Cambodia Energy Situation

COGEN 3: A Business Facilitator
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Raffles Hotel Le Royal, Phnom Penh

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Country Co-ordinator, Cambodia

Local Energy Situation & Role of Country Coordinator

- Primary energy consumption
- Electricity Production
- Electricity Transmission Network
- Major Power Plants (with fuels)
- Cogeneration Plants (Status)
- Gas Utilization (in sectors)
- Gas Transmission network
- Coal Harbours and Location of Consumers
- Energy Pricing
- Energy Sector Legislation
- Coming and Future Legislation
- Promotion Actions for Cogeneration
- Role of Country Coordinators

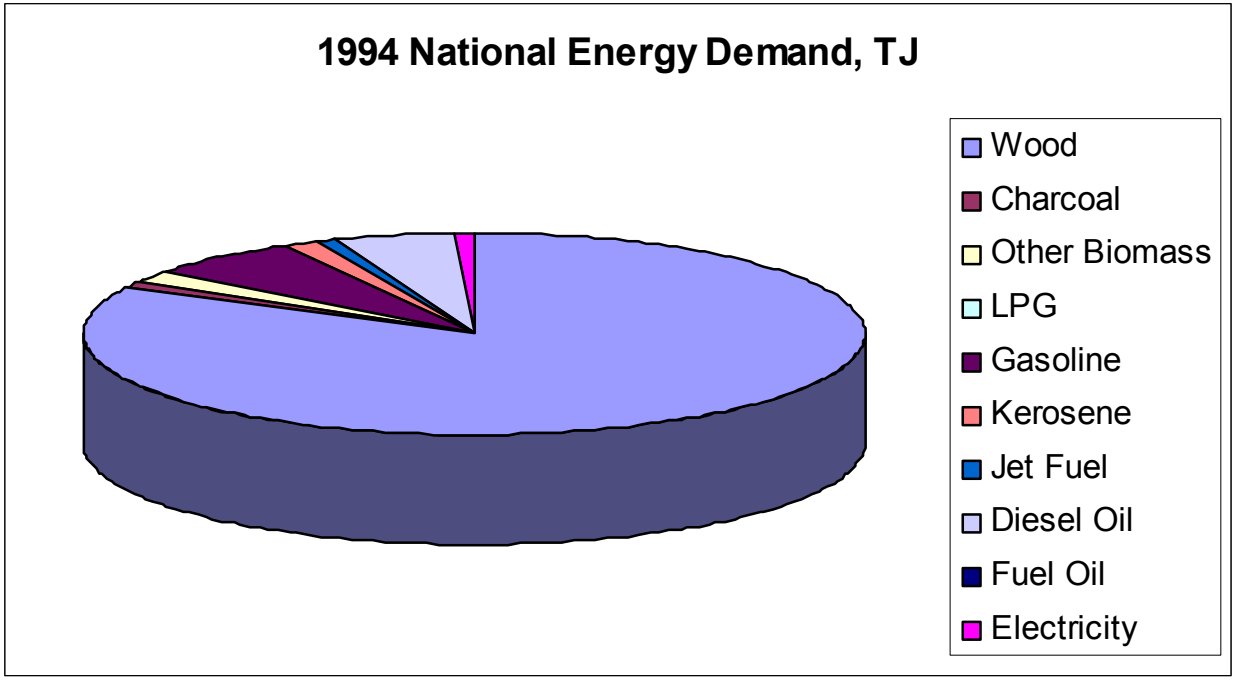
1. Primary Energy Consumption

- Biomass accounts for over 85% of the total energy demand, for household use
- All petroleum fuels are imported.

1. Primary Energy Consumption (cont.)

1994 National Energy Demand (in Terajoules, TJ)

Source: Asian Development Bank-Ministry of Industry, Mines and Energy, Strengthening the Institutional and Legal Framework for the Energy and Minerals Sectors Project, October 1996



1. Primary Energy Consumption (cont.)

1994 National Energy Demand (in Terajoules, TJ)

Source: Asian Development Bank-Ministry of Industry, Mines and Energy, Strengthening the Institutional and Legal Framework for the Energy and Minerals Sectors Project, October 1996

		%
Wood	77,721	83
Charcoal	1,097	1
Other Biomass	1,754	2
LPG	103	0
Gasoline	6,006	6
Kerosene	1,323	1
Jet Fuel	725	1
Diesel Oil	4,580	5
Fuel Oil	65	0
Electricity	777	1
TOTAL	94,151	100%

2. Electricity Production

- The country is served by 22 small isolated power systems.
- These systems can be divided into two parts:
  - Phnom Penh and six big provincial towns served by EDC
  - the remainder of the country is served under the responsibility of MIME

2. Electricity Production (cont.)

Fuel Used by Power Plants under the EDC

