

# 

# Annual Report 2015

### **Chairman's Statement**



On behalf of the Board of Directors, I would like to express sincere appreciation to EDC for bringing out its Annual Report for the year 2015. We are proud and appreciated achievements of EDC during 2015 and we strongly believe that EDC is moving towards

its goal and vision to be the foremost power utility in the Kingdom of Cambodia that builds a deep customer relationship with a reputation for supplying reliable and affordable electricity to its valued customers.

The Board of Directors takes great pride in acknowledging the huge success of the EDC management and staff. The cumulative achievements in recent years have been unprecedented.

On this occasion, I wish to extend my personal heart felt thanks to the management and staff of EDC who have worked tirelessly to create many enduring achievements. It is through their dedication and hard work that EDC is well placed to realize its vision and goals.

Victor Jona Chairman of the Board

# From RGC Delegate In charge of Managing EDC



It gives me a great pride to present to you the annual report of Electricité du Cambodge (EDC) for the year 2015 as this is another turning point in the power sector development in the Kingdom of Cambodia. The vision of EDC is to become the leading power utility in the Kingdom of Cambodia, we have always strive to meet our customers' load demands and focus on improving the quality and reliability of our power supply. This is also the year that we intensified our efforts to further strengthen

our service support for our valued customers.

Our energy sale for 2015 was 5,341 GWh, achieving an increase of 29% over the energy sale of the previous year. The total system loss was reduced to 6%. Our revenue grew by 27% over the previous year to reach 3,814 billion riels. We had a combined workforce of 4,026 staff members providing serving to 774,613 customers.

The second unit of a coal-fired power plant in Preah Sihanouk province, with a capacity of 135 MW, was commissioned. To ensure that we provide the highest reliability of power supply in the southern Phnom Penh, a 115 kV transmission line was constructed to link our GS7 with GS2 and put into operation in 2015. This is a part of the Project for Phnom Penh Loop Line funded by China Exim Bank.

A new interconnection point from Champasak province, Ban Hat Substation, Lao PDR to Kampong Sralau, Preah Vihear province, Cambodia, the initial design and construction for the 115 kV transmission line was energized at 22 kV voltage level for the first stage until the transmission line from Lao boarder to Chey Sen Substation was completed.

A number of high voltage transmission lines and medium voltage lines are currently under construction, the goal is to extend and strengthen the power supply in Cambodia. The major projects are as follows:

Phnom Penh - Bavet, Svay Rieng and Kampong Cham - Kratie - Stung Treng - Lower Sesan II Hydro Power Plant transmission lines with a total length of 426 km are under construction. These projects are expected to be completed by the end of 2017.

Aproximately 1,200 km of medium voltage lines covering 6 provinces including Kratie, Stung Treng, Ratanakiri, Mondulkiri, Oddar Meanchey, and Siem Reap, being constructed under the rural electrification project phase II, funding is provided from the Royal Government of Cambodia, are expected to be completed in 2016.

Projects for a transmission line surrounding Tonle Sap Lake (connecting Battambang - Siem Reap - Kampong Thom - Kampong Cham), Phom Penh Loop

Line Phase 2 (NPP - Chroy Changvar - EPP - SPP), and a transmission line connecting Kampong Thom - Preah Vihear - Lao PDR Border are under study. These projects are funded by China Exim Bank.

Loans for construction of more than 2,040 km of distribution lines and 220 km of transmission lines will be constructed in 14 provinces, including Kandal, Kampong Speu, Kampong Chhnang, Pursat, Siem Reap, Oddar Meanchey, Preah Vihear, Kampong Cham, Kratie, Stung Treng, Rattanakkiri, Mondulkiri, Koh Kong, and Preah Sihanouk, have been subsequently sanctioned by China Exim Bank as Project Phase 2, 3, and 4.

The Agence Francaise De Developmente, AFD, has offered loans for the development of transmission and distribution line expansion in Koh Kong, Kampong Cham, and Kratie provinces.

By the end of 2015, a total of 193 power purchase agreements between EDC and REEs or license holders (licensees), who are electricity distribution service providers, were signed for bulk supply of electrical energy from the National Grid resulting in discontinuation of operation of high-cost small generators.

In 2015, EDC provided a grant of 9 Million USD to Department of Rural Electrification Fund , REF, to continue its encouragement and development of rural electrification sector in the whole country.

EDC has established a 24-hour hotline and create an official Facebook page to collect feedback and circulate important information, aiming at improving effectiveness of the customer services and giving important news and announcements to the customers.

The above efforts have resulted in many direct and indirect benefits for millions of households and businesses across the country. This is clearly, a concrete and real progress in helping Cambodia build a stronger foundation for a sustainable economy and social development country.

We would like to take this opportunity to acknowledge the contribution and commitment of all our employees who have played such an indispensable role in the success of this organization. We are highly indebted to the great guidance and wisdom provided by Samdech Aka Moha Sena Padey Techo Hun Sen, Prime Minister of the Kingdom of Cambodia, who has always provided key support at every major turning point.

We are also grateful to the Ministry of Mines and Energy for their ongoing sectoral direction and relentless efforts and to the Ministry of Economy and Finance for their support. Our special appreciation goes to the Electricity Authority of Cambodia and to the Board of Directors of EDC for its valuable input and guidance. We also highly

value the support of all our client groups. In addition, we highly appreciate the continued assistance extended to us by all development partners, particularly the Exim Bank of the People's Republic of China and all our Independent Power Producer partners.

With such solid progress, EDC is moving forward with a renewed sense of optimism in its noble mission to help develop the power sector in the Kingdom of Cambodia.

Keo Rottanak

**RGC** Delegate In charge of Managing EDC

# Contents

Overview Human Resource Development	1
Human Resource Development	7
Power Generating Facilities and Electricity Supply	8
Transmission and Distribution Networks	21
Rural Electrification Fund of EDC	28
Cambodia Power Development Plan	29
Power Co-operation with Neighbouring Countries	33
Financial Data	36

# **ABBREVIATION**

- ADB : Asian Development Bank
- AFD : French Development Agency
- APG : ASEAN Power Grid
- APGCC : ASEAN Power Grid Consultative Committee
- ASEAN : Association of Southeast Asian Nations
- BIO : Biomass
- BOT : Build Operate Transfer
- BTB : Battambong
- BTC : Banteay Meanchey
- BVT : Bavet
- C : Coal
- Cct-km : Circuit-kilometer
- CEIB : China Export Import Bank (China Exim Bank)
- CEE : Compagnie des Eaux et Electricité
- CFKE : Compagnie Franco-Khmère d'Electricité
- Con't : Continue
- EAC : Electricity Authority of Cambodia
- EDC : Electricité du Cambodge
- EDP : Electricité de Phnom Penh
- EPP : East Phnom Penh
- FO : Fuel Oil
- GS : Grid Substation
- GWh : Gigawatt-hours
- H : Hydro
- HQ : Headquarter
- IE : Industrial Estate
- IEB : Indian Exim Bank
- IMP : Import
- IPP : Independent Power Producer
- JICA : Japan International Cooperation Agency
- KfW : KfW Development Bank
- KGT : Kampong Trach
- KPC : Kampong Cham
- KPS : Kampong Speu
- KPT : Kampot
- KRT : Kratie
- KSM : Keosiema

- LDP : Looking for Development Partner
- LSRC : Lower Stung Russei Chrom Hydropower Plant
- LV : Low Voltage
- MDKR : Mondulkiri
- MIME : Ministry of Industry, Mines and Energy
- MME : Ministry of Mines and Energy
- MMT : Memot
- MV : Medium Voltage
- MW : Megawatt
- NCC : National Control Center
- NDF : Nordic Development Fun, Finland
- NG : National Grid
- NPP : North Phnom Penh
- P2P : Power to the Poor
- PHN : Phnom Penh
- PKK : Ponhea Krek
- PPA : Power Purchase Agreement
- PST : Pursat
- PRV : Prey Veng
- REE : Rural Electricity Enterprise
- REF : Rural Electrification Fund
- RGC : Royal Government of Cambodia
- RTK : Ratanakiri
- SHS : Solar Home Systems
- SHV : Preah Sihanouk Province
- SNL : Snuol
- SPP : South Phnom Penh
- SRP : Siem Reap
- STH : Stung Hav
- STR : Stung Treng
- SVP : Suvannaphum Coal-fired Power Plant
- SVR : Svay Rieng
- SWS : Switching Substation
- TKO : Takeo
- UNEDI : Union d'Electricité d'Indochine
- WPP : West Phnom Penh
- WB : World Bank

# **OVERVIEW**

#### VISION

EDC's vision is to become the leading power utility in the Kingdom of Cambodia by striving to meet the customers' demands and to improve the quality and reliability of supply.

#### MISSION

Provide sufficient and consistently reliable power supply to consumers in its entire coverage areas at a competitive price. Improve the business operation to excellence and efficiency and participate in the implementation of the government's policies on poverty reduction, environmental preservation, and socio-economic development.

#### FUNCTION AND RESPONSIBILITIES

**EDC** has the rights and responsibilities for generating, transmitting and distributing electricity throughout the Kingdom of Cambodia in conformity with its commercial obligations stipulated by laws, statute, license and other regulations of the Royal Government of Cambodia.

**EDC** operates as a commercial enterprise with independence to organize its business of generation, transmission and distribution of electricity and make capital investments, in the appropriate response to market requirements and earn a profit and raise productivity.

**EDC** is required to abide by the conditions of its license issued by the Electricity Authority of Cambodia in providing electricity service. EDC is required to achieve its objectives by implementing its business plan approved by its Board of Directors and in accordance with the national energy policy and national development plan.

