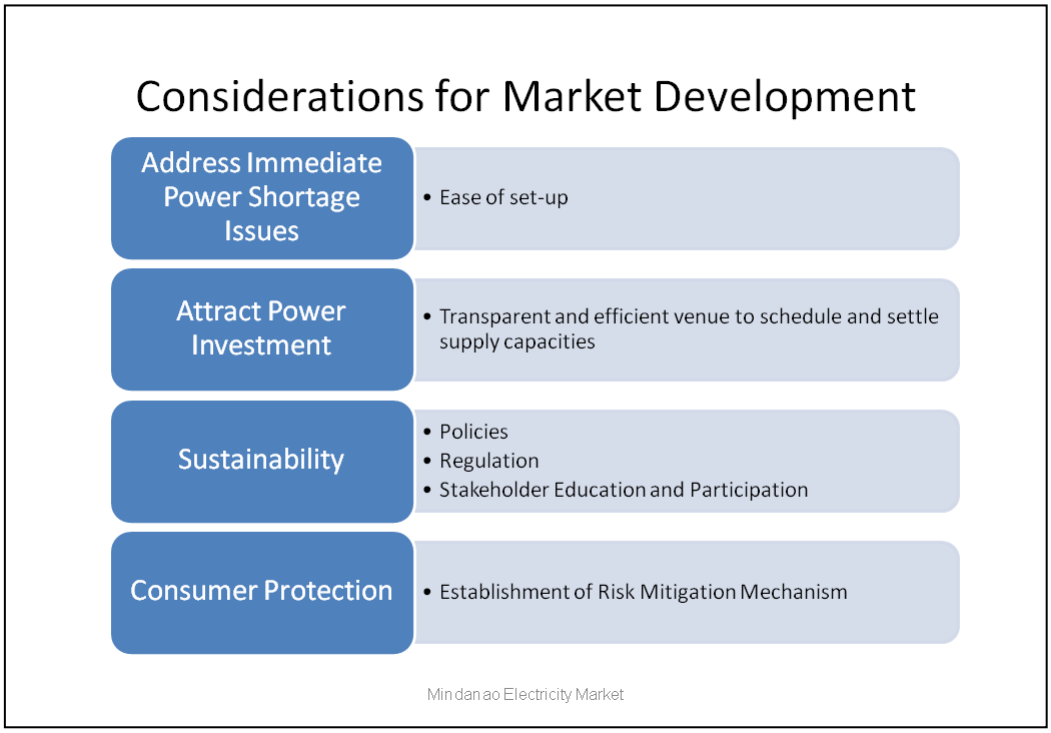
Mindanao Electricity Market

Action Items



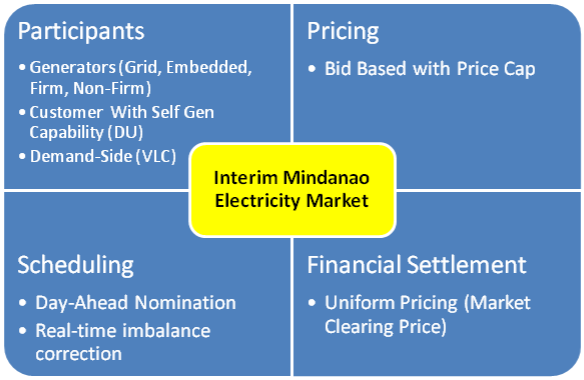
Mindanao Electricity Market


Collective Efforts
DOE
Policy
NGCP/TransCo
Transmission Management
PSALM
Financial Management of Government owned plants and existing contracts with EC
NPC
Plant Operation Management
NEA
Governance , Financial and Operational support for EC
(EC Empowerment)
PEMC
Establishment of Electricity Market
Mindanao Electricity Market


Considerations for Market Development
Address Immediate Power Shortage Issues
• Ease of set-up
Attract Power Investment
• Transparent and efficient venue to schedule and settle supply capacities
Sustainability
• Policies
• Regulation
• Stakeholder Education and Participation
Consumer Protection
• Establishment of Risk Mitigation Mechanism
Mindanao Electricity Market

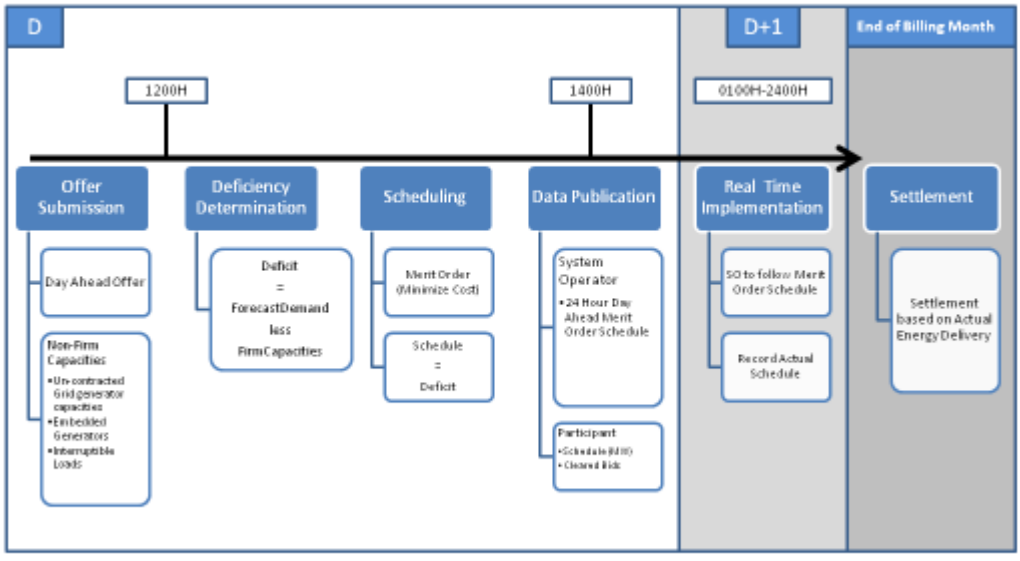
Interim Mindanao Electricity Market (IMEM) Design

Goal: Provide an immediate venue for transparent and efficient utilization of additional capacities to address current Mindanao energy supply shortfall



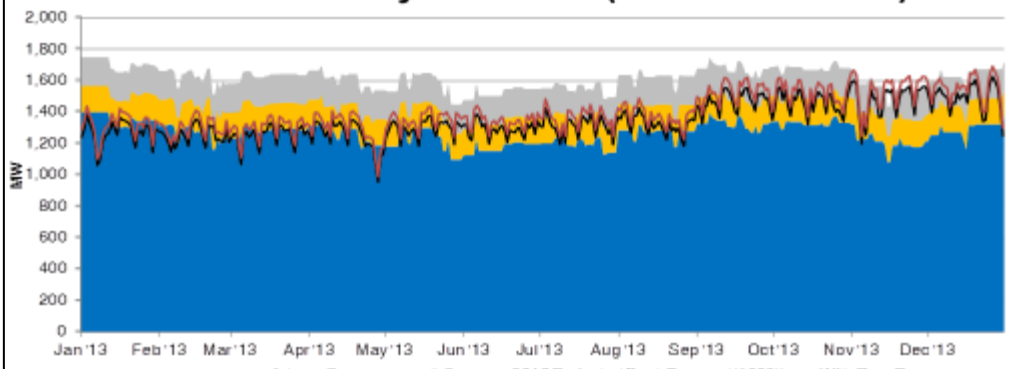
Mindanao Electricity Market

Interim Market Process



20

Market Projections (IMEM 2013)



