

THE PLN'S DEMAND SIDE MANAGEMENT PROGRAMS AND EXPERIENCES

Introduction of CFL and Disincentive Tariff for Clipping the Peak Load

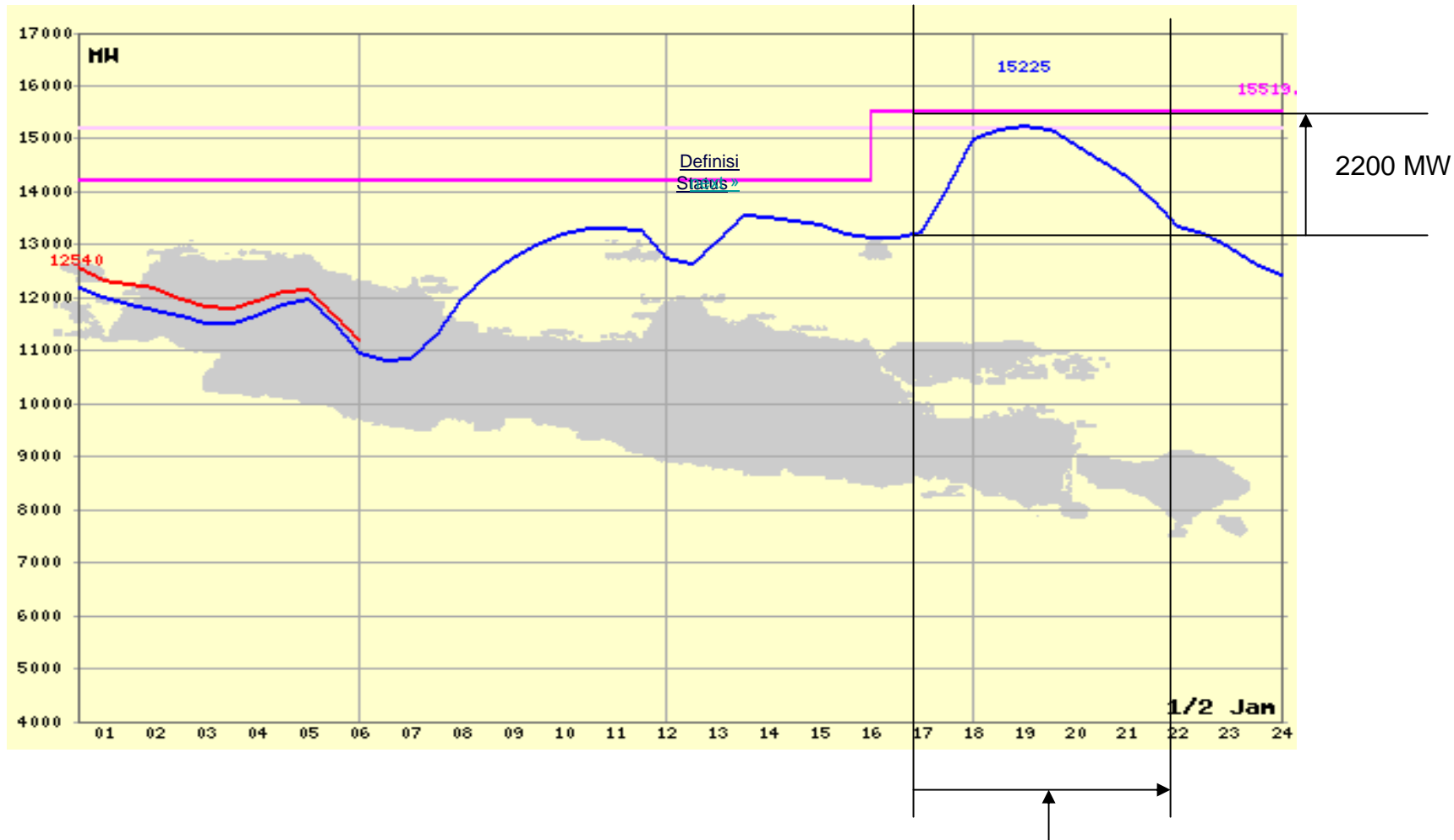
By

Syaiful B Ibrahim

Working Team of DSM Program

PT PLN (Persero) Head Office

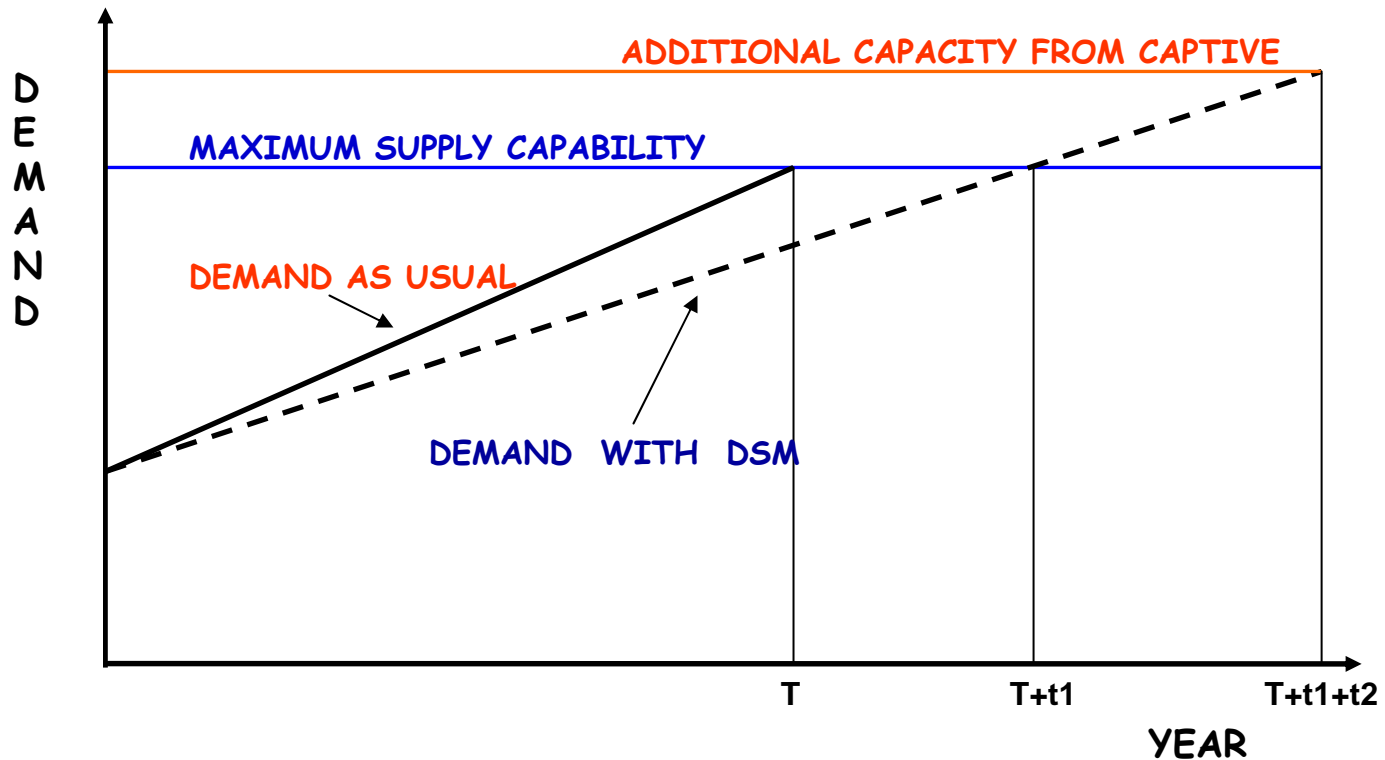
LOAD CHARACTERISTICS JAWA- BALI SYSTEM , 16 NOVEMBER 2007



At 5 PM to 10 PM The System Load Increased 2200 MW, become a driving factor for PLN have to implement DSM program all the years

Integrated Resource Planning (IRP)

PLN's Short term strategy for postpone the crisis



CHRONOLOGY

INTRODUCTION OF CFL AND DISINCENTIVE TARIFF FOR CLIPPING THE PEAK LOAD

- Since 2000, PLN was suffered for lack of power for fulfill the high growth of peak load demand caused by the residential sector.
- Even the macro economic condition of Indonesia in 1998 – 2000 was on recession, but the residential sector still growing due to the agriculture sector have an windfall profit from export.
- In the year 2002, the PLN's reserved margin become deteriorate, some Region has experience of scheduled outage and the mostly planned new power plant was postponed.
- In the year 2002, the DSM working Team was established and release the Integrated Resource Plan (IRP) action plan with the priority program for clipping the peak load and purchase the electricity from the “Captive Power”
- Since the year 2002, PLN introduces the program called “ DSM Terang” with aims for introducing the CFL replacing incandescent lamp and influenced the retail price of CFL down to willingness price of residential sector