**EDC** shall limit its business activities to the types stipulated in its Statute and license granted by EAC.

EDC is permitted to be responsible for:

- 1- Generating, transmitting, and distributing electric power with the purpose of meeting the demand for all categories of buyers;
- 2- Exporting electric power to neighboring countries and import electricity from neighboring countries;
- 3- Constructing and operating national electric grid for energy transmission in order to ensure adequate and quality supply;
- 4- Constructing and operating sub-transmission system for distribution of electricity and facilitate connections and operations between EDC and other distribution systems;
- 5- Selling electric power and other related services;
- 6- Purchasing, transferring and exchanging electricity from other generators.

EDC has its source of capital from:

- 1- Grant contribution from the Royal Government;
- 2- Assets and land transferred by the Royal Government to EDC as per Article 7 of the Sub-Decree No. 23;
- 3- Capital generated from revenue as per the accounting rules of EDC;
- 4- Grant and other financing received by EDC with approval from the Officers;
- 5- Finance received by EDC from other financial sources with the approval of the Officers.

#### EVOLUTION OF ELECTRICITE DU CAMBODGE

Electricity has come to Cambodia in 1906. Before October 1958, power and light in Cambodia were provided by three private companies:

- Compagnie des Eaux et Electricité (CEE)
- Union d'Electricité d'Indochine (UNEDI)
- Compagnie Franco-Khmère d'Electricité (CFKE).

The CEE served the Greater Phnom Penh Area. The UNEDI took care of all other provinces, except Battambang. The CFKE had been serving Battambang-city all along.

By virtue of Kret N° 665-NS of October 10, 1958, the first two companies, CEE, and UNEDI, merged under the name of ELECTRICITE DU CAMBODGE.

During 1970 to 1979, the power sector in the country passed through two dangerous events: civil war (1970-1975) and turbulent history during the Khmer Rouge Regime (1975-1979). During this time, all kinds of generation, transmission, and distribution facilities were destroyed not only in Phnom Penh but also in other areas.

In 1979, EDC was re-integrated into an administrative structure under Ministry of Industry and then transferred to Phnom Penh Municipality in 1991, by the name Electricité de Phnom Penh (EDP) to manage the electric supply in Phnom Penh while the electric generations in the provinces were managed by the Department of Industry of the provincial authorities.

In 1992, EDP was re-named Electricité du Cambodge and was attached to the Ministry of Energy. After the election in 1993, EDC was restructured under the Ministry of Industry, Mines and Energy (MIME)<sup>(1)</sup> and was responsible for the development, management, and operation of the power system in Phnom Penh. Power utilities in a few provinces continue to remain under the control of Provincial Authorities, which receive budgetary support through MIME.

In March 1996 by the Royal Decree # 0396/10, Electricité du Cambodge became an autonomous wholly state-owned limited liability company to generate, transmit and distribute electric power throughout Cambodia. EDC is a judicial organization with administrative, financial, and managerial autonomy. EDC is responsible for its profits and losses and liable for its debts to the extent of the value of its assets.

<sup>(1)</sup> In December 2013 by the Royal Decree # 1213/017 to establish the Ministry of Mines and Energy (MME).

#### **MANAGEMENT STRUCTURE**

On behalf of the Royal Government of Cambodia, the Ministry of Mines and Energy and the Ministry of Economy and Finance are co-owners of the EDC.

#### **Board of Directors**

As of 2015, EDC's Board comprises of the following seven members:



**H.E. Victor Jona** Chairperson Representative of the Ministry of Mines and Energy



H.E. Keo Rottanak Member RGC Delegate in charge of Managing EDC Advisor to the Prime Minister



**H.E. Chan Sothy** Member Representative of the Ministry of Economy and Finance



**H.E. Hem Kranh Tony** Member Representative of the Council of the Ministers



**Mr. Hang Touch** Member Representative of EDC's Employees



**Mr. Ky Khemlin** Member Representative of the Ministry of Justice



**Ms. Sok Sotheavy** Member Representative of the Chamber of Commerce of Cambodia.

### **EDC's Management**

EDC is headed by an RGC Delegate in charge of Managing EDC, with the ranking equivalence of a Secretary of State in the Government who reports to the Board of Directors, which in turn reports to the shareholding Ministers. EDC's Managing Director is assisted by four Deputy Managing Directors and nine Executive Directors. As of 2015, the Management Level of EDC comprises of:



H.E. Keo Rottanak RGC Delegate in charge of Managing EDC Advisor to the Prime Minister



**Dr. Praing Chulasa** Deputy Managing Director Planning and Technique



**Mr. Chhung Ung** Deputy Managing Director Finance and Business



H.E Eng Kunthea Deputy Managing Director Administration and Training



Mr. Keo Virac Deputy Managing Director Rural Electrification Fund



Mr. Chun Piseth Executive Director Dept of Corporate Planning and Projects



Miss. Sin Sovanny Executive Director Dept of Finance and Accounting



**Mr. Ly Tikhea** Executive Director Dept of Administration



**Mr. Nou Sokhon** Executive Director Dept of Transmission



**Mr. Aun Hemrith** Executive Director Dept of Generation



Mr. Chea Sinhel Executive Director Dept of Business and Distribution



**Mr. Nget Sokhan** Executive Director Dept of Procurement



Mr. Oum Piseth Executive Director Institute of Electrical Science



Mr. Loeung Keosela Executive Director Dept of Rural Electrification Fund

# **ORGANIZATION CHART OF EDC**



# HUMAN RESOURCE DEVELOPMENT

In 2015, a total of 872 trainees have been trained in 163 batches and 89 courses at EDC's Institute of Electrical Science. The breakups of the trainees for different trainings are: 258 trainees on the distribution network, 40 trainees on Power Plant Protection, 171 trainees on metering, 105 trainees on safety, 33 trainees on generation, 164 trainees on the high voltage transmission line, 70 trainees on a software program and 31 trainees on technical English.

EDC is also collaborating with other educational institutes for training in order to improve the quality of work and provide new knowledge to its staff.

Туре	2010	2011	2012	2013	2014	2015
Doctorate	1	2	3	4	4	4
Post-graduated	104	119	142	141	151	165
Engineer & other graduated	551	672	822	934	1,078	1,240
Vocational Technicians	390	429	493	570	736	917
Skilled Workers	246	207	188	180	178	173
High school, Unskilled	1,278	1,331	1,287	1,398	1,438	1,527
Total	2,570	2,760	2,935	3,227	3,585	4,026

#### Table 1: EDC's Staff from 2010 to 2015

EDC's Management has the following vision for the betterment of its employees:

- To provide its employees with opportunities for professional growth and advancement on the basis of their performance, integrity and loyalty to EDC.
- To provide its employees with competitive remuneration and benefits to ensure good living conditions.
- To guarantee fairness, equal treatment and opportunity to employees, to maximize their contribution to the development of EDC.
- To provide suitable working conditions that facilitate an open and honest communication of information among employees to promote teamwork, productivity, and cooperation for the organization's growth.

# POWER GENERATING FACILITIES AND ELECTRICITY SUPPLY

#### **GENERATION SOURCES**

For the year 2015, the total installed capacity is 1,972 MW, consisting of hydro (930 MW), coal (400 MW), Fuel oil (248 MW), Biomass (6 MW), and power import from neighboring countries (388 MW) including Thailand, Vietnam, and Laos. Total energy generation is 5,698 GWh in which hydro shares 38%, coal 37%, fuel oil 3%, biomass 0.5%, and import from neighbouring countries 22%. As a result of domestic power source development, there has been dramatically decreasing in energy import from neighbouring countries from 62% in 2010 to 22% in 2015 as well as fuel oil consumption from 34% in 2010 to 3% in 2015, and the annual generation growth is around 8% compared to 2014.

#### **DEMAND & SUPPLY IN NATIONAL GRID**

As of 2015, Cambodian National Grid is connected with Vietnam HV System, Thai HV System, Hydropower plants located in Kampong Speu, Koh Kong and Pursat, Hydropower plants located along Kirirom mountains and Kamchay mountains, and Coal-fired power plants located in Preah Sihanouk Province. The National Grid now supply power directly to 14 city/provinces: Phnom Penh, Kandal, Kampong Speu, Takeo, Kampot, Kep, Preah Sihanouk, Kampong Chhnang, Pursat, Battambang, Banteay Meanchey, Siem Reap, Kampong Cham, and Koh Kong. The four provinces of Tbong Khmum, Prey Veng, Kampong Thom, and Pailin are supplied electricity from the National Grid through sub-transmission lines connected to the National Grid with the peak demand in the coverage area is 951 MW, and generated energy is 5,399 GWh. Coverage areas are as follows:

**PHNOM PENH AND SUBURBAN AREAS:** PHN is the capital city of Cambodia. In this report, the PNH system is supplied by National Grid via 230 kV substations such as GS4, GS6, and GS7 with the total capacity of about 900 MW which is then delivered to 115 kV system via GS1, GS2, GS3, GS4, GS5, GS6, and GS7. Generated by local fuel oil power plants, about 194 MW is additionally injected into the system. EDC Phnom Penh's coverage area includes Phnom Penh, its suburban areas, and Ta khmau, the provincial town of Kandal Province.

In 2015, for Phnom Penh System, the peak demand is 674 MW. Supplying power to 774, 613 customers, EDC has absorbed 4,113 GWh of energy from National Grid while, in 2014, there was only 3,268 GWh.