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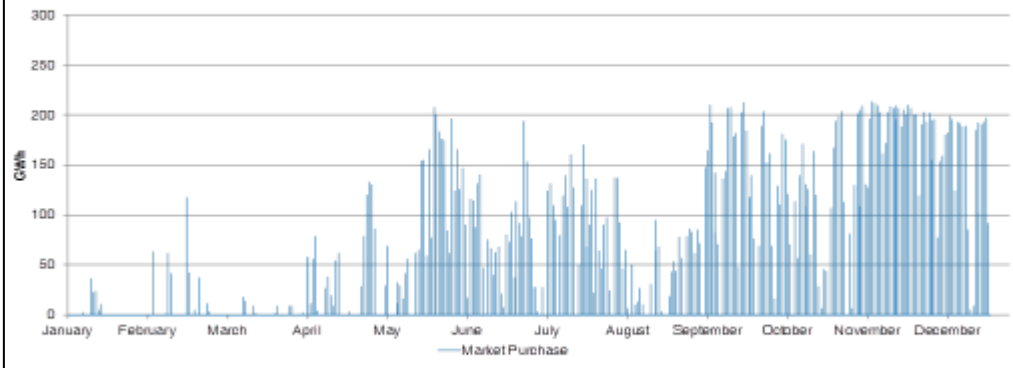
Offpeak/Peak	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P
Min. Grid Margin	148	(51)	57	(141)	126	(35)	32	(101)	(69)	(233)	(51)	(226)	(7)	(216)	44	(154)	(46)	(247)	(15)	(256)	(147)	(448)	(65)	(337)
Embedded	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166
ILD	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183
Min. System Margin	497	298	406	208	475	314	381	248	280	116	298	123	342	133	393	194	303	102	334	93	201	(99)	284	12
Hrs. w/ Def	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0

O=10PM-9AM, P=10AM-9PM

Market Projections (IMEM 2013)

- Market Purchase (GWh)



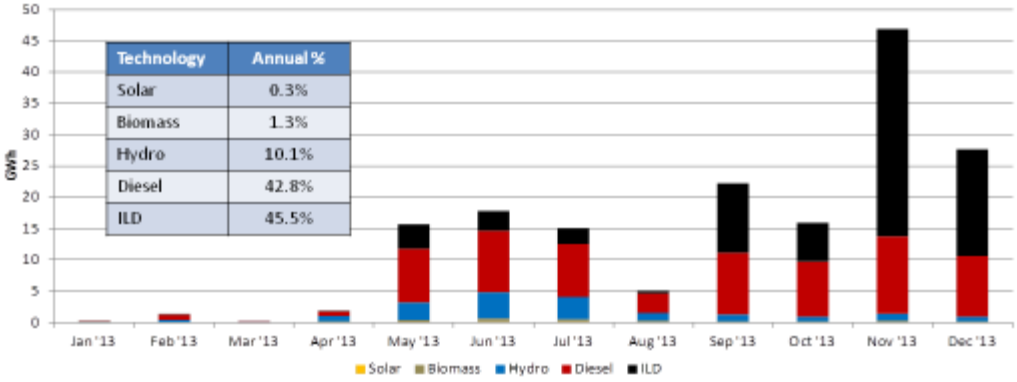
Total Projected Market Purchase for 2013 = 169,809.52 MWh*

*1.80% of Total Energy Consumption

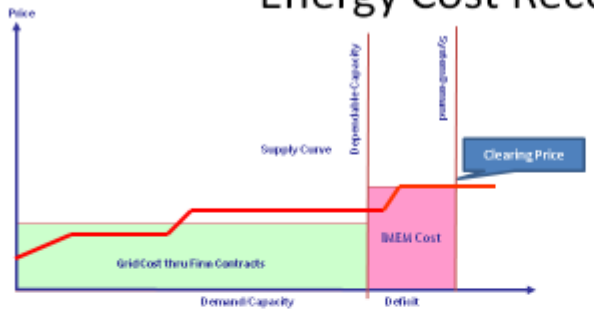
Market Projections (IMEM 2013)

- Monthly Excess Capacity Sold to the IMEM per Technology

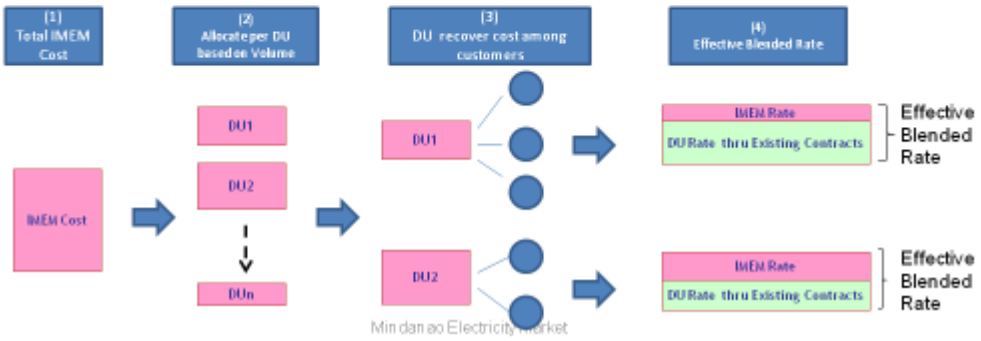
Technology	Annual %
Solar	0.3%
Biomass	1.3%
Hydro	10.1%
Diesel	42.8%
ILD	45.5%



Energy Cost Recovery



Cost Recovery	Effective Rate Range (PhP/KWh)
Payment to IMEM Supply Providers	4 – 12

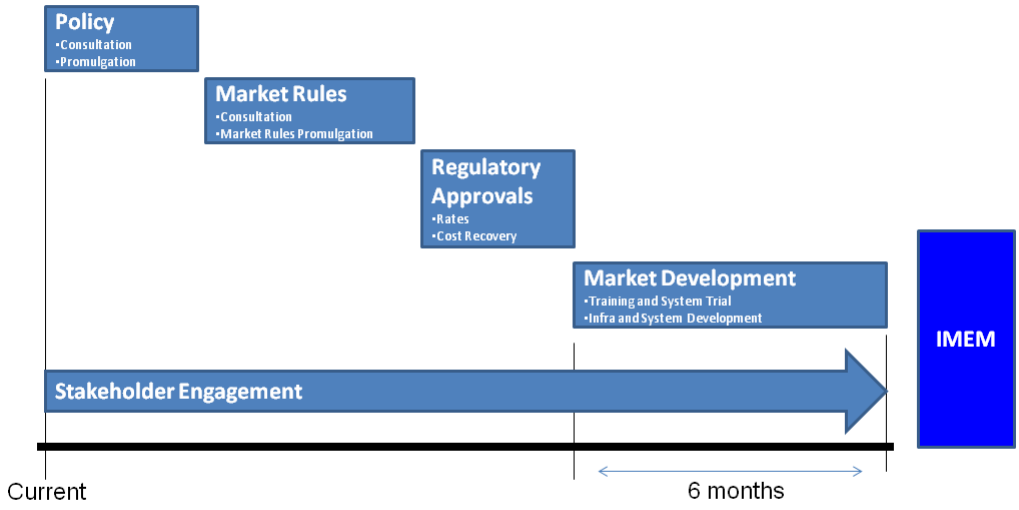


Market Projections: Energy Cost Recovery (IMEM 2013)

- Effective Market Rate Projection

Parameter	Estimated IMEM Rate (2013)	
Recoverable to:	IMEM Participants	System-Wide (Gross Level)
IMEM Total Energy Cost	PhP 1,941.509 M	
Recoverable Consumption	169.810 GWh	9,456.239 GWh
Effective IMEM Energy Rate (PhP/KWh)	**0.03 – 0.77**	**0.205**

Ways Forward



Mindanao Electricity Market

Thank You!