CHRONOLOGY (CONT)

- On the year 2002 – 2003 , the DSM Terang Program implemented, PLN with five CFL producers (Phillips, GE, Osram, Panasonic and Chiyoda) sell almost 1 million CFL through the PLN's payment point with factory price almost 50 % lower than market price.
- On the year 2004, the other program was released called DSM Peduli, it is introducing CFL for lower income customers, by given an discount to every CFL purchase.
- On the year 2005, PLN released the disincentive tariff for Big Commercial and Industry customer, for force down their demand on peak load period.
- On the year 2007, PLN introduce the program called CFL Donation, it is program for give free three CFL for 17 Million lower income customer.

PLN's IRP STRATEGY FOR ALLEVIATE THE GAP

INTRODUCTION OF DEMAND SIDE MANAGEMENT PROGRAM

- CFL uses on Residential sector for clipping the peak demand
- Energy audit for industrial and commercial sector for energy conservation program
- Labeling household energy appliances
- Interruptible and Curtail able incentive

IMPLEMENTATION SUPPLY SIDE MANAGEMENT

- Power purchases during peak hours
- Increase the power supply availability

IMPLEMENTATION OF PLN's DSM PROGRAM 2002 - 2007

I. PRIORITY PROGRAM

1. POWER PURCHASE IN CRISIS AREA

Purchasing energy on Peak Hours, have been transacted on :

- Java, Kalimantan, Sumatra total power purchase 165 MW

2. HIGH EFFICIENCY LIGHTING RESIDENTIAL & STREET LIGHTING

DSM Program" Terang and Peduli", CFL sold throughout PLN's payment point during 2002- 2003 is 1 057 142.

3. CFL SALE FOR POOR CUSTOMER

Program for selling CFL by installment on 10 location

IMPLEMENTATION OF PLN's DSM PROGRAM 2002 - 2007

II. ADVANCE PROGRAM

1. ENERGY AUDIT INDUSTRY & COMMERCIAL SECTOR

Supporting the Government program of "alliance on energy conservation" have been audited 5 Electricity intensity industries in 2004 and 3 industries in Makassar on 2005, 8 Multi stories commercial building and 6 more in 2005

2. LABELING HOUSEHOLDS ELECTRICAL APPLIANCES

5 kinds household appliances have been energy performance test, such as CFL, refrigerator, AC, Fan and water pump

3. TOU & IC TARRIFS IMPLEMENTATION

The PLN's have publish Board Circular for promoting Industry and big commercial customers using energy during off peak periods and disincentive on peak period

Evaluation of DSM Program

- Evaluation of DSM Program “ Terang and Peduli “ - the campaign of replacing Incandescent Lamps to Compact Fluorescent Lamps – the impacts to :
 - 1. **Switching of lighting appliances for PLN’s customer**
 - 2. **Peak Load Reshaping for Jawa – Bali system**

1. Switching the appliances Incandescent lamp to CFL

The CFL Survey Result 2002

	>450 VA Customers	450 VA Customers
Penetration rate	78%	50-65%
CFL/house hold	2.6-6.6 unit	1.1-1.7 unit
CFL wattage	>12	7-9

Source of data: Price Water House & PLN Survey, March 2002

1. Switching the appliances, Incandescent lamp to CFL

- **CFL IMPORTED**

YEAR	UNIT	PLN's DSM PROGRAMS
2001	9 971 364	PLN's DSM Program not yet started
2002	23 767 133	DSM Program Terang and Peduli, launched for introducing CFL
2003	35 995 883	DSM Program Terang and Peduli already implemented on all Unit of PLN
2004	48 129 751	Continue the Programs
2005	64 128 301	Continue the programs
2006	56 944 223	Focus on promoting through Media
2007	71 780 000	Continue the programs