**SIEM REAP:** SRP is the area of tourist attraction and located in the northwest of Cambodia. The power system of SRP was handed over to EDC on December 30, 1995. Electricity supply in SRP is from its own power plant and GS Puok (power import from Thailand via a 115 kV transmission line in 2007 and the system was connected to the National Grid in 2013). The main operational features of the power system in SRP for 2015 are: around 90 MW of power supply originating from the National Grid and 11 MW from the local power generation. Peak Demand is 68 MW, 402 GWh of electrical energy supplied by the National Grid, 1,129 cct-km of MV and LV lines, and 40,949 customers.

**PREAH SIHANOUK:** SHV has the most stunning fine sandy beaches and is located in the southwestern part of Cambodia. The power system of SHV was handed over to EDC on June 11, 1996. Originally, the system was isolated and supplied by local power generation with installed capacity of 20 MW. At the end of 2011, it was connected to KPT system that got power from the National Grid as well as imported

power from Vietnam. At the end of 2012 and early 2013, the system was supplied by the National Grid through a 230 kV transmission line from GS KPT to GS STH and a 115 kV transmission line from GS STH to GS SHV. As of 2015, 90 MW of supply comes from the National Grid and 20 MW from the local power generation. This has increased the system's capability to supply power to more areas and to other licensees in SHV. The main operational features of the power system in SHV for 2015 are: 194 GWh of the annual energy generation, 40 MW is the peak demand, 503 cct-km of MV and LV network, and 15,975 customers.

**KAMPONG CHAM:** KGC is a province with the most fertile rubber plantations, located in the eastern part of Cambodia. The power system of KGC was handed over to EDC on March 23, 1998. The system was supplied by local power generation in 1996. Some parts of the system received imported power from Vietnam in 2011. KGC system has been connected to the National Grid since 2013. The main operational features of the power system in KGC for 2015 are: 90 MW of power supply coming from the National Grid and 8 MW from the local power generation, 49 GWh is the energy generation, 9 MW installed capacity, 22 MW peak demand, 732 cct-km of MV and LV lines, and 16,999 customers.

**MEMOT AND PONHEA KREK:** The power supply system for MMT and PKK is a part of Kampong Cham province. The power supply to these areas has been imported from Vietnam since 2002 with the contracted capacity of 10 MW. As of 2015, the import is 41 GWh. The system has total MV and LV lines of 321 cct-km, 11 MW of peak demand, and 11,566 customers.

**BATTAMBANG:** BTB is the leading and economically potential province in term of agriculture, particularly rice production. It is located in the northwestern part of Cambodia. The power system of BTB was handed over to EDC on June 28, 2000. BTB system has covered the 22 kV sub-transmission lines in Pursat Province. A 115 kV transmission line for importing power from Thailand was connected with SRP and BTC systems in 2007. Then, it was linked to the National Grid in 2012. The system has been supplied by the National Grid via GS BTB(CPG) and GS BTB(CPTL) with the total capacity of 185 MW and 2 MW of local power generation. As of 2015, the system has 696 cct-km of the total MV and LV lines, 236 GWh of energy generation, 47 MW of peak demand, and 45,216 customers.

**BANTEAY MEANCHEY AND MONGKUL BOREI:** BTC is located in the northwestern part of Cambodia. The power system of BTC was handed over to EDC on August 14, 2003. BTC was supplied by its own power plant and imported power from Thailand in 2007. Then the system was connected to the National Grid in 2013. As of 2015, 68 MW of the supply capacity is from National Grid (GS BTC and GS IE), and 3 MW more is generated by the local fuel oil power plant. There are 112 GWh of the energy generation, 23 MW of peak demand, 318 cct-km of MV and LV network and 21,186 customers.

**STUNG TRENG:** STR is a remote and sparsely populated province located in the northeast of Cambodia. The power system of STR was handed over to EDC on August 14, 2003. The power system of STR town has been connected to Laos system at 22 kV since 2010. As of 2015. the system has 6 MW of installed capacity (2 MW generated by its own power plant and 4 MW imported from Laos), 240 cct-km of total MV and LV lines, 3 MW of peak demand, 18 GWh of the energy generation, and 6,280 customers.

**RATTANAKIRI:** RTK is situated on the border of Vietnam's central highlands and Laos. The power system of RTK was handed over to EDC on August 14, 2003. As of 2015, the system has 4 MW of installed capacity that is the sum of fuel oil and hydro generations, 8 MW of power import from Vietnam via a 35 kV sub-transmission line, 167 cct-km of MV and LV lines, 6 MW of peak demand, 33 GWh of energy generation, and 5,235 customers.

**TAKEO AND ANG TASOM:** TKO is located in the plain region of the southern part of Cambodia. The power system of TKO was handed over to EDC on June 26, 2000. The 230 kV line from Vietnam to TKO substation was energized on 31<sup>st</sup> March 2009 to import power from Vietnam. As of 2015, 45 MW of the supply capacity comes from the National Grid and 2 MW from local fuel oil power generation. The system has a peak demand of 20 MW, 746 cct-km of MV and LV line. Generated energy from its own power plant, power import from Vietnam, and National Grid is 94 GWh supplied to 20,203 customers.

**KAMPOT:** KPT is located in the southern part of the country. The power system of KPT was handed over to EDC on August 14, 2003. The power from the local fuel oil power generation and import from Vietnam that have been transmitted via a 22 kV line through Kampong Trach are used for supplying in KPT city. The supply capacity from National Grid was about 45 MW in 2011. As of 2015, energy generation from its own power plant, National Grid, and power import from Vietnam is 72 GWh. The system has 18 MW of peak demand, 436 cct-km of MV and LV lines, and 11,989 customers.

**KAMPONG TRACH:** The power supply system for KGT is a part of KPT province, and it has imported electricity from Vietnam since 2002. The power system in KGT has been supplied by the National Grid since 2014. As of 2015, the contracted capacity has been 10 MW, and the system has 100 cct-km of the line length of MV and LV lines ,13 GWh of energy generation, 5 MW of peak demand, and 4,176 customers.

**PREY VENG:** PRV is located in the southeast of the country. The power system of PRV was handed over to EDC on August 14, 2003. The supply sources of PRV City system are comprised of EDC's own power generation with an installed capacity around 1 MW (in 2003) and imported power from Vietnam (in 2009). After energizing lines of the rural project, PRV has also got power from KGC system (in 2013), PNH system for supplying areas along National Road No.8 (in 2014), and Suvannaphum coal fired power plant (in 2015). There are 794 cct-km of MV and LV lines and 14 MW of peak demand. The available energy is 33 GWh supplied to 6,497 customers.

**SVAY RIENG:** SVR is located in the southeast of the country. The power system of Svay Rieng was handed over to EDC on August 14, 2003. The source of power supply consist of power import from Vietnam (in 2003), its own power generation (in 2006), and Suvannaphum coal fired power plant (in 2015). The available capacity of the system is 8 MW. Power import and generation, as of 2015, are 166 GWh while the peak demand is 12 MW. The line length of MV and LV network is 369 cct-km to connect to 13,968 of customers have been supplied.

**BAVET:** The power system for BVT is a part of SVR province, and the power supply source for this area is from Vietnam. As of 2015, there is a peak demand of 17 MW, 16 MW of imported power from Vietnam, and the system has 6,742 customers.

**MONDULKIRI:** The power system of MDKR was handed over to EDC on May 10, 2010. The installed capacity of the system is comprised of 370 kW of hydro power generation, 300 kW of diesel power generation, and 1 MW imported from Vietnam. Under EDC control, as of 2015, available energy has been 5 GWh, and peak demand is about 1 MW. The line length of MV and LV network is 133 cct-km through which 2,348 customers have been supplied.

**KEOSIEMA:** The power system for KSM is in MDKR province. Supply source is by power import from Vietnam with a contracted capacity of 0.4 MW. The import has been 4 GWh and, a peak demand is 1 MW. The line length of MV and LV network is 90 cct-km through which 1,753 of customers have been supplied.

**KRATIE:** The power system of KRT was handed over to EDC on April 20, 2011. The system is supplied by local power generation with an installed capacity of around 1 MW (in 2011) and KGC system (in 2015). Under EDC control, as of 2015, generation has been 28 GWh, and a peak demand is about 3 MW. The line length of MV and LV network is 225 cct-km through which 6,707 of customers have been supplied.

**SNUOL:** The power system is in KRT province. This system is supplied by 5 MW of imported power from Vietnam with the annual energy of 12 GWh and 2 MW of peak demand. The line length of MV and LV network is 37 cct-km through which 1,311 of customers have been supplied.

**KAMPONG SPEU:** On March 14, 2012, KPS branch was upgraded to a province unit as it had been under Phnom Penh System. This unit is in charge of the system in KPS town and the areas along National Road No.4, which get power supply from GS KPS. Some areas of KPS are getting power supply from GS4, GS6, and GS TKO. As of 2015, 45 MW of the supply capacity is from the National Grid. Energy generation from the National Grid has been 122 GWh, and annual sale energy has been 137 GWh. Peak demand is 38 MW. The line length of MV and LV network is 401 cct-km through which 12,996 customers have been supplied.