Mindanao Electricity Market

ANNEX B MINDANAO ELECTRICITY ROADMAP PRESENTATION IN DAVAO CITY

Mindanao Electricity Market Roadmap

Philippine Electricity Market Corporation

November 2012

Mindanao Electricity Market

Background

DOE lead the Initiative

- This Roadmap is the result of discussions among various power industry agencies organized by the Department of Energy (DOE)
  - PEMC, NGCP, NPC, PSALM, NEA, TRANSCO
  - Several meetings were held in the past months to discuss past, current and forecasted Mindanao power situation

Discussion of Facts

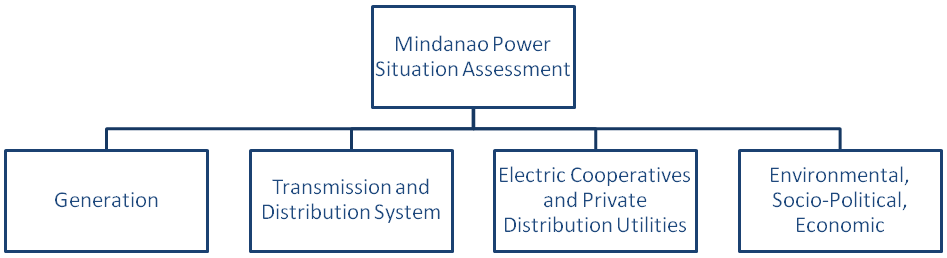
- It is evident that Mindanao needs an immediate measure to address the worsening power shortage thru efficient and transparent utilization of existing means and resources

Way Forward

- Attract new power investments thru active participation and collective efforts of all stakeholders in achieving a sustainable energy security program for Mindanao

Mindanao Electricity Market

Mindanao Power Situation



Mindanao Electricity Market

Mindanao Situation

Generation Capacity

- Insufficient generation and reserve capacity during peak demand periods
- Aging and unreliable power plants
- No incentive for embedded generation facilities and voluntary load participants
- Government is not allowed to enter into new power supply obligation under EPIRA
- Some private sector initiatives may not be able to address immediate supply problem once they materialize (e.g., AMRECO's bid to solicit 300 MW baseload power requirement)
- Last major private sector initiated supply project was the 232 MW STEAG coal plant last 2006

Mindanao Electricity Market

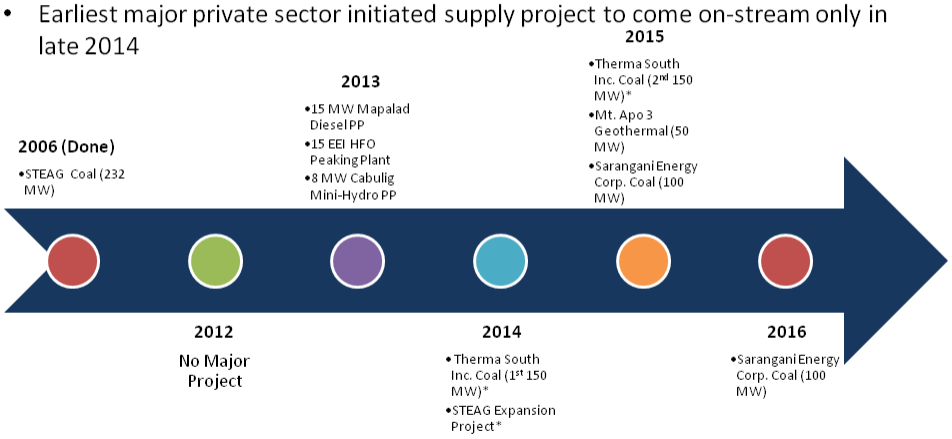
Main Grid Generators

Technology	Facility Name	Dependable Capacity (MW)	Installed Capacity (MW)
Hydroelectric	Agus 1	52	80
	Agus 2	135	180
	Agus 4	156	158
	Agus 5	55	55
	Agus 6	155	200
	Agus 7	27	54
	Pulangui 4	200	255
	TOTAL HYDRO	**780 (53%)**	**982 (57%)**
Diesel	Power Barge 104	16	32
	SPPC	50	59
	WMPC	100	113
	TMI Power Barges	200	200
	TOTAL DIESEL	**366 (25%)**	**404 (23%)**
Geothermal	Mount Apo Geo	**102 (7%)**	**109 (6%)**
Coal	Mindanao Coal	**210 (14%)**	**232 (13%)**
	TOTAL MINDANAO GRID	**1,458 (100%)**	**1,727 (100%)**

Data Source: DOE as of April 2012

Generation Projects

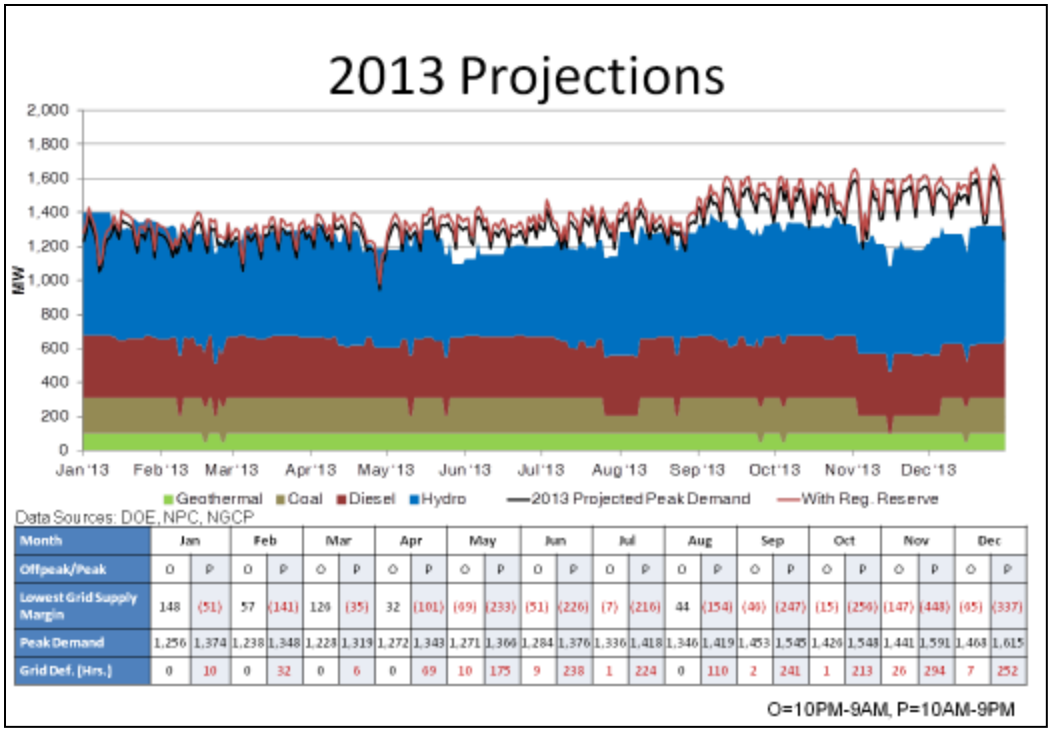
- Earliest major private sector initiated supply project to come on-stream only in late 2014



Data Source: DOE

*Indicative Projects

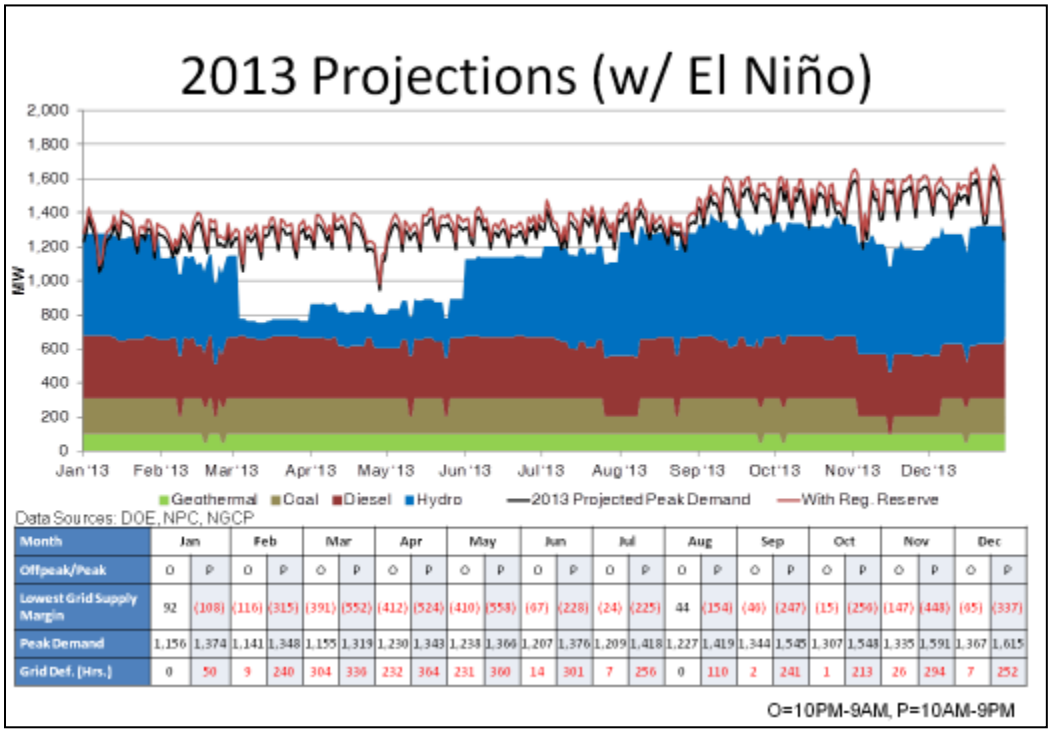
Mindanao Electricity Market



Data Sources: DOE, NPC, NGCP

Month	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
Offpeak/Peak	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P
Lowest Grid Supply Margin	148	(51)	57	(141)	126	(35)	32	(101)	(69)	(233)	(51)	(226)	(7)	(216)	44	(154)	(46)	(247)	(15)	(256)	(147)	(448)	(65)	(337)
Peak Demand	1,256	1,374	1,238	1,348	1,223	1,319	1,272	1,343	1,271	1,366	1,284	1,376	1,336	1,418	1,346	1,419	1,453	1,545	1,426	1,548	1,441	1,591	1,463	1,615
Grid Def. (Hrs.)	0	10	0	32	0	6	0	69	10	175	9	238	1	224	0	110	2	241	1	213	26	294	7	252