Sources : BPS, import by commodity

The PLN's DSM Program has caused the significant import of CFL

2. Evaluation of DSM Program on Jawa-Bali Peak Load Reshaping

YEAR	PEAK LOAD (MW)	INCREASE (%)	ENERGY SALES (GWH)	INCREASE (%)
2001	12 577		67 928	
2002	13 374	6.3	69 960	3.0
2003	13 682	2.3	72 190	3.2
2004	14 323	4.6	79 793	10.5
2005	14 821	3.5	85 409	7.7
2006	15 399	3.9	89 043	4.25

Noted : Net peak load

The growth of peak load since 2003 are smaller compare to the growth of energy sales , its caused improvement of load factor

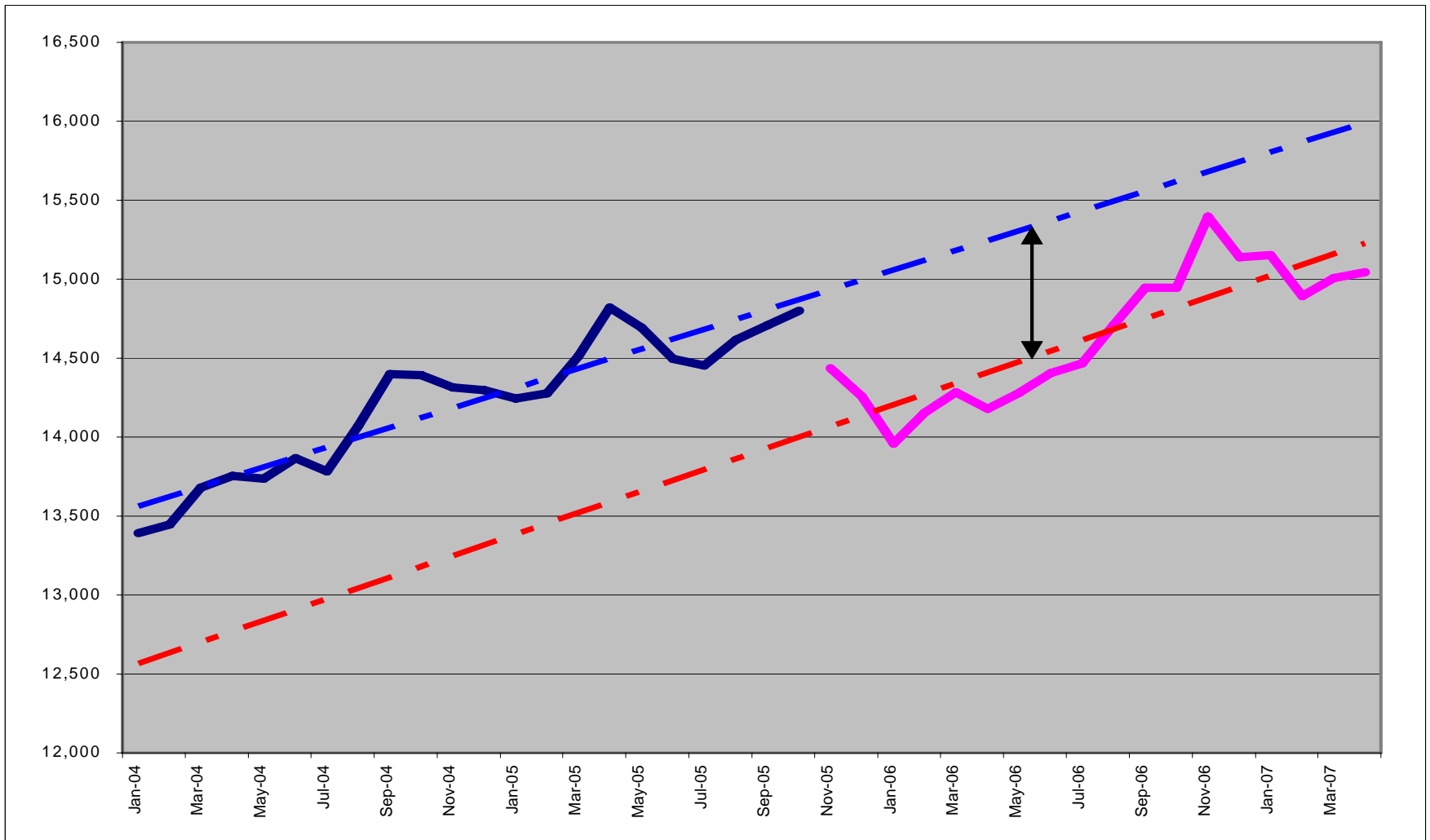
LOAD MANAGEMENT PROGRAM DISINCENTIVE TARIFF

- **Two Approach for Regulation load**
 1. Increasing the multiplier (K) factor of electrical price on the peak hours, from the beginning $K = 1.4$ to $K = 2$.