	Yea	r		0040	0044	0040	0040	0044	0045	
Locat	ion		Capacity	2010	2011	2012	2013	2014	2015	
Netlene			Installed	434	438	751	1,364	1,913	1,896	
Nationa	Gria		Output	322	341	<b>688</b>	1,107	1,708	1,825	
			Installed	429	429	<b>634</b>	1,220	1,728	1,842	
PH	N		Output	318	333	571	968	1,533	1,778	
500		50	Installed	44	44	44	44	44	81	
EDC	IPP	FU	Output	41	41	41	41	41	75	
CUDI		FO	Installed	37	37	37	37	37	-	
CUPL	IFF	FU	Output	32	32	32	32	32	-	
KED		FO	Installed	49	49	49	49	49	49	
REP	IFF	FU	Output	45	45	43	43	43	43	
	IDD	FO	Installed	8	8	-	8	-		
CITTPOWER	IFF	10	Output	7	7	-	7	-	-	
CER	IDD	FO	Installed	49	49	49	49	49	49	
GEP	IFF		Output	45	45	45	45	45	45	
	IDD	FO	Installed	20	20	20	20	20	14	
COLBEN	IFF	10	Output	10	10	10	10	10	10	
Kirirom I	IPP	н	Installed	12	12	12	12	12	12	
KIIIOIIII			Output	11	11	11	11	11	11	
Kirirom III IPP	IDD	н	Installed	-	-	18	18	18	18	
			Output	-	-	18	18	18	18	
Kamchay	IPP	н	Installed	-	-	194	194	194	194	
Ramenay			Output	-	-	194	194	194	194	
Atav	IPP	н	Installed	-	-	-	120	120	120	
Auy			Output	-	-	-	120	120	120	
LSRC	IPP	н	Installed	-	-	-	338	338	338	
20110			Output	-	-	-	169	338	338	
Tatay	IPP	н	Installed	-	-	-	-	246	246	
	· · · ·		Output	-	-	-	-	246	246	
CEL	IPP	EL IPP	С	Installed	-	-	-	120	120	120
~		-	Output	-	-	-	100	100	100	
CIIDG	IPP	С	Installed	-	-	-	-	270	270	
			Output	-	-	-	-	125	251	
SVP	IPP	С	Installed	10	10	10	10	10	10	
			Output	7	7	7	8	8	8	
Thailand	IM	Р	PPA	-	-	-	-	-	120	
			Output	-	-	-	-	-	120	
Vietnam	IM	Р		200	200	200	200	200	200	
			Output	120	135	1/0	170	200	200	
Provin	ces		Installed	1/5	187	215	217	257	131	
	Т		Output	168	1/9	207	210	248	121	
	EDC	FO		11		11	11	11	11	
SRP			Output	11	11	11	11	11	11	
	N	G		40	40	40	40	00		
				40	40	40	40	08	-	
	EDC	FO		0 	0 7	6	6	6	<u> </u>	
SHV				C 1 4	C 1 /	C 1 1	C C	C 1 4	5	
	IPP	FO	Output	14	14	14	14	14	14	
	1	1	Julpul	10	10	10	10	10	10	

# Table 2: Installed Capacity and Output from Power Plants and Import, MW

	Year			2010	2011	2012	2012	2014	2015
Loc	ation		Capacity	2010	2011	2012	2013	2014	2015
	IPP	FO	Installed	8	8	8	8	8	8
KGC			Output	1	/	/	/	5	5
	N	G	Installed	-	2	2	2	2	2
		[	Output	-	2	2	2	2	2
	EDC	FO	Installed	2	2	2	2	2	2
тко			Output	2	2	Z	2		2
	N	G		3	4	10	10	10	-
			Uniput	<u></u> ు	4	10	10	10	-
	EDC	FO		3	3 2	3	2	2	2
BTB			Installed	20	20	20	20	20	4
	NG			20	20	20	20	20	
			Installed	20	20	20	20	20	3
	EDC	FO	Output	<u> </u>	3	<u> </u>	<u> </u>	3	3
BTC			PPA	20	20	20	20	20	-
	NG		Output	20	20	20	20	20	-
			Installed	3	3	3	3	3	3
КРТ	EDC	FO	Output	3	3	3	3	3	3
KDO	חחו		Installed	-	-	-	-	-	6
KPS	IPP	BIO	Output	_	-	-	-	-	6
Off Grid			Installed	43	53	<b>69</b>	73	73	76
On Gha		Output	42	51	67	71	71	74	
PKK	IN		PPA	5	5	5	5	5	5
FIX			Output	5	5	5	5	5	5
ммт	IN	1P	PPA	5	5	5	5	5	5
			Output	5	5	5	5	5	5
KGT	IMP		PPA	10	10	10	10	10	10
_			Output	10	10	10	10	10	10
	EDC	FO	Installed	2	2	2	2	2	2
PRV			Output	2	2	2	2	2	2
	IN	1P	PPA Output	1	1	1	3	3	3
			Output	1	1	<u> </u>	3	3	3
	EDC	FO		2	2	2	2	2	2
STR				2	2	2		2	2
	IN	1P	Output	2	2	4	4	4	0
			Installed	2	<u> </u>	4	4	4	0
	IPP	FO	Output	<u> </u>	1			1	1
			Installed	1	1	1	1	1	1
RTK	EDC	Н	Output	1	1	1	1	1	1
			PPA	-	7	7	8	8	8
	IN	1P	Output	-	7	7	8	8	8
		<b>F^</b>	Installed	1	1	1	1	1	1
CV/D	EDC	FU	Output	1	1	1	1	1	1
SVR	15		PPA	8	8	7	8	8	8
			Output	8	8	7	8	8	8
BVT	IN		PPA	5	5	16	16	16	<mark>1</mark> 6
ви	IMP		Output	5	5	16	16	16	16

# Table 2: Installed Capacity and Output from Power Plants and Import, MW (Con't)

	Yea	r		2010	2011	2012	2012	2014	2015
Loca	tion		Capacity	2010	2011	2012	2013	2014	2015
	EDC		Installed	1	1	1	1	1	1
MDKD			Output	1	1	1	1	1	1
WIDKK		סו	PPA	-	-	1	1	1	1
	IIVIP		Output	-	-	1	1	1	1
KCM	IMP		PPA	0.4	0.4	0.4	0.4	0.4	0.4
<b>NSIVI</b>			Output	0.4	0.4	0.4	0.4	0.4	0.4
	EDC	FO	Installed	-	-	-	1	1	1
KPT	LDC	FU	Output	-	-	-	1	1	1
		FO	Installed	-	3	3	3	-	-
	IFF	FU	Output	-	1	1	1	-	-
CNI		סו	PPA	-	1	4	4	4	5
SINL		IP	Output	-	1	4	4	4	5
То			Installed	604	617	849	1,437	1,985	1,972
10	ai		Output	486	512	778	1,178	1,779	1,899
Pe	rcenta	ge, %		80%	83%	<b>92%</b>	82%	90%	96%

### Table 2: Installed Capacity and Output from Power Plants and Import, MW (Con't)



Figure 1: Installed Capacity by type from 2010 - 2015

Year	2010	2011	2012	2013	2014	2015
Location National Crid	2.009	2 290	2 092	2 4 2 2	4 229	5 200
	2,050	2,309	<b>3,002</b>	3,423	4,220	5,399
	120	49	122	72	20	5
Kirirom	120	100	20	15	30	
Killiolilli Kam Chav	24	30	29	40	424	262
Kalli Cildy Kirirom III	-	-	390	403	424	303 70
	-	-	00	90	207	19
	-	-	-	120	966	024
	-	-	-	130	104	726
		-	- 107	- 140	04	730
	230	252	197	140	00	51
	247	20	200	111	- 06	-
	247	220	209	144	90	00
	30	10	10	19	1	4
	4	12	10	20	12	4
	52	40	51	130	43 654	54 620
	-	-	-	139	167	1 474
Thailand	-	-	- 76	-	250	1,474
	-	- 1 101	1 100	417	970	109
	900	1,121	1,199	1,529	10	004
PP Suyal	- 104	- 214	269	1	10	23
	194	214	200	25	5	4
	25	70	90 57	20	9	0.2
	35	13	26	0.03	0 02	0.2
	9 50	13	106	0.03	0.02	0.02
	21	33	100	12	0.01	0.01
RTC	21	22	14	0.16	0.04	0.04
	20	175	220	0.10	0.04	0.04
	26	32	<u>223</u> 40	200	204	233
MMT	10	11	+0 14	16	16	19
KGT	10 Q	15	17	10	10	7
PRV	5	7	17	17	13	, 0
STR	6	7	9	11	14	18
RTK	8	9	17	23	28	33
SVR	18	24	27	33	137	155
BVT	61	50	74	87	-	-
MDKR	1	2		3	4	5
KSM	04	1	1	2	3	4
KRT		2	7	10	15	15
SNI		5	7	a 10	10	11
Total	2,242	2,564	3,310	3,689	4,512	5,698

# Table 3: Energy Generation from Power Plants and Import, GWh

LOCATION		FUEL OIL	HYDRO	BIOMASS	COAL	IMPORT	TOTAL
Nation	al Grid	141	2,149	27	2,128	954	5,399
	EDC	9	-	-	-	-	9
PHIN	IPPs	125	2,149	27	2,128	942	5,371
KPS		-	-	-	-	-	-
SRP		4	-	-	-	-	4
SHV		3	-	-	-	-	3
KGC		0.2	-	-	-	-	0.2
ТКО		0.02	-	-	-	-	0.02
BTB		0.01	-	-	-	-	0.01
KPT		0.1	-	-	-	12	12
BTC		0.04	-	-	-	-	0.04
Off	Grid	0.5	4	-	-	295	299
PKK		-	-	-	-	22	22
MMT		-	-	-	-	19	19
KGT		-	-	-	-	7	7
PRV		0.1	-	-	-	9	9
STR		0.03	-	-	-	18	18
RTK		0.2	2	-	-	31	33
SVR		0.01	-	-	-	155	155
MDKR		0.1	1	-	-	4	5
KSM		-	-	-	-	4	4
KRT		0.01	-	-	-	15	15
SNL		-	-	-	-	11	11
то	TAL	141	2,153	27	2,128	1,249	5,698