O=10PM-9AM, P=10AM-9PM



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Lowest Grid Supply Margin	92	(108)	(116)	(315)	(391)	(552)	(412)	(524)	(410)	(558)	(67)	(228)	(24)	(225)	44	(154)	(46)	(247)	(15)	(256)	(147)	(448)	(65)	(337)
Peak Demand	1,156	1,374	1,141	1,348	1,155	1,319	1,230	1,343	1,238	1,366	1,207	1,376	1,209	1,418	1,227	1,419	1,344	1,545	1,307	1,548	1,335	1,591	1,367	1,615
Grid Def. (Hrs.)	0	50	9	240	304	336	232	364	231	360	14	301	7	256	0	110	2	241	1	213	26	294	7	252

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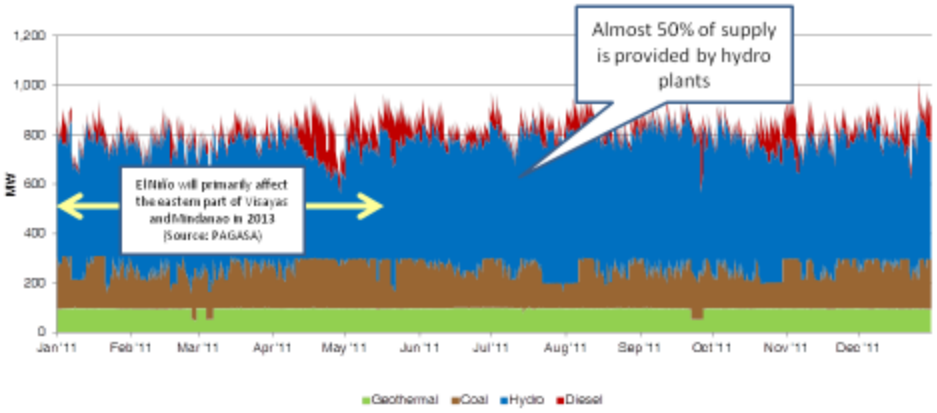
Historically, Mindanao is Hydro and Weather Dependent



Data Sources: NGCP

Potential Additional Supply Sources

Distribution Utility	Facility	2012 Dependable Capacity (MW)	Fuel Type
CEPALCO	MINERGY 1 &2	45	Diesel
	FGBPC	1.6	Hydro
	BUBUNAWAN	4.9	Hydro
	SOLAR PV	1	Solar
	CABULIG	8	Hydro
DLPC	SIBULAN	36	Hydro
	TALOMO	4.5	Hydro
	BAJADA DPP	48	Diesel
CLPC	COTABATO LIGHT	9.9	Diesel
FIBECO	Crystal Sugar	7	Biomass
	Total Embedded	**165.9**	
Various	Self-Generating Facilities within DU	183	ILD
	TOTAL	**348.9**	

*Majority of these supplies are already contracted and the system cannot access them despite being available

Source: DOE, PSALM

Potential Voluntary Load Curtailment Participants

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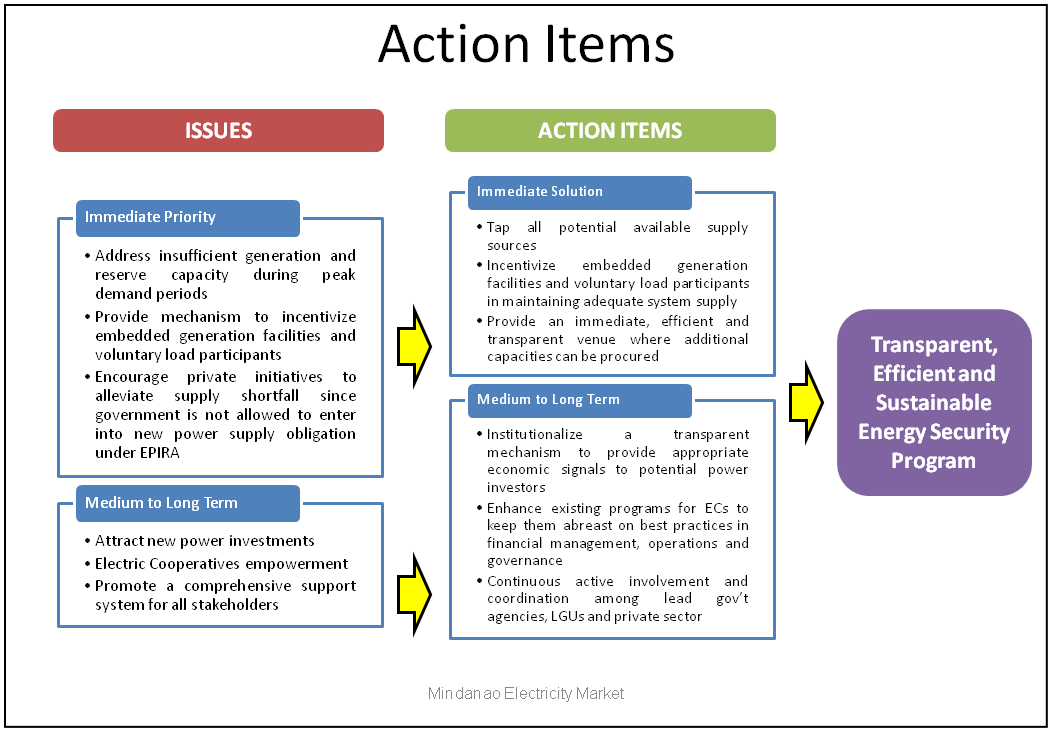
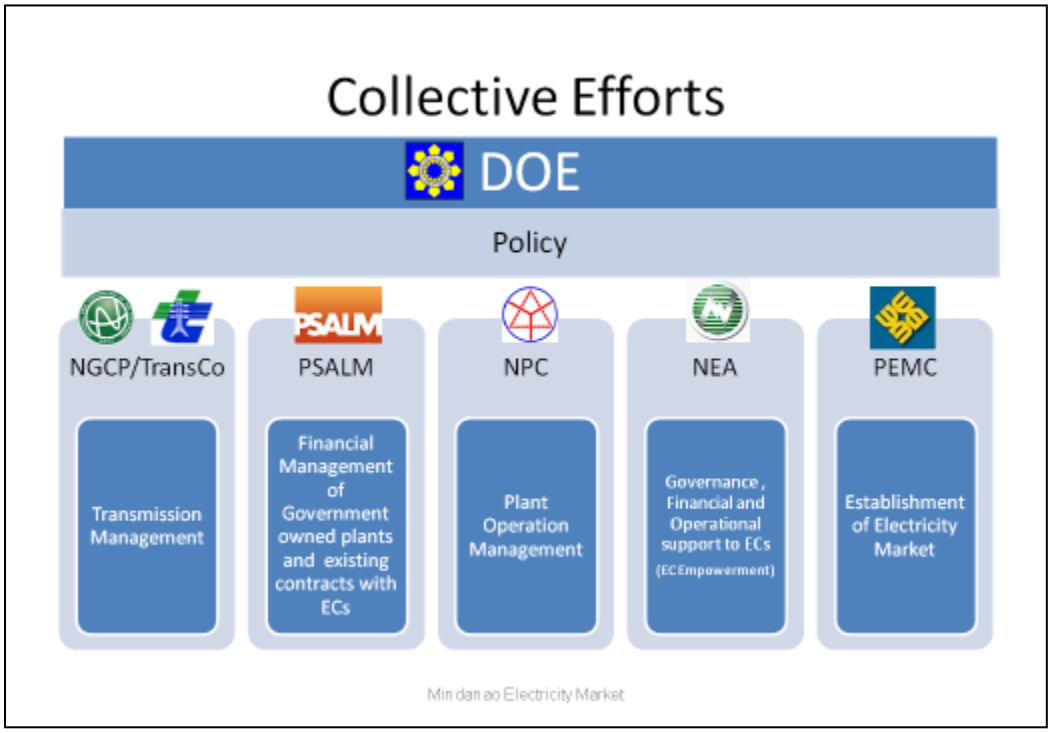