The limitation on power (VA) using during peak hours has been limited to maximally 50% from the connected power in compliance with the contract
 2. Limiting the power usage (kVA) and Energy (kWh) on peak hours for the big Commercial and Industrial customers
The limitation on energy (kWh) using has been limited to maximally 50% from the average using of the last 6 months.
- **The Price Penalty for both is maximum two times regular price**

Impact of the Disincentive Tariff

Load growth reducing for about 700 MW and the demand growth delayed for the period of 14 months.



Lesson Learned

- 1. The DSM program “Terang and Peduli” have been successful for introduce the uses of CFL on society and decreasing the retail price by the vendor also has pushed the market volume
- 2. The CFL market is growing fast , its reflected on import figure of cfl ; cfl imported on 2002, 2.5 times compare to 2001 and on the year 2006, 6 times compare to 2001.
- 3. Estimation figure for peak load reduction on the year 2004 at Jawa Bali system in the range 192 MW to 184 MW.
- 4. The disincentive tariff also has successful force down the Peak load demanded by big customers around 700 MW in the year 2005

THE CFL DONATION PROGRAM

- **OBJECTIVE**

The 8 Watt CFL Donation Program in the amount of 51,156,329 pieces to 17 Million household customers is intended to i.a :

1. Cutting back on peak load in the amount of 1,600 MW in the entire Indonesia.
2. Reduction of electricity production in the amount of 1,250 GWh in 2008 and 2,458 GWh in 2009.
3. Reduction of oil fuel consumption in the amount of 405,000 KI in 2008 and 811,000 KI in 2009, or reduction in fuel oil cost in the amount of Rp 4,8 Trillion (\$ 4.8 Million) in 2009.
4. Obtain reduction of CO₂ produced by oil generated power plant (base line of reduction for CO₂ produced by oil generator = 0.9 Kg CO₂ for 1 kWh) in 2009 in the amount of 2.2 Million Tons of CO₂.

- **SCOPES OF PROGRAM**

- Procuring 51,156,329 CFLs wattage 8 Watt bearing the mark *Lampu PLN* (PLN Lamp), with one year warranty and met all technical requirements for replacing 40 Watt incandescent lamps.
- Distributing the CFLs to 17 Million PLN customers in 21 Distribution/ PLN Areas in the entire Indonesia.
- Monitoring the reduction of electricity power and energy in order to meet the CO2 reduction claim.
- Socialization of the entire program to stakeholders.

FINANCIAL FEASIBILITY

- The cost for procuring and distribution of 8 Watt ESL in the amount of 51,156,329 is 921 Billion Rp (USD 100 Million).
- The electricity generation that may be saved assuming that the hourly use of a lamp is 1,350 hours per year and network loss of 12 % is $1600 \text{ MW} \times 1,350 \text{ h/y} \times (1/0.88) = 2,458 \text{ GWh}$
- Annual fuel oil consumption that may be conserved with SFC 0.33 l/kWh = 0.811 Million liters.
- Fuel oil cost that may be saved Rp 4.8 Trillion (USD 500 Million).
- The loss of income from the sale of electricity, with the average selling price to the household customer of Rp 460/kWh is $1600 \text{ MW} \times 1350 \text{ h/y} \times \text{Rp } 460 /\text{kWh} = \text{Rp } 993 \text{ Billion (USD 100 Million)}$
- The benefit of the ESL program is the Conservation of fuel oil – the Costs of procurement of ESL – Loss of income from sale is in the amount of
- $\text{Rp } 4,800 \text{ Billion} - \text{Rp } 921 \text{ Billion} - \text{Rp } 933 \text{ Billion} = \text{Rp } 2,946 \text{ Billion (USD 300 Million)}$
- $\text{BCR} = \text{Rp } 2,946 \text{ Billion} / \text{Rp } 921 \text{ Billion} \times 100 \% = 319 \%$

Thank you...

Terima kasih



ELECTRICITY FOR A BETTER LIVE