# Table 4: Generation by types from Power Plants and Import during 2015, GWh



Figure 2: Generation by type in 2015

Location	2010	2011	2012	2013	2014	2015
National Grid	334	407	508	625	784	951
PHN	300	349	410	493	563	674
SRP	35	39	47	57	59	<mark>6</mark> 8
SHV	13	16	19	25	30	40
KGC	7	8	10	17	14	22
РКК	5	7	7	7	6	4
ММТ	3	4	4	5	4	7
тко	3	5	7	9	18	20
ВТВ	10	17	21	23	26	47
КРТ	5	5	5	6	13	18
KGT	2	2	3	3	3	5
PRV	1	1	3	3	8	14
BTC	6	6	9	11	19	23
STR	2	2	3	4	5	3
RTK	2	2	4	4	5	6
SVR	4	5	5	7	8	12
BVT	11	11	15	16	17	17
MDKR	0.5	1	1	1	1	1
KSM	-	-	0.4	0.5	1	1
KRT	-	2	1	2	3	3
SNL	-	-	1	1	2	2
KPS	-	-	-	-	-	38

#### Table 5: Breakdown of Yearly Peak Demand, MW





Year	2010	2011	2012	2013	2014	2015
PHN	1,540	1,752	2,266	2,531	2,956	3,748
SRP	171	188	237	270	319	376
SHV	58	69	80	96	141	186
KGC	31	35	52	44	43	<mark>6</mark> 8
PKK	25	31	38	37	29	23
MMT	10	11	13	15	15	19
ТКО	8	12	24	37	54	90
BTB	45	63	99	127	161	222
КРТ	15	31	49	29	44	81
KGT	8	15	17	16	13	-
PRV	4	6	11	14	20	42
BTC	23	26	36	47	71	106
STR	5	6	8	10	12	16
RTK	8	9	16	21	26	31
SVR	17	23	24	26	129	159
BVT	62	55	71	87	-	-
MDKR	1	2	3	3	4	5
KSM	0.4	1	1	2	3	3
KRT	-	2	6	10	15	18
SNL	-	2	6	8	11	10
KPS	-	16	42	52	84	137
TOTAL	2,032	2,354	3,098	3,484	4,152	5,341

# Table 6: Energy Sales, GWh



# Figure 4: Energy Sale by type in 2015



Figure 7: Daily Peak Load Curve from 2010 to 2015 in National Grid



Figure 8: Distribution Losses from 2010 to 2015

Year	2010	2011	2012	2013	2014	2015
PHN	240,992	256,642	276,307	299,774	319,423	522,517
SRP	19,951	26,156	28,791	32,725	36,694	40,949
SHV	10,636	11,472	12,246	13,146	14,238	15,975
KGC	10,478	11,739	12,239	13,003	14,876	16,999
PKK	2,386	2,519	2,694	2,849	2,996	3,958
MMT	4,018	4,285	4,992	5,321	5,591	7,608
ТКО	5,987	7,682	11,201	13,081	15,636	20,203
BTB	31,575	32,756	38,498	40,735	42,336	45,216
КРТ	7,171	7,796	9,332	10,559	11,234	11,989
KGT	2,515	2,676	2,831	3,499	3,670	4,176
PRV	4,447	4,725	5,538	5,790	6,110	6,497
BTC	14,816	16,085	17,213	18,022	19,217	21,186
STR	2,636	3,090	3,563	4,668	5,782	6,280
RTK	2,910	3,197	3,538	4,233	4,722	5,235
SVR	10,795	11,390	10,298	12,474	13,892	13,968
BVT	2,495	2,562	4,518	3,174	3,802	6,742
MDKR	1,328	1,444	1,719	2,070	2,195	2,348
KSM	861	973	1,202	1,337	1,554	1,753
KRT	-	3,552	3,632	4,404	4,776	6,707
SNL	-	1,051	1,094	1,167	1,238	1,311
KPS	-	6,274	9,547	10,828	11,159	12,996
TOTAL	375,997	418,066	460,993	502,859	541,141	774,613

# Table 7: Customer from 2010 to 2015



Figure 9: Customer by Type in 2015

# TRANSMISSION AND DISTRIBUTION NETWORKS

#### **Transmission Networks**

The main purpose of the 115 kV ring bus line around Phnom Penh is to supply power to Phnom Penh area and to increase the reliability of power supply in Phnom Penh system by interlinking three grid substations. The first 115 kV transmission line of 23 km length linking the three grid substations (GS1, GS2, and GS3) in Phnom Penh System was energized in 1999. In 2002, another 115kV transmission line of 111 km length was erected to link Kirirom I Hydro Power Plant to GS1.

The Major source of power supply for three provinces in the north - western Cambodia - Battambang, Banteay Meanchey, and Siem Reap are imported from Thailand via 115 kV transmission line of 185 km length which was commissioned at the end of 2007.

In 2009, the first 230 kV transmission line in Cambodian history with 97 km in length to supply power to Takeo Grid Substation and the West Phnom Penh Substation (GS4) was put in service getting power from Vietnam. The 115 kV transmission line ring system connecting West Phnom Penh Substation (GS4) to the 3 existing substations in Phnom Penh was also put in operation.

In 2011, the 230 kV transmission line with 73 km in length was extended from Takeo Grid Substation to Kampot Grid Substation and linked to Kamchay Hydropower plant with another 230 kV transmission line with a length of 11 km.

The 230 kV transmission line from Phnom Penh to Battambang has started operating since April 2012 with a length of 300 km and another 230 kV transmission line from Ou Soam substation (Koh Kong) to Pursat province substation with a length of 130 km under BOT construction scheme. The construction of 115 kV from 230/115/22 kV substation of CPG (Cambodia Power Grid) to connect with 115 kV substation of CPTL (Cambodia Power Transmission Line) which was put in service on September 01, 2012 permits the National Grid to be able to extend from a part of the southern grid (Phnom Penh, Kandal, Kampong Speu, Takeo, Kampot and Kep) to the northwestern grid (Battambang, Banteay Meanchey and Siem Reap) through Kampong Chhnang and Pursat provinces.

In 2013, the 230 kV transmission line from Kampot to Preah Sihanouk province under ADB and JICA loans with a length of 88 km and another 230 kV transmission line from Phnom Penh to Kampong Cham with a length of 110 km have been put in operation. These projects permit the National Grid to cover two more provinces: Preah Sihanouk and Kampong Cham.

In 2014, 11 km of 115 kV transmission line from GS STH to GS SHV, funded by JICA loans, and 12 km of 115 kV transmission line from Chhouk to Banteay Meas Substation, funded by EDC's budget, as well as 48 km of 230 kV transmission line in Phnom Penh Loop Line project, connecting GS 6 to GS 5 and funded by loans of China Exim Bank, were put in operation.

In 2015, a 115 kV transmission line was constructed to link our GS7 with GS2 and put into operation in 2015. This is a part of the Project for Phnom Penh Loop Line funded by China Exim Bank. A new interconnection point from Champasak province, Ban Hat Substation, Lao PDR to Kampong Sralau, Preah Vihear province, Cambodia, the initial design and construction for the 115 kV transmission line was energized at 22 kV voltage level for the first stage until the transmission line from Lao boarder to Chey Sen Substation was completed.

Phnom Penh - Bavet and Kampong Cham - Kratie - Stung Treng - Lower Sesan II Hydro Power Plant transmission lines with a total length of 426 km are under construction. These projects are expected to be completed by the end of 2017. Projects for a transmission line surrounding Tonle Sap Lake (connecting Battambang -Siem Reap - Kampong Thom - Kampong Cham), Phom Penh Loop Line Phase 2 (NPP -Chroy Changvar - EPP - SPP), and a transmission line connecting Kampong Thom -Preah Vihear - Lao PDR Border are under study. These projects are funded by China Exim Bank.

#### Table 8: Transmission Facilities

I.	115 kV Transmission line	Circuit	Cross Section (mm <sup>2</sup> )	Line Length (km)	Operation Year	Capital Source
1	GS1 - GS3	1	2x250	12	1999	WB
2	GS3 - GS2	1	2x250	12	1999	WB
3	GS1 - GS KPS	1	150	41	2002	BOT
4	GS KPS - Kirirom I	1	150	65	2002	BOT
5	Thai Border - GS IE	2	400	4	2007	BOT
6	GS IE - GS BMC	2	400	43	2007	BOT
7	GS BMC - GS SR	1	400	85	2007	BOT
8	GS BMC - GS BTB	1	400	53	2007	BOT
9	GS4 - GS1	1	2x250	30	2009	WB
10	GS4 - KEP	1	2x250	23	2009	WB
11	KEP - GS2	1	2x250	7	2009	WB
12	Kirirom I - Kirirom III	1	150	32	2012	BOT
13	Atay Hydropower Plant - GS Ou saom	2	630	18	2013	BOT
14	GS STH - GS Sihanouk Ville	2	400	11	2014	JICA
15	GS Chhuk - GS Banteay Meas	1	400	12	2014	EDC
16	Phnom Penh Loop Line	2	2x250	45	2015	CEIB
	Total length			493	ĸm	

Ш	230 kV Transmission line	Circuit	Section (mm <sup>2</sup> )	Line Length (km)	Operation Year	Capital Source
1	Vietnam Border - GS TKO	2	400	50	2009	ADB - NDF
2	GS TKO - GS4 (WPP)	2	630	47	2009	ADB - NDF
3	GS TKO - GS KPT	2	450	73	2011	KfW
4	GS KPT - Kamchay Hydro Power Plant	2	400	11	2012	вот
5	GS4 - GS6(NPP) - GS Kampong Chhnang - GS Pursat - GS Battambang	2	2x630	297	2012	вот
6	GS Pursat - GS Ou Saom	2	2x630	132	2012	BOT
7	GS KPT - GS Stung Hav(SHV)	2	630	82	2013	ADB - JICA
8	GS6(NPP) - GS KGC	2	2x400	97	2013	BOT
9	GS Ou Saom - Lower Russei Chrum Hydropower Plant	2	2x400	42	2013	вот
10	Phnom Penh loop line (WPP - SPP)	2	2x630	24	2014	CEIB
11	Lower Upper Russei Chrum Hydropower - Tatay Hydropower	2	2x400	38	2014	вот
	Total length			893	ĸm	