Action Items
ISSUES
ACTION ITEMS
Immediate Priority
• Address insufficient generation and reserve capacity during peak demand periods
• Provide mechanism to incentivize embedded generation facilities and voluntary load participants
• Encourage private initiatives to alleviate supply shortfall since government is not allowed to enter into new power supply obligation under EPIRA
Medium to Long Term
• Attract new power investments
• Electric Cooperatives empowerment
• Promote a comprehensive support system for all stakeholders
Immediate Solution
• Tap all potential available supply sources
• Incentivize embedded generation facilities and voluntary load participants in maintaining adequate system supply
• Provide an immediate, efficient and transparent venue where additional capacities can be procured
Medium to Long Term
• Institutionalize a transparent mechanism to provide appropriate economic signals to potential power investors
• Enhance existing programs for ECs to keep them abreast on best practices in financial management, operations and governance
• Continuous active involvement and coordination among lead gov't agencies, LGUs and private sector
Transparent, Efficient and Sustainable Energy Security Program
Mindanao Electricity Market


Collective Efforts
DOE
Policy
NGCP/TransCo
Transmission Management
PSALM
Financial Management of Government owned plants and existing contracts with ECs
NPC
Plant Operation Management
NEA
Governance, Financial and Operational support to ECs
(EC Empowerment)
PEMC
Establishment of Electricity Market
Mindanao Electricity Market

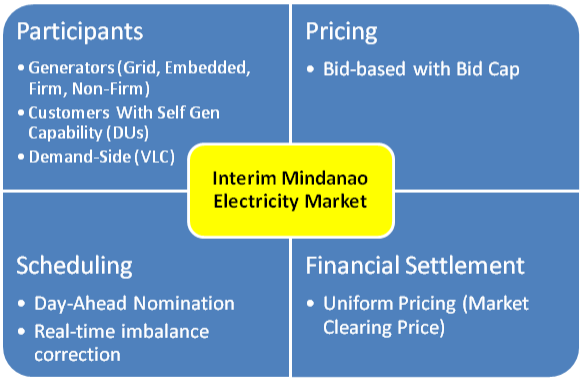
Considerations for Market Development

Address Immediate Power Shortage Issues	• Ease of set-up
Attract Power Investments	• Transparent and efficient venue to schedule and settle supply capacities
Sustainability	• Policies • Regulation • Stakeholder Education and Participation
Consumer Protection	• Establishment of Risk Mitigation Mechanisms

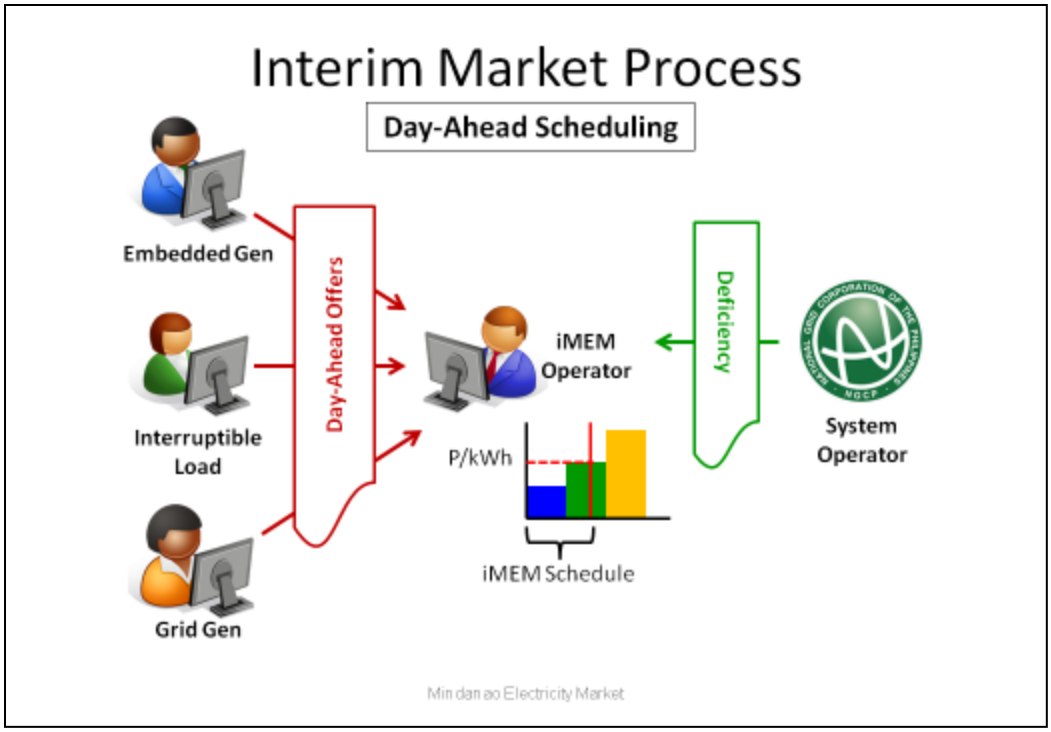
Mindanao Electricity Market

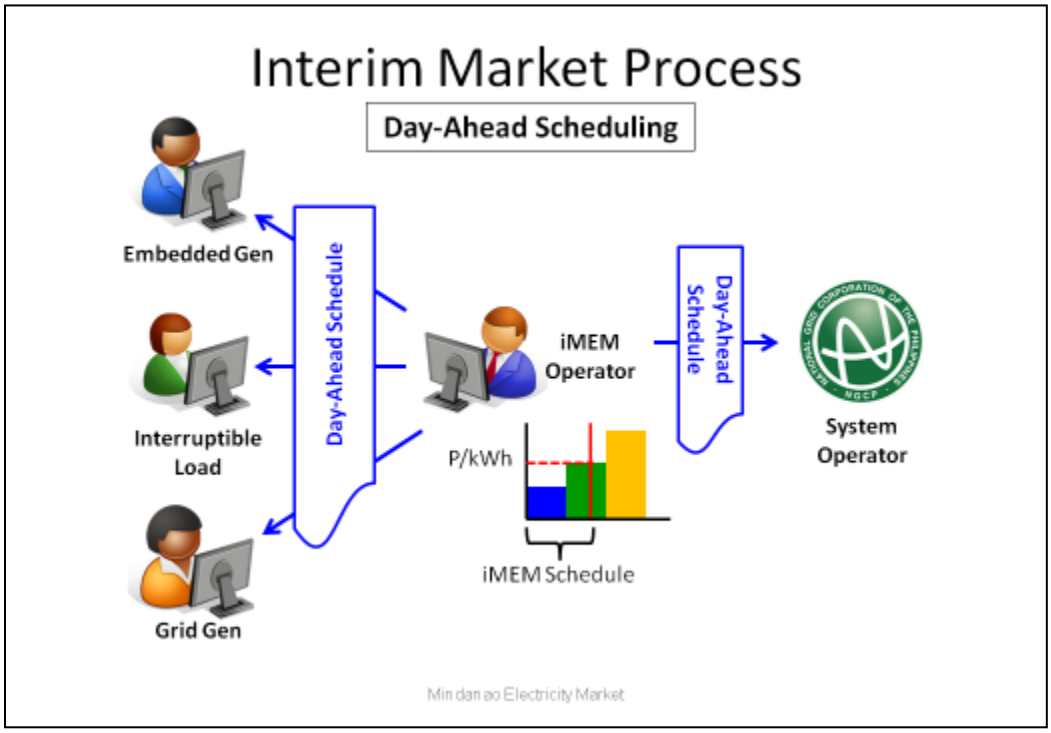
Interim Mindanao Electricity Market (IMEM) Design

