PLN STATISTICS
2011
Preface

PLN Statistics 2011 contains information on performances of PT PLN (Persero) and its Subsidiary Companies for Calendar Year 2011 as well as the preceding years.

Data are presented in the form of tables with a breakdown for each Province within PLN’s Regional and Distribution Offices.

This book is divided into three parts:

- The first part begins with explanations on formulas, abbreviations and definitions followed by PLN’s performance for Calendar Year 2011.
- The second part contains data for nine consecutive years up to Calendar Year 2011.
- The third part contains data for the end of Five Years Development Plan (REPELITA) I to the end of Year 2011.

Graphics are included to highlight important information.

Constructive comments and feedback are expected for the improvement of the presentation, and will be incorporated in the next publication.

Jakarta, May 2011

PT PLN (Persero)
1. Generation

Installed Capacity

At the end of December 2011 PT PLN (Persero) and Subsidiary Companies owned and operated about 5,269 generating units with total installed capacity of 29,268.16 MW, of which 22,513.61 MW (76.9%) was installed in Java. The total installed capacity was up 8.82% from December 2010. The total generating plant capacity broken down by type of power plant as follows: Steam Turbine 12,053 MW (41.2%), Combined Cycle 7,834 MW (26.8%), Diesel 2,569 MW (8.8%), Hydro 3,511 MW (12%), Gas Turbine 2,839 MW (9.7%), and Geothermal 435 MW (1.5%).

Peak Load

The system peak load for the calendar year 2011 (CY 2011) was 26,664.56 MW, increased 7.01% over the previous year. The peak load for the Java Bali system was 19,739 MW. This was up 9.06%, over the previous year.

Energy Production and Purchase

The own energy production (included rented) throughout the CY 2011 was 142,739.06 GWh, up 8.4% over the previous year. Of the energy production, 47.4% was produced by PT PLN (Persero) Holding, and 52.6% came from Subsidiary Companies, i.e. PT Indonesia Power, PT PJB, PT PLN Batam and PT PLN Tarakan. Of this energy production 32,138.47 GWh (24.3%) was produced by natural gas, 54,950.57 GWh (41.5%) was produced by coal fired, 41,846.27 GWh (31.6%) was produced by oil, 10,315.55 GWh (7.8%) was produced by hydro and 3,487.39 GWh (2.6%) came from geothermal. The share of oil, coal and geothermal used for electricity production increased over the previous year, while natural gas constant relatively and hydro was decreased.

The total production (including purchase from utilities outside PLN) during the CY 2011 was 183,420.93 GWh, an increase of 13,634.70 GWh or 8.03% over the previous year. Of this energy production, the energy purchased from other utilities outside PLN amounted 40,681.87 GWh (22.2%). This was increased by 2,605.71 GWh or 6.8% over the previous year. From the total energy purchased, the greater part were 9,415 GWh (23.1%) from PT Paiton Energy Company and 8,162 GWh (20%) from PT Jawa Power.

2. Transmission and Distribution

At the end of CY 2011, the total of transmission lines was 36,719.74 kmc, of which about 5,052.00 kmc was 500 kV, 1,028.30 kmc was 275 kV, 26,170.79 kmc was 150 kV, 4,456.69 kmc was 70 kV and 11.96 kmc was 25 and 30 kV transmission levels. The total length of distribution lines amounted to 679,424.30 kmc of which about 288,719.36 kmc was medium voltages lines (20 kV, 12 kV, 6-7 kV distribution networks) and 390,704.94 kmc was low voltage lines (220/380 V).

Total capacity of substation transformers operated was 71,615 MVA, increased by 8.4% over the previous year. The total substation transformers was 1,233 unit. This consisted of 47 substation transformers with 500 kV system, 7 substation transformers with 275 kV system, 980 substation transformers with 150 kV system, 196 substation transformers with 70 kV system and 3 substation transformers with < 30 kV system.

Total capacity of distribution substation transformers increased by 10% to be 39,277 MVA and the total substation transformers increased by 7% to be 318,431 unit.
3. Energy Sales

PLN’s total energy during the CY 2011 was 157,992.66 GWh, up 7.3% from the previous year. Among groups of customers, energy sold to Residential was the major share, consuming 65,111.57 GWh (41%) followed by Industry 54,725.82 GWh (35%), Commercial 28,307.21 GWh (18%), and Others (social, government office building, and public street lighting) 9,848.06 GWh (6%). Energy sold to Industry, Residential, Commercial and others group of customers increased by 7%, 9%, 4% and 6% over the previous year.

Total number of customers was 45,895,145 at the end of December 2011. This was up 8% from the end of December 2010. PLN’s average power rate per kWh throughout the CY 2011 was 714.24 Rp/kWh, was increased compared to the previous year of 699.09 Rp/kWh.

4. Energy Losses

During the CY 2011, energy losses were 9.41%, consisting of 2.25% transmission losses and 7.34% distribution losses. This was better than the previous year of 9.70%.