# **Table 9: Grid Substation Facilities**

No.	Grid Substation Name	Rate Voltage (kV)	Number of Transformer	Total Capacity (MVA)	Operation Year
1	GS1	115/22	2 x 75	150	1999 Upgraded in 2013
2	GS2	115/22	3 x 50	150	1999 Added 1 unit in 2013
3	653	115/22	2 x 50	100	1999
5	000	115/22/15	1 x 50	50	2013
4	GS KPS	115/22	1 x 50	50	2002
5	GS BTB (CPTL)	115/22	1 x 25	25	2007
6	GS BTC	115/22	1 x 25	25	2007
7	GS SRP	115/22	2 x 50	100	2007 Added 1 unit in 2014
0		230/115	2 x 100	200	2000
0	(WFF)	115/22	2 x 50	100	2009
9	GS TKO	230/22	1 x 50	50	2009
10	GS KPT	230/22	1 x 50	50	2011
11	GS Kampong Chhnang	230/22	1 x 25	25	2012
12	GS Pursat	230/22	1 x 25	25	2012
13	GS BTB (CPG)	230/115/22	2 x 90	180	2012 Added 1 unit in 2015
14	GS5	115/22	2 x 50	100	2013
15	GS STH	230/22	1 x 50	50	2013
16		115/22	1 x 50	50	2012
10	930 (NFF)	230/115	2 x 200	400	2013
17	GS Osom	230/115/22	1 x 150	150	2013
18	GS KGC	115/22	2 x 50	100	2013 Added 1 unit in 2015
19	GS Chhuk	230/115	1 x 100	100	2014
20	GS SHV	115/22	1 x 50	50	2014
21	GS Banteay Meas (SWS)	115	-	-	2014
າາ		230/115	1 x 200	200	2015
		115/22	1 x 50	50	2013
23	GS Tatay	230/35/22	1 x 60	60/60/40	2015
24	GS IE	115/22	1 x 50	50	2015

#### **Distribution Networks**

The voltage of medium voltage systems of EDC generally is 22 kV and low voltage 0.4/0.22 kV. During 2009 and 2010, Distribution network in Phnom Penh, Kampong Speu, Prey Veng, Banlung (Rattanakiri), Stung Treng, and Preah Sihanouk province have been strengthened with 22 kV medium voltage lines. The detailed data of lines of different voltages are shown in the following table.

Medium voltage lines of the total length of about 2,000 km in four provinces of Kampong Cham, Prey Veng, Kampong Speu, and Preah Sihanouk were commissioned under the rural electrification projects funded by China Exim Bank loan.

In addition, the construction of medium voltage lines of 1,200 km covering 6 provinces including Kratie, Stung Treng, Rattanakiri, Mondulkiri, Oddar Meanchey, and Siem Reap have been started under the rural electrification project phase II with funds from Royal Government of Cambodia. The project is expected to be completed in 2016. Preliminary work for construction of more than 2,040 km of distribution line in 14 provinces such as Kandal, Kampong Speu, Kampong Chhnang, Pursat, Siem Reap, Oddar Meanchey, Preah Vihear, Kampong Cham, Kratie, Stung Treng, Rattanakkiri, Mondulkiri, Koh Kong, and Preah Sihanouk are under construction for which loan is sanctioned by China Exim Bank in Phase 2, 3, and 4.

Location	ltem	2010	2011	2012	2013	2014	2015
	Line Length, cct-km	1,877	2,058	2,573	3,586	3,779	4,187
	Medium Voltage	933	1,076	1,287	2,204	2,325	2,641
PHN	Low Voltage	945	982	1,285	1,382	1,453	1,546
& Kandal	# MV Substation	1,591	1,875	2,170	2,385	2,665	2,994
	Indoor	-	-	-	-	1,076	1,218
	Outdoor	-	-	-	-	1,589	1,776
	Line Length, cct-km	116	128	152	806	825	401
	Medium Voltage	61	74	96	673	683	242
KDS	Low Voltage	55	54	56	132	142	160
RF3	# MV Substation	23	62	71	87	95	102
	Indoor	-	-	-	-	-	3
	Outdoor	-	-	-	-	95	99
	Line Length, cct-km	417	626	658	736	808	1,129
	Medium Voltage	192	350	368	414	462	749
SPD	Low Voltage	225	276	290	322	346	380
SKP	# MV Substation	126	158	184	196	230	308
	Indoor	-	-	-	-	132	141
	Outdoor	-	-	-	-	98	167
	Line Length, cct-km	284	298	298	304	362	<b>503</b>
	Medium Voltage	203	204	204	208	266	401
СНЛ	Low Voltage	80	94	94	96	96	103
SIIV	# MV Substation	144	155	178	187	281	312
	Indoor	-	-	-	-	51	54
	Outdoor	-	-	-	-	230	258
	Line Length, cct-km	142	144	145	150	667	732
	Medium Voltage	51	51	51	52	548	607
KGC	Low Voltage	91	93	94	98	119	125
Roo	# MV Substation	52	59	59	64	141	201
	Indoor	-	-	-	-	6	6
	Outdoor	-	-	-	-	135	195

#### Table 10: Distribution Facilities of EDC System

Location	ltem	2010	2011	2012	2013	2014	2015
	Line Length, cct-km	40	44	45	45	64	75
	Medium Voltage	24	27	27	27	46	50
РКК	Low Voltage	16	17	18	18	18	25
	# MV Substation	27	31	31	21	33	43
	Indoor	-	-	-	-	-	
	Outdoor	-	-	-	-	33	43
	Line Length, cct-km	46	46	46	48	216	246
	Medium Voltage	23	23	23	23	189	189
ммт	Low Voltage	23	23	23	25	26	<b>56</b>
	# MV Substation	31	37	37	24	25	77
	Indoor	-	-	-	-	-	-
	Outdoor	-	-	-	-	25	77
	Line Length, cct-km	106	280	280	368	567	746
	Medium Voltage	32	158	158	158	316	353
тко	Low Voltage	74	122	122	210	251	394
into	# MV Substation	31	101	104	113	167	188
	Indoor	-	-	-	-	17	25
	Outdoor	-	-	-	-	150	163
	Line Length, cct-km	249	643	643	692	691	696
	Medium Voltage	75	401	401	444	444	447
BTB	Low Voltage	174	242	242	247	247	249
5.5	# MV Substation	79	227	228	240	240	252
	Indoor	-	-	-	-		1
	Outdoor	-	-	-	-	240	251
	Line Length, cct-km	148	290	339	339	339	436
	Medium Voltage	68	206	227	227	227	311
КРТ	Low Voltage	79	84	112	112	112	125
	# MV Substation	38	71	90	105	105	187
	Indoor	-	-	-	-		-
	Outdoor	-	-	-	-	105	187
	Line Length, cct-km	45	45	60	76	76	100
	Medium Voltage	25	25	39	47	47	48
KGT	Low Voltage	20	20	21	29	29	52
	# MV Substation	24	31	36	44	44	47
	Indoor	-	-	-	-	1	1
	Outdoor	-	-	-	-	43	46
	Line Length, cct-km	100	100	112	474	790	794
	Medium Voltage	53	53	56	417	731	731
PRV	Low Voltage	47	47	57	57	59	63
	# MV Substation	17	17	20	21	194	202
	Indoor	-	-	-	-	-	4
	Outdoor	-	-	-	-	194	198
	Line Length, cct-km	136	160	171	174	181	229
	Medium Voltage	30	41	46	49	51	65
BTC	Low Voltage	107	118	125	125	130	164
	# MV Substation	33	39	50	55	60	86
	Indoor	-	-	-	-	-	8
	Outdoor	-	-	-	-	60	78

# Table 10: Distribution Facilities of EDC System (Con't)

Location	ltem	2010	2011	2012	2013	2014	2015
	Line Length, cct-km	50	64	82	82	82	89
	Medium Voltage	15	30	45	45	45	46
МКВ	Low Voltage	34	34	37	37	37	44
	# MV Substation	17	26	35	35	39	42
	Indoor	-	-	-	-	-	-
	Outdoor	-	-	-	-	39	42
	Line Length, cct-km	74	133	133	202	240	240
	Medium Voltage	40	92	92	132	151	151
STR	Low Voltage	34	41	41	70	89	89
Unix	# MV Substation	14	25	23	37	48	53
	Indoor	-	-	-	-	-	4
	Outdoor	-	-	-	-	48	49
	Line Length, cct-km	54	124	130	139	141	167
	Medium Voltage	20	90	90	92	92	103
RTK	Low Voltage	34	34	40	47	49	<b>63</b>
	# MV Substation	14	30	50	72	85	103
	Indoor	-	-	-	-	1	5
	Outdoor	-	-	-	-	84	<mark>98</mark>
	Line Length, cct-km	218	406	418	419	605	369
	Medium Voltage	128	314	325	325	466	154
SVR	Low Voltage	90	92	92	94	139	215
	# MV Substation	53	56	71	54	76	114
	Indoor	-	-	-	-	-	5
	Outdoor	-	-	-	-	76	109
	Line Length, cct-km	32	40	174	186	-	-
	Medium Voltage	11	12	141	141	-	
BVT	Low Voltage	21	28	33	44	-	
2	# MV Substation	35	50	50	21	-	-
	Indoor	-	-	-	-	-	-
	Outdoor	-	-	-	-	-	-
	Line Length, cct-km	62	64	109	120	125	133
	Medium Voltage	30	32	69	73	77	85
MDKR	Low Voltage	32	32	40	47	47	48
	# MV Substation	40	42	49	54	55	76
	Indoor	-	-	-	-	-	-
	Outdoor	-	-	-	-	55	76
	Line Length, cct-km	44	44	64	78	89	90
	Medium Voltage	20	20	33	46	48	48
KSM	Low Voltage	24	24	31	32	41	42
	# MV Substation	16	16	22	22	26	30
	Indoor	-	-	-	-	-	-
	Outdoor	-	-	-	-	26	30
	Line Length, cct-km	-	47	136	160	160	225
	Medium Voltage	-	29	117	123	123	139
KRT	Low Voltage	-	18	19	38	38	85
	# MV Substation	-	13	44	49	53	71
	Indoor	-	-	-	-	-	-
	Outdoor	- 1	-	-	-	53	71