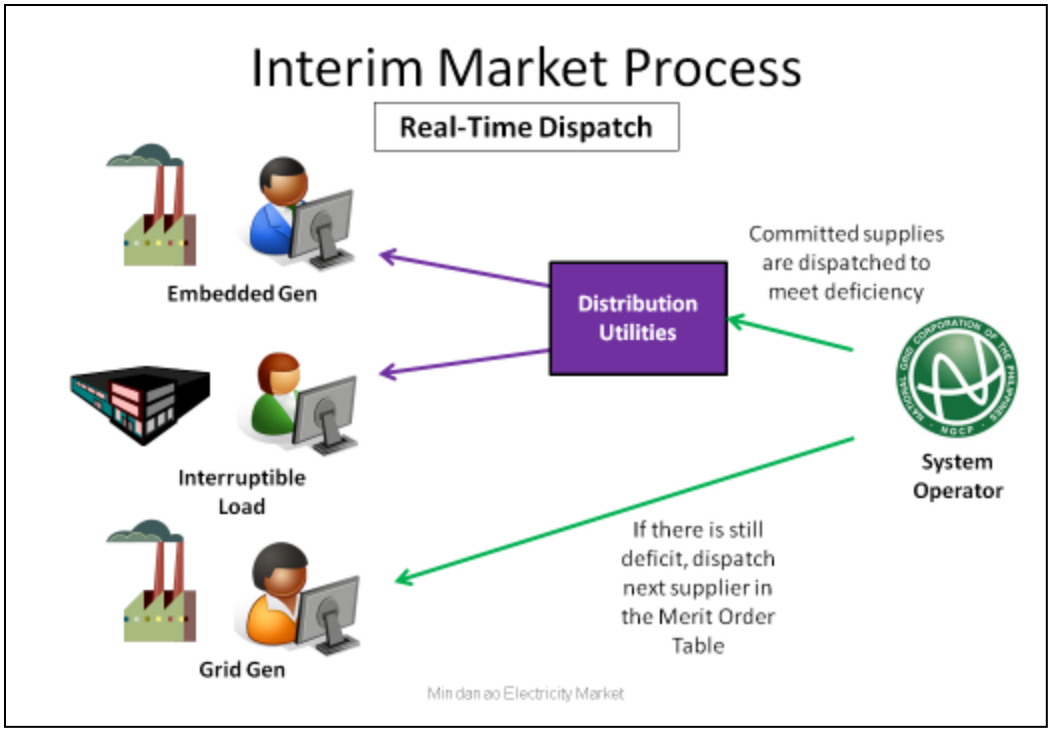
Goal: Provide an immediate venue for transparent and efficient utilization of additional capacities to address current Mindanao energy supply shortfall

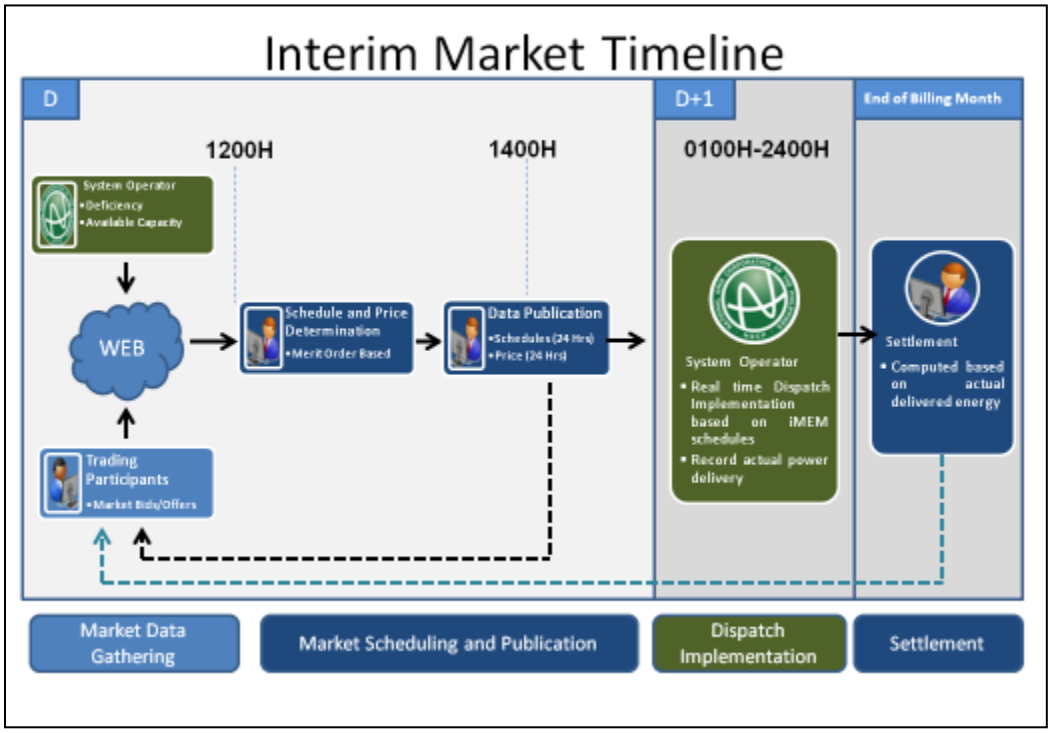


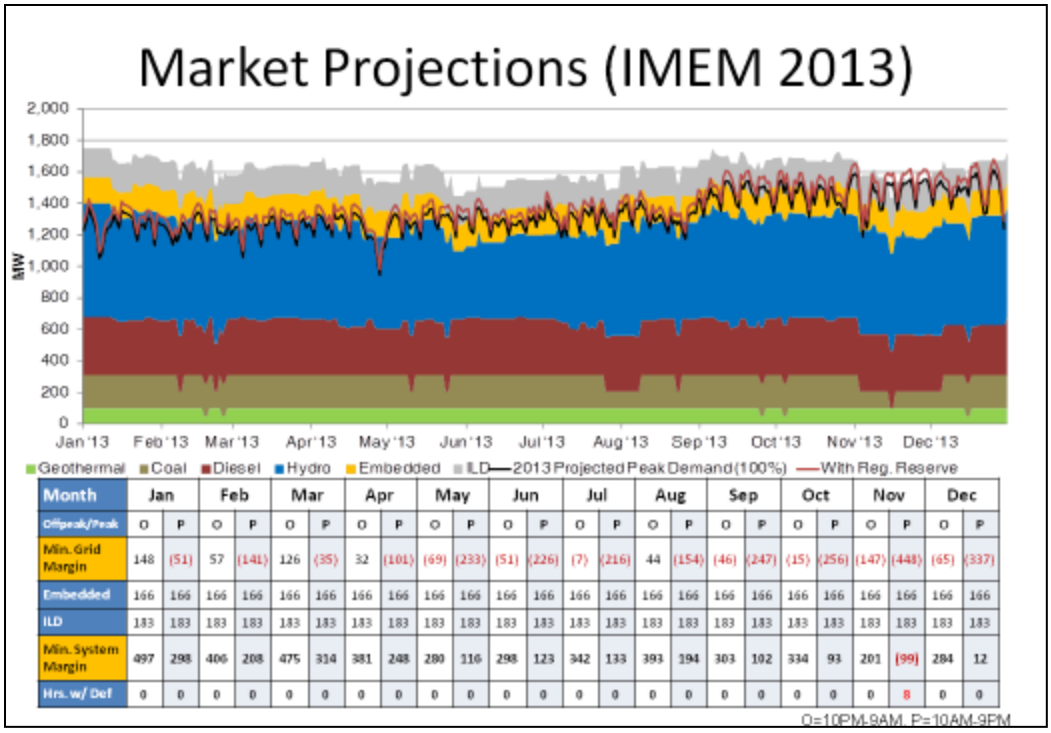
Mindanao Electricity Market


Interim Market Process
Day-Ahead Scheduling
Embedded Gen
Interruptible Load
Grid Gen
Day-Ahead Offers
iMEM Operator
Deficiency
System Operator
P/kWh
iMEM Schedule
Mindanao Electricity Market