5. Electrification Ratio

With the growth of total number of residential customers from 39,324,520 at the end of CY 2010 to 45,829,980 at the end of 2011, the electrification ratio reached around 71.23%*) at the end of 2011.

Note: *) The electrification ratio is the correction of the Indonesian version of PLN Statistics Book.

6. Financial

In CY 2011 total operation revenues reached Rp 208,017,823 million out of which electric revenues came to Rp 112,844,853 million (54%), government subsidy Rp 93,177,740 million (45%) and other operation revenues Rp 1,995,230 million (1%). Total operation cost amounted Rp 193,397,299 million, while the operation profit came to Rp 14,620,524 million, a significant increase over the previous year that operation profit amounted to Rp 13,267,223 million. The total asset amounted to approximately Rp 426,518,863 million, increased by 16% from the previous year.

7. Human Resources

By the end of December 2011, the total number of PLN employees (excluding Head Office, Services and Projects) was 43,464 employee. Employee productivity in the year 2011 was amounted to 3,635 MWh per employee and 1,056 customers per employee, an increase over CY 2010 that amounted to 3,440 MWh per employee and 991 customers per employee.
1. The formulas used in this book are defined as follows.

1.1. The capacity factor *)

\[
\frac{\sum \text{kWh gross production annually}}{\sum \text{kW installed capacity} \times 8,760 \text{ hours}} \times 100 \%
\]

**kWh gross production** is the energy (kWh) generated by the generator before deducting the energy used for own purpose (for auxiliary equipment, station lighting, etc.) or the production of electric energy measured at the generator terminal.

**Installed capacity** is the capacity of one generating unit as written on the generator name plate or on the prime mover, which of both is the smaller. Particularly for Gas Turbine Power Plants, the installed capacity is as written on the name plate based on the base-load and not on the peak-load.

1.2. Load factor *)

\[
\frac{\sum \text{kWh total production annually}}{\sum \text{kW peak load} \times 8,760 \text{ hours}} \times 100 \%
\]

**kWh total production** is the total kWh produced by the generator of the PLN unit in question plus the kWh received from the other PLN units plus the kWh purchased from outside PLN (if any).

**Peak Load** is the highest load over reached by each system in the calendar year in question.

1.3. Demand Factor

\[
\frac{\sum \text{kW peak load}}{\sum \text{kVA connected} \times \cos \varphi} \times 100 \%
\]

\[\cos \varphi = 0,8\]

*) Circular Letter of the PLN BOD No. 006/PST/88
1.4. *Energy Losses*

\[
\frac{\sum \text{kWh transmission losses} + \sum \text{kWh distribution losses}}{\sum \text{kWh netto production}} \times 100 \%
\]

**kWh netto production** is the energy (kWh) generated by the generator, plus the energy (kWh) received from the other PLN Unit, plus the energy (kWh) purchased from outside PLN and rented (if any), minus the energy (kWh) used for central own purpose.

**kWh transmission losses** is kWh netto production, minus the energy (kWh) used for substation transformer own purpose, minus the energy (kWh) sent to other PLN Unit and outside PLN, minus the energy (kWh) sent to Distribution.

**kWh distribution losses** is the energy (kWh) sent to Distribution, minus the energy (kWh) used for distribution substation transformer own purpose, minus the energy (kWh) sold.

1.5. **SAIDI (System Average Interruption Duration Index)**

\[
\frac{\sum (\text{Duration of customers who are blackout} \times \text{Number of customers who are blackout})}{\text{Number of customers}}
\]

1.6. **SAIFI (System Average Interruption Frequency Index)**

\[
\frac{\sum (\text{Number of customers who are blackout})}{\text{Number of customers}}
\]

**) Blackout at distribution lines which are experienced by customers, due to interruption or maintenance at generation as well as transmission lines (Circular of the PLN BOD. SE Direksi PLN No. SE.031.E/471/PST/1993).

1.7. **SOD (System Outage Duration)**: Interruption duration which cause blackout

\[
\frac{\text{Interruption duration which cause blackout}}{100 \text{ kmc transmission lines}}
\]

**SOD (System Outage Duration)** is a performance indicator of outage duration which cause blackout at services point of transmission lines, measured with hours per 100 kmc.
1.8. SOF (System Outage Frequency) : Number of interruption which cause blackout

100 kmc transmission lines

**SOF (System Outage Frequency)** is a performance indicator of outage number which cause blackout at services point of transmission lines, measured with times per 100 kmc.

2. Data grouping

2.1. Data on generation

In the data on Hydro (Hydro Power Plant/HPP) have been included the data on Mini/micro Hydro Power Plant (MHPP), i.e. hydro power plants with a generating capacity of 1,000 kW and less (Circular letter No. 006/PST/88).