Location	Item	2010	2011	2012	2013	2014	2015
	Line Length, cct-km	-	-	33	33	33	37
	Medium Voltage	-	-	19	19	20	24
SNI	Low Voltage	-	-	14	14	14	14
SINL	# MV Substation	-	-	25	28	32	40
	Indoor	-	-	-	-	-	-
	Outdoor	-	-	-	-	32	40
	Line Length, cct-km	4,239	5,785	6,800	9,216	10,838	11,622
	Medium Voltage	2,034	3,309	3,915	5,939	7,356	7,583
Total	Low Voltage	2,206	2,476	2,885	3,277	3,482	4,040
Total	# MV Substation	2,405	3,121	3,627	3,914	4,694	5,528
	Indoor	-	-	-	-	1,284	1,475
	Outdoor	-	-	-	-	3,410	4,053

# Table 10: Distribution Facilities of EDC System (Con't)

# RURAL ELECTRIFICATION FUND OF EDC

#### **Establishment of Rural Electrification Fund (REF)**

The Royal Government of Cambodia (RGC) issued the Royal Decree No. NS/RKT/1204/048 dated 4 December 2004 on the establishment of Rural Electrification Fund of the Kingdom of Cambodia under MME to accelerate the development of rural electrification. Then, on 22<sup>nd</sup> August 2012, RGC issued a new Royal Decree No. NS/RKT/0812/734, amending some articles of the old Royal Decree on the formation of Rural Electrification Fund, to integrate Rural Electrification with EDC as a department so that REF can continue to perform its works independently on Cambodian funding by receiving major fund from EDC and also grant and donations from external funding to assist in the development of rural electrification in Cambodia.

#### Work progress of REF after integration with EDC until the end of 2015

- 1. Power to the Poor (P2P): The purpose of this program is to facilitate the poor households in rural areas to access to electricity for their houses from grid supply by providing interest free loan to meet (i)- costs for the connection fees, (ii)- costs for deposit, (iii)- costs for the equipment and the installation of wires from the connection point to its house, and (iv)- costs for the equipment and the installation of in-house wiring. The loan will be paid through the electricity suppliers who are responsible for paying back to REF by collecting the borrowers' monthly installments within a specific period. The amount of this loan shall not exceed 480,000 Riels per household. So far, 1,622 rural families' equivalent to 7,461 people have directly benefited from this program.
- 2. Solar Home Systems (SHS) Program: The purpose of this program is to facilitate the remote rural household, which may not access to the electricity network for a long period, to access electricity through SHS. REF subsidizes 100 USD per SHS to rural households, as assistance to reduce the cost of the SHS and purchasers shall pay monthly installment without interest, in a period of four years. After the purchaser has paid the remaining cost in full, the SHS will become the property of the purchaser. So far, 11,240 rural families' equivalent to 51,704 people have directly benefited from this program.
- 3. **Program for Providing Assistance to Develop Electricity Infrastructure in Rural Areas:** The purpose of this program is to facilitate the private electricity supplier in rural areas having legal license to access fund for investing on expansion of electricity supply infrastructure to fully cover its authorized distribution area in order to allow all rural households to have access to electricity for use. So far, 199 licensees equivalent to the length of 2,375 km have directly benefited from this program.

# CAMBODIA POWER DEVELOPMENT PLAN

#### **Power Sector Development Policy**

The Royal Government of Cambodia formulated an energy sector development policy in October 1994, which aims at:

- Providing an adequate supply of electricity throughout Cambodia at reasonable and affordable price,
- Ensuring reliable and secure electricity supply which facilitates investment in Cambodia and development of the national economy,
- Encouraging exploration and environmentally and socially acceptable development of energy resources needed for supply to all sectors of the Cambodian economy,
- Encouraging efficient use of energy and minimizing environmental effects resulting from energy supply and use.

#### **Power Demand Forecast**

According to Power Development Plan of the Kingdom of Cambodia, prepared in 2007, electricity demand is expected to face a significant increase for the next 15 years. Electricity generation in Cambodia is projected to grow from 409 MW and 2,242 GWh in the year 2010 to 2,678 MW and 14,951 GWh in the year 2025. To meet the future demand, the Royal Government has developed Power Development Plan up to 2030.

The majority of this growth will occur in the southern grid which includes Phnom Penh. The Table below depicts the expected power demand and energy output for Cambodia.

Base Case	Unit	2015	2020	2025	
Peak in National Grid	MW	951*	1 691	2,678	
Peak in Whole Country	MW	1,103	1,001		
Energy in National Grid	GWh	5,698*	0.406	14.051	
Energy in Whole Country	GWh	6,015**	9,400	14,951	

#### Table 11: Cambodia's Power Demand Forecasting

\* Peak Demand and Energy in National Grid are actual data in 2015.

\*\* Energy in whole country is actual data in EAC Annual Report 2015.

#### **Generation Master Plan**

Generation Master Plan has been developed on the following criteria:

- Peak thermal generation in Phnom Penh.
- Small and medium size diesel units for base and peak load generation in the provincial towns and cities.
- Expansion of hydro development based initially on smaller size hydropower plants which are easily accessible such as Kirirom I & III, and subsequently mid and large size hydro projects such as Lower Sesan II, Battambang, Lower Srepork II.

No.	Project Name	Туре	Capacity (MW)	Operation Year
1	135 MW Coal Fired Power Plant (CIIDG)	Coal	120	2017
2	Lower Sesan II	Hydro	400	<b>2018</b>
3	Coal Fired Power Plant I	Coal	100	2010
4	Coal Fired Power Plant II	Coal	120	2019
5	Coal Fired Power Plant III	Coal	250	2020
6	Coal Fired Power Plant IV	Coal	250	2021
7	Chay Areng	Hydro	108	2022
8	Pursat I	Hydro	40	
9	Battambang II	Hydro	36	2023
10	Lower Sesan III	Hydro	260	
11	Lower Sre Pok III (3B)	Hydro	68	
12	Lower Sre Pok IV	Hydro	48	2024
13	Lower Sre Pok III (3A)	Hydro	300	
14	Prek Liang I	Hydro	72	
15	Prek Liang II	Hydro	50	
16	Prek Chhlong II	Hydro	16	
17	Lower Sesan I	Hydro	96	2025
18	Prek Por	Hydro	17	
19	Lower Sekong	Hydro	190	
20	Thermal I	Coal / Gas	300	
	Total		2,841 MW	

# Table 12: Generation Development Plan 2016 - 2025

# Table 13: Transmission Master Plan

# Transmission Development Plan 2016 - 2025

No.	115 kV Transmission Line	Length (km)	Year	Development Partner
1	GS Siem Reap - New GS East Siem Reap	25	2016	BOT
2	GS2 - GS Hunsen Park and Grid Substation	5		ВТ
3	GS7(SPP) - GS Prey Veng - GS Bavet	160		CEIB
4	Laos Border to GS Preah Vihear	60	2017	CEIB
5	GS Battambong - GS Pailin	80		EDC
6	GS3 - GS Toul Kork	5		EDC

No.	115 kV Transmission Line	Length (km)	Year	Development Partner
7	GS5 - GS Chroy Changvar	18	2017	Remain from Phnom Penh Loop Line Project (CEIB)
8	GS Kampong Cham - GS Praek Prosab (Kratie)	91		AFD
9	GS Svay Antor - GS Prey Veng	46		CEIB
10	GS Preah Sihanouk - GS Ream	12		CEIB
11	GS Ream - GS Chamkar Loung	60	2018	LDP
12	GS Chamkar Loung - Kirirom III Hydro Power	27		LDP
13	GS Kampong Thom - GS Preah Vihear	140		CEIB
14	GS Krolanh - GS Oddar Meanchey	80		LDP
15	Underground Line from GS1 - GS EDC HQ - GS Samdech Hunsen Park - GS Olympic Stadium - NCC - GS3	14	2019	JICA Phase 1
16	GS Praek Prosab - GS Kratie	30	2021	LDP
	Total Length	853	km	