Interim Market Process
Day-Ahead Scheduling
Embedded Gen
Interruptible Load
Grid Gen
Day-Ahead Schedule
iMEM Operator
Day-Ahead Schedule
System Operator
P/kWh
iMEM Schedule
Mindanao Electricity Market

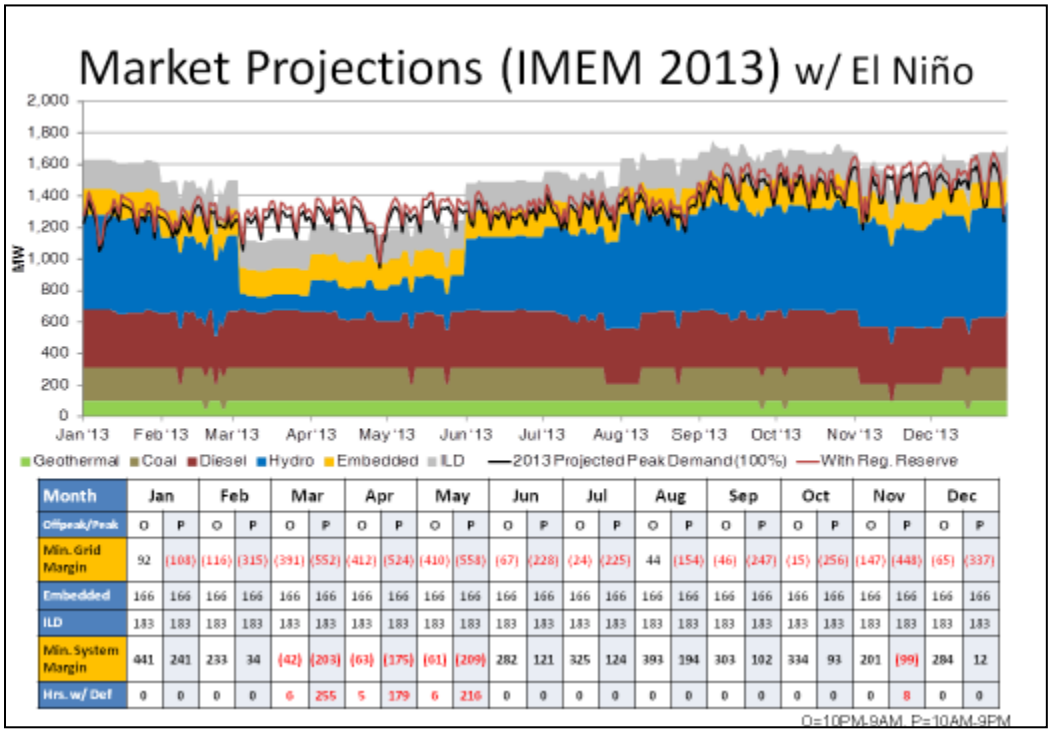

Interim Market Process
Real-Time Dispatch
Embedded Gen
Distribution Utilities
Committed supplies are dispatched to meet deficiency
Interruptible Load
System Operator
If there is still deficit, dispatch next supplier in the Merit Order Table
Grid Gen
Mindanao Electricity Market


Interim Market Timeline
D
D+1
End of Billing Month
1200H
1400H
0100H-2400H
System Operator
•Deficiency
•Available Capacity
WEB
Schedule and Price Determination
•Merit Order Based
Data Publication
•Schedules (24 Hrs)
•Price (24 Hrs)
System Operator
• Real time Dispatch Implementation based on IMEM schedules
• Record actual power delivery
Settlement
• Computed based on actual delivered energy
Trading Participants
•Market Bids/Offers
Market Data Gathering
Market Scheduling and Publication
Dispatch Implementation
Settlement



Month	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
Offpeak/Peak	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P
Min. Grid Margin	148	(51)	57	(141)	126	(35)	32	(101)	(69)	(233)	(51)	(226)	(7)	(216)	44	(154)	(46)	(247)	(15)	(256)	(147)	(448)	(65)	(337)
Embedded	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166
ILD	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183
Min. System Margin	497	298	406	208	475	314	381	248	280	116	298	123	342	133	393	194	303	102	334	93	201	(99)	284	12
Hrs. w/ Def	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0

O=10PM-9AM, P=10AM-9PM

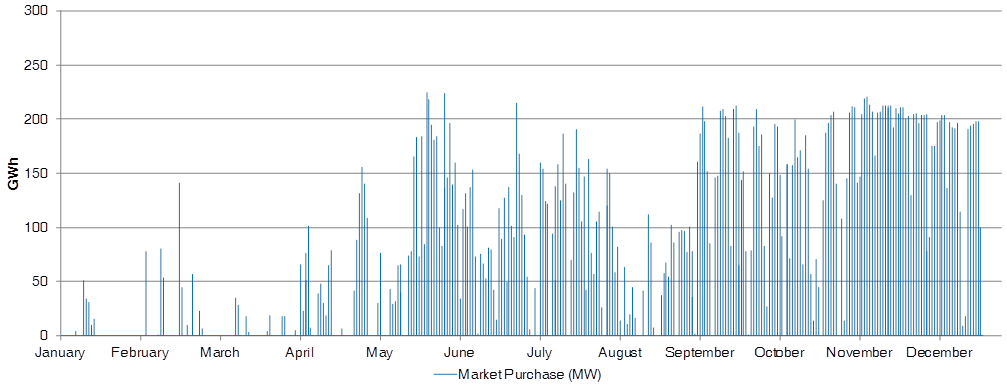


Month	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
Offpeak/Peak	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P	O	P
Min. Grid Margin	92	(108)	(116)	(315)	(391)	(552)	(412)	(524)	(410)	(558)	(67)	(228)	(24)	(225)	44	(154)	(46)	(247)	(15)	(256)	(147)	(448)	(65)	(337)
Embedded	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166
ILD	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183
Min. System Margin	441	241	233	34	(42)	(203)	(63)	(175)	(61)	(209)	282	121	325	124	393	194	303	102	334	93	201	(99)	284	12
Hrs. w/ Def	0	0	0	0	6	255	5	179	6	216	0	0	0	0	0	0	0	0	0	0	0	8	0	0

O=10PM-9AM, P=10AM-9PM

Market Projections (IMEM 2013)

- Market Purchase (GWh)

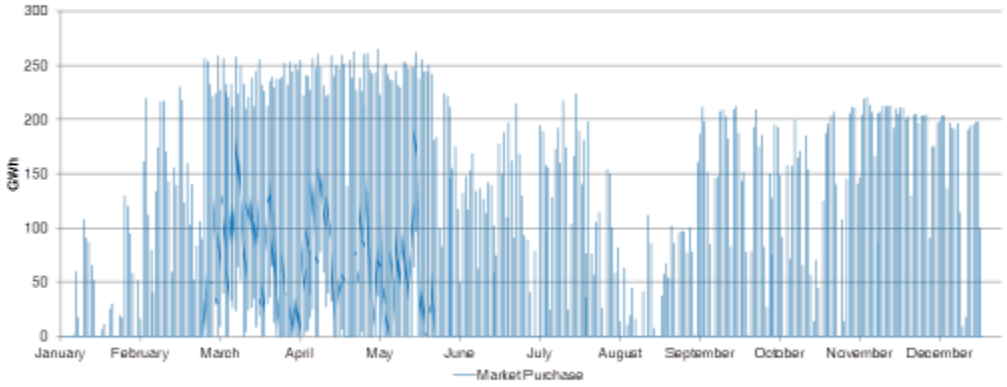


Total Projected Market Purchase for 2013 = 169,809.52 MWh*

*1.80% of Total Energy Requirements

Market Projections (IMEM 2013) w/ El Niño

- Market Purchase (GWh)

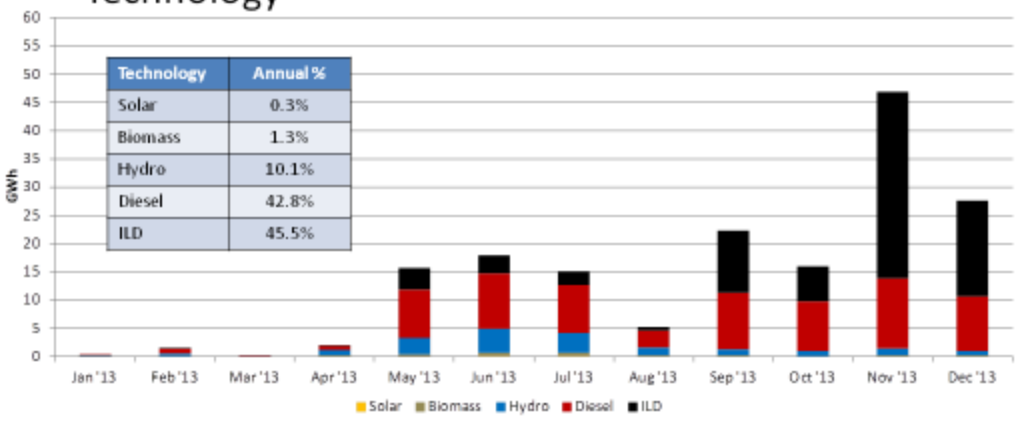


Total Projected Market Purchase for 2013 = 470,478.94 MWh*

*4.98% of Total Energy Requirements

Market Projections (IMEM 2013)

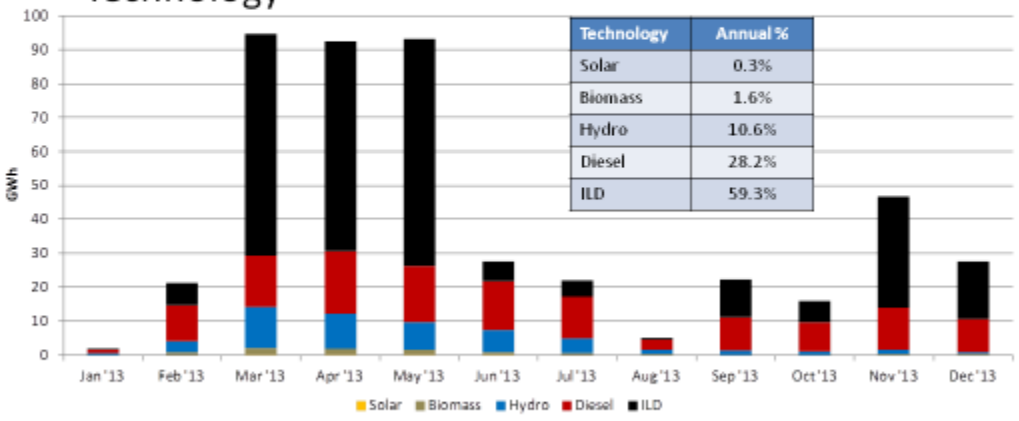
- Monthly Excess Capacity Sold to the IMEM per Technology



Technology	Annual %
Solar	0.3%
Biomass	1.3%
Hydro	10.1%
Diesel	42.8%
ILD	45.5%

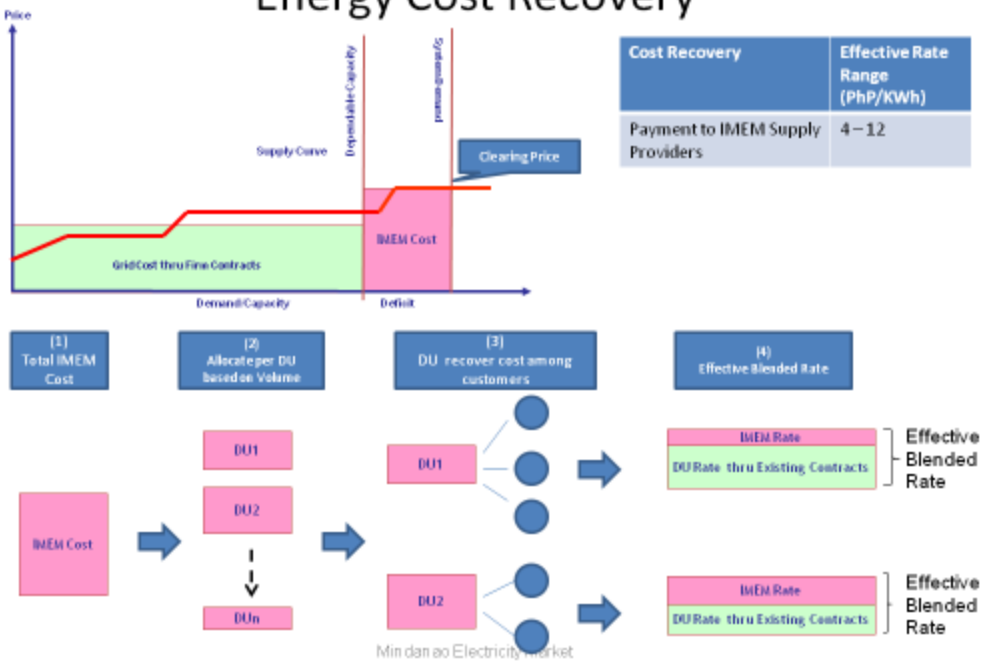
Market Projections (IMEM 2013) w/ El Niño

- Monthly Excess Capacity Sold to the IMEM per Technology



Technology	Annual %
Solar	0.3%
Biomass	1.6%
Hydro	10.6%
Diesel	28.2%
ILD	59.3%

Energy Cost Recovery



Cost Recovery	Effective Rate Range (PhP/KWh)
Payment to IMEM Supply Providers	4 – 12

Market Projections: Energy Cost Recovery (IMEM 2013)

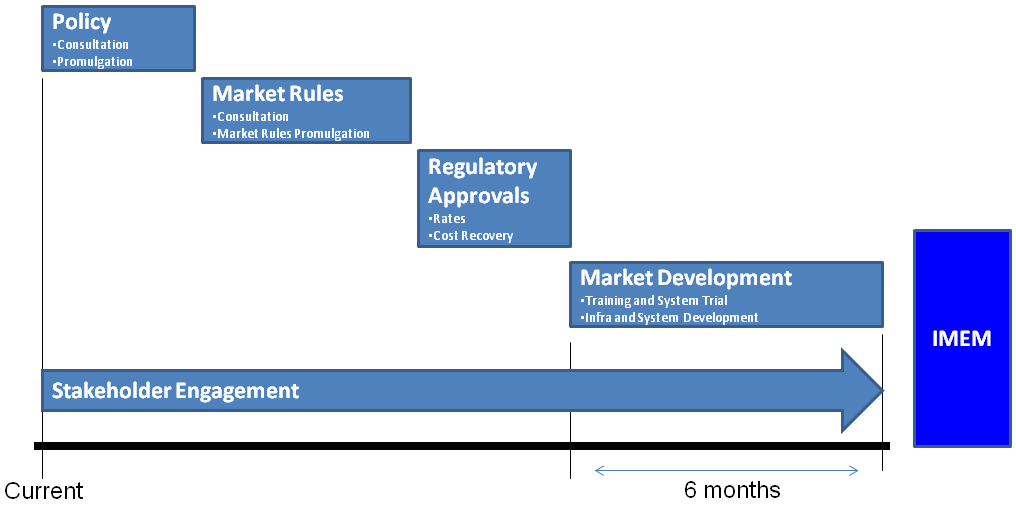
- Without El Nino

Parameter	Estimated IMEM Rate (2013)	
Recoverable to:	IMEM Participants	System-Wide (Gross Level)
IMEM Total Energy Cost	PhP 1,941.51 M	
Recoverable Consumption	169.810 GWh	9,379.229 GWh
Effective IMEM Energy Rate (PhP/KWh)	**0.004 – 0.897**	**0.207**

- With El Nino

Parameter	Estimated IMEM Rate (2013)	
Recoverable to:	IMEM Participants	System-Wide (Gross Level)
IMEM Total Energy Cost	PhP 6,850.33 M	
Recoverable Consumption	593.348 GWh	9,463.598 GWh
Effective IMEM Energy Rate (PhP/KWh)	**0.001 – 2.167**	**0.724**

Ways Forward



Mindanao Electricity Market

Thank You!

Mindanao Electricity Market