2.2. Data on customers by tariff category

2.2.1. By type of customers

- **Residential** group : i.e. the total of tariff categories S-1, R-1, R-2, and R-3.
- **Business** group : i.e. the total of tariff categories B-1, B-2, B-3, T, C and M.
- **Industrial** group : i.e. the total of tariff categories I-1, I-2, I-3, and I-4.
- **Social** group : i.e. total of tariff categories S-2, and S-3.
- **Government office building** group : i.e. the total of tariff categories P-1 and P-2.
- **Public street lighting** group : i.e. tariff categories P-3.

2.2.2. By type of voltage

- **Low Voltage** is total of tariff categories S-1, S-2, R-1, R-2, R-3, B-1, B-2, I-1, I-2, P-1 and P-3.
- **Medium Voltage** is total of tariff categories S-3, B-3, I-3, P-2, Traction (T) and C (Bulk).
- **High Voltage** is tariff categories I-4.
- **Multipurpose** is multipurpose tariff just for special electric power consumer with special demand of quality which could not be included to S, R, B, I, P, T (Traction) and C (Bulk) Category.
3. Energy Sold

The energy sold to customer is the energy (kWh) sold to HV (high voltage), MV (medium voltage) and LV (low voltage) customers according to the total kWh, for which the bill is made (TUL III-09).

4. Data status

The year 2011 means one calendar year as from 1 January 2011 to 31 December 2011.

5. Abbreviations

<table>
<thead>
<tr>
<th>Term</th>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydro</td>
<td>Hydro Power Plant</td>
<td>MMBTU $: 10^6$ British Thermal Unit (MM=10^6)</td>
</tr>
<tr>
<td>Steam</td>
<td>Steam Power Plant</td>
<td>HSD : High Speed Diesel Oil</td>
</tr>
<tr>
<td>Gas Turbine</td>
<td>Gas Turbine Power Plant</td>
<td>IDO : Intermediate Diesel Oil</td>
</tr>
<tr>
<td>Combined Cycle</td>
<td>Combined Cycle Power Plant</td>
<td>MFO : Marine Fuel Oil</td>
</tr>
<tr>
<td>Diesel</td>
<td>Diesel Power Plant</td>
<td>SAIDI : System Average Interruption Duration Index</td>
</tr>
<tr>
<td>Geothermal</td>
<td>Geothermal Power Plant</td>
<td>SAIFI : System Average Interruption Frequency Index</td>
</tr>
<tr>
<td>Gas Machine</td>
<td>Gas Machine Power Plant</td>
<td></td>
</tr>
<tr>
<td>VA</td>
<td>volt-ampere</td>
<td>Dist. : Distribution</td>
</tr>
<tr>
<td>MVA</td>
<td>mega-volt-ampere</td>
<td>G &amp; T : Generation &amp; Transmission</td>
</tr>
<tr>
<td>kW</td>
<td>kilowatt</td>
<td>Gov. Office Building</td>
</tr>
<tr>
<td>MW</td>
<td>megawatt</td>
<td>Publ. Street : Public Street Lighting</td>
</tr>
<tr>
<td>kWh</td>
<td>kilowatt-hour</td>
<td>PJB : Java Bali Generation Company</td>
</tr>
<tr>
<td>MWh</td>
<td>megawatt-hour</td>
<td>P3B : Transmission and Control Centre</td>
</tr>
<tr>
<td>GWh</td>
<td>gigawatt-hour</td>
<td>SOD : System Outage Duration</td>
</tr>
<tr>
<td>kmc</td>
<td>kilometer of circuit</td>
<td>SOF : System Outage Frequency</td>
</tr>
<tr>
<td>MSCF</td>
<td>$10^3$ Standard Cubic Foot (M=10^3)</td>
<td></td>
</tr>
<tr>
<td>MMSCF</td>
<td>$10^6$ Standard Cubic Foot (MM=10^6)</td>
<td></td>
</tr>
</tbody>
</table>

Explanation

MMBTU : $10^6$ British Thermal Unit (MM=10^6)

Dist. : Distribution

G & T : Generation & Transmission

Gov. Office Building : Government Office Building

Publ. Street : Public Street Lighting

PJB : Java Bali Generation Company

P3B : Transmission and Control Centre

SOD : System Outage Duration

SOF : System Outage Frequency

n.a : not available
**British Thermal Unit (BTU)** is the amount of heat needed to raise 1 pound of water with 1 degree Fahrenheit at a temperature of 60 degree Fahrenheit at an absolute pressure of 14.7 pound per square inch.

**Standard Cubic Foot (SCF)** is the amount of gas needed to fill a space of 1 cubic Foot with an absolute pressure of 14.7 pound per square inch at temperature of 60 degree Fahrenheit in a dry condition.

**1000 BTU Gas** is Gas having a Gross Heating Value of 1,000 BTU per SCF.

**Gross Heating Value** is the amount of heat expressed in BTU units resulting from the combustion of 1 standard cubic foot of gas, at temperature of 60 degrees Fahrenheit and absolute pressure of 14.7 pounds per square inch, with air at the same temperature and pressure as the gas and after cooling of the combustion result at the initial temperature of the gas and air, the vapour formed in the combustion process is condensed in liquid form.
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