# Transmission Development Plan 2016 - 2025 (Con't)

No.	230 kV Transmission Line	Length (km)	Year	Development Partner
1	GS Kampong Cham - GS Kratie	125	2017	вот
2	GS Kratie - GS Stung Treng	115	2017	IEB
3	GS Stung Treng - Lower Sesan II	26	2017	вот
4	GS Battambang - East Siem Reap - Kampong Thom - Kampong Cham	350	2018	CEIB
5	Phnom Penh Loop Line Phase 2 (NPP - Chroy Changvar - EPP - NPP)	96	2018	CEIB
6	Tatay Hydropower - Phnom Penh	182	2018	вот
7	GS Koh Kong - GS Koh Kong City	20	2018	AFD
8	GS Chamkar Loung - GS Botumsakor	54	2018	AFD
9	GS Botumsakor - Tatay Hydropower	70	2018	LDP
10	GS Kratie - GS Mondulkiri	170	2019	CEIB
11	GS Ratanakiri - GS Stung Treng	120	2019	CEIB
12	GS Stung Treng - Laos Border	48	2019	LDP

# Transmission Development Plan 2016 - 2025 (Con't)

No.	230 kV Transmission Line	Length (km)	Year	Development Partner
13	GS Beak Chan - GS5 - NCC	20	2020	JICA Phase II
14	GS Tropang Prasat - GS Siem Reap	30	2021	вот
Total Length		1,426 km		

No.	500 kV Transmission Line	Length (km)	Year	Development Partner
1	Phnom Penh - Preah Sihanouk	198	2019	вот
2	Phnom Penh - Soung	96	2021	LDP
3	Soung - Sambo - Stung Treng	-	2025	LDP
Total Length		294	km	

# **POWER COOPERATION WITH NEIGHBORING COUNTRIES**

#### **Power Interconnection with Thailand**

The Power Cooperation Agreement with Thailand was signed on 3<sup>rd</sup> February 2000. This agreement provided a framework for the power trade and technical assistant between these two countries and opened the power access to the third countries. The Power Purchase Agreement (PPA) was signed in 2002 and amended in 2007. It encouraged the joint utilization of the existing natural resources of the two countries. When the power pool is established in the future, both countries will be able to participate widely in term of receiving and supplying the power.

Electric Power between Cambodia and Thailand is transmitted at 115 kV and 22 kV levels. 115 kV transmission line from Aranya Prathet substation, Thailand connection to BTC, BTB and SRP was commissioned in 2007.

An agreement was signed with Trat Province (Thailand) to supply power to Koh Kong province (Cambodia) and Poit Pet (Cambodia) via 22 kV line. The above areas have been connected since 2001.

#### **Power Interconnection with Vietnam**

The Power Cooperation with Vietnam was signed on 10<sup>th</sup> June 1999. The agreement aims at the cooperation in Power Sector between the two countries. The supply of power to the areas along the border by medium voltage lines and interconnection between high voltage lines is encouraged.

In early 2009, EDC imported power from Vietnam via a 230kV transmission line to supply Phnom Den, Takeo Province and Phnom Penh in March 2009.

Since 2002, EDC has imported power from PC2 (Vietnam) to supply power to Memut and Ponhea Krek Districts of Kampong Cham Province, Bavet in Svay Rieng Province, Kampong Trach in Kampot Province, Koh Thom and Chrey Thom in Kandal Province, Snuol District in Kratie Province, Keo Seima District in Mondulkiri Province, Kompong Ro in Svay Rieng Province.

#### **Power Interconnection with Lao PDR**

The Power Cooperation with Lao PDR was signed on 21<sup>st</sup> October 1999. The agreement aims at the cooperation in Power Sector between the two countries. The supply of power to the areas along the border via medium voltage (22kV) lines and interconnection between high voltage links are also encouraged. The 22 kV interconnection line from Lao to Stung Treng was charged in 2010.

In 2015, A new interconnection point from Champasak province, Ban Hat Substation, Lao PDR to Kampong Sralau, Preah Vihear province, Cambodia, the initial design and construction for the 115 kV transmission line was energized at 22 kV voltage level for the first stage until the transmission line from Lao boarder to Chey Sen Substation was completed.

#### **Sub-regional Interconnection**

Interconnections between the isolated grids of the countries within the Mekong Basin (Cambodia, Laos, Thailand, Vietnam, Yunan-China and Myanmar) or even a further extension of this grid to include Malaysia and Singapore have been subjected to a number of studies which aim at improving the utilization of energy resources. The report of ASEAN interconnection Master plan has been adopted since 2002,

presenting a clear study about the ASEAN interconnection. Meanwhile, the revision of the ASEAN Interconnection Master Plan is under study by the ASEAN study team.

The study provides mostly an assessment of the viability and priority of regional interconnections based on the pre-feasibility studies. The study has postulated an urgent need to develop ASEAN Power Grid (APG). The ASEAN Power Grid Consultative Committee (APGCC) has been established. However, among the 10 interconnection options studies, the links between Cambodia and Vietnam are ranked as fourth and classified as a potential short to medium term project for completion before 2010.





# **FINANCIAL DATA**

#### ELECTRICITE DU CAMBODGE STATEMENT OF FINANCIAL POSITION AS AT 31 DECEMBER 2015

	2015	2014
	KHR'000	KHR'000
ASSETS		
Non-current assets		
Property, plant, and equipment	3,253,353,952	2,408,088,218
Intangible assets	520,508	687,102
Other non-current assets	-	-
	3,253,874,460	2,408,775,320
Current assets		
Cash and cash equivalents	1,051,948,504	923,608,421
Trade and other receivables	541,137,022	501,221,983
Inventories	232,951,873	202,191,621
	1,826,037,399	1,627,022,025
Total Assets	5,079,911,859	4,035,797,345
EQUITY		
Assigned capital	729.231.615	684.018.062
Retained earnings	1.470.684.535	1.117.011.742
	2,199,916,150	1,801,029,804
LIABILITIES		
Non-current liabilities		
Borrowings	1,889,207,441	1,539,666,227
Customer deposits	178,871,675	135,496,263
Provision for retirement benefit	3,150,191	2,676,712
Deferred tax liabilityies -net	27,572,798	19,986,869
	2,098,802,105	1,697,826,071
Current liabilities		
Trade and other pavables Borrowings	627.636.366	401.678.538
Borrowings Trade and other pavables	86.589.761	79.926.370
Income Current income tax liability	66.967.477	55.336.562
······	781,193,604	536,941,470
TOTAL EQUITY AND LIABILITIES	5,079,911,859	4,035,797,345

#### ELECTRICITE DU CAMBODGE STATEMENT OF COMPREHENSIVE INCOME For the year ended 31 December 2015

	2015	2014
	KHR'000	KHR'000
Revenue		
Electricity sales	3,763,629,241	2,958,274,445
Connection service fees	34,298,112	39,544,709
Other income	15,722,090	15,392,163
	3,813,649,443	3,013,211,317
Operating expenses		
Purchased power	(2,820,985,078)	(2,243,866,492)
Fuel costs	(6,927,267)	(29,471,785)
Import duty	(29,065,630)	(33,963,181)
Salaries and other benefits	(153,172,713)	(125,726,983)
Other operating expenses	(214,287,293)	(77,844,015)
Depreciation	(82,468,483)	(72,081,334)
Amortisation	(195,512)	(157,261)
Operating profit	506,547,467	430,100,266
Net finance costs	(39,682,849)	(49,513,604)
Profit before income tax	466,864,618	380,586,662
Income tax expense	(98,108,272)	(78,915,691)
Net profit for the year/total		
Comprehensive income for the year	368,756,346	301,670,971

#### ELECTRICITE DU CAMBODGE STATEMENT OF CASH FLOWS For the year ended 31 December 2015

	2015	2014
	KHR'000	KHR'000
Cash flow from operating activities		
Net profit for the year	368,756,346	301,670,971
Adjustments for:		
Depreciation and amortisation	82,663,995	72,238,595
Foreign expense (gain/loss)	(31,571,899)	14,117,848
Loss on disposal of property, plant, and equipment	12,808,239	6,283,814
Interest expense	55,001,635	51,919,427
Income tax expense	98,108,272	78,915,691
Addition of allowance		
for bad and doubtful debts	1,535,930	927,326
Allowance for retirement benefits	473,479	81,148
Allowance for inventory obsolescence	4,700,449	3,234,536
	592,476,446	529,389,356
Changes in:		
Trade and other receivables	(8,194,377)	194,160,027
Inventories	(142,208,968)	(99,960,225)
Other non-current assets	-	192,251,528
Trade and other payables	223,357,912	(186,735,533)
Customer deposits	43,375,412	32,265,730
Net cash generated from operations	708 806 425	661 370 883
Interest paid	(52 401 719)	(82 978 722)
Interest tax paid	(78 891 428)	(76, 330, 489)
	(10,001,120)	(10,000,100)
Net cash generated from operating activities	577,513,278	502,061,672
Cash flows from Investing activities		
Purchases of property, plant, and equipment	(395,096,151)	(308,055,029)
Purchase of intangible assets	(28,918)	(723,963)
Proceeds from disposal of property, plant, and	06.664	
equipment	90,004	290,204
Net cash used in investing activities	(395,028,405)	(308,482,728)
Cash flow from financing activities		
Proceeds from horrowings	30 172 387	76 222 022
Renavments on borrowings	(86 253 113)	(117 003 /00)
Government grants	1 935 936	(117,000,409)
Overnment grants	1,000,000	(140,012)
Net cash used in financing activities	(54,144,790)	(40,926,489)
Net increase in cash and cash equivalents	128,340,083	152,652,455
Cash and cash equivalents at beginning of the year	923,608,421	770,955,966
Cash and cash equivalents at end of the year	1,051,948,504	923,608,421

# **ELECTRICITE DU CAMBODGE**

# 2, Preah Ang Yukanthor Street(19), Wat Phnom, Daun Penh District, Phnom Penh, Cambodia.
Tel : 855 23 724 771
Fax : 855 23 426 018
Email : info@edc.com.kh
Website : www.edc.com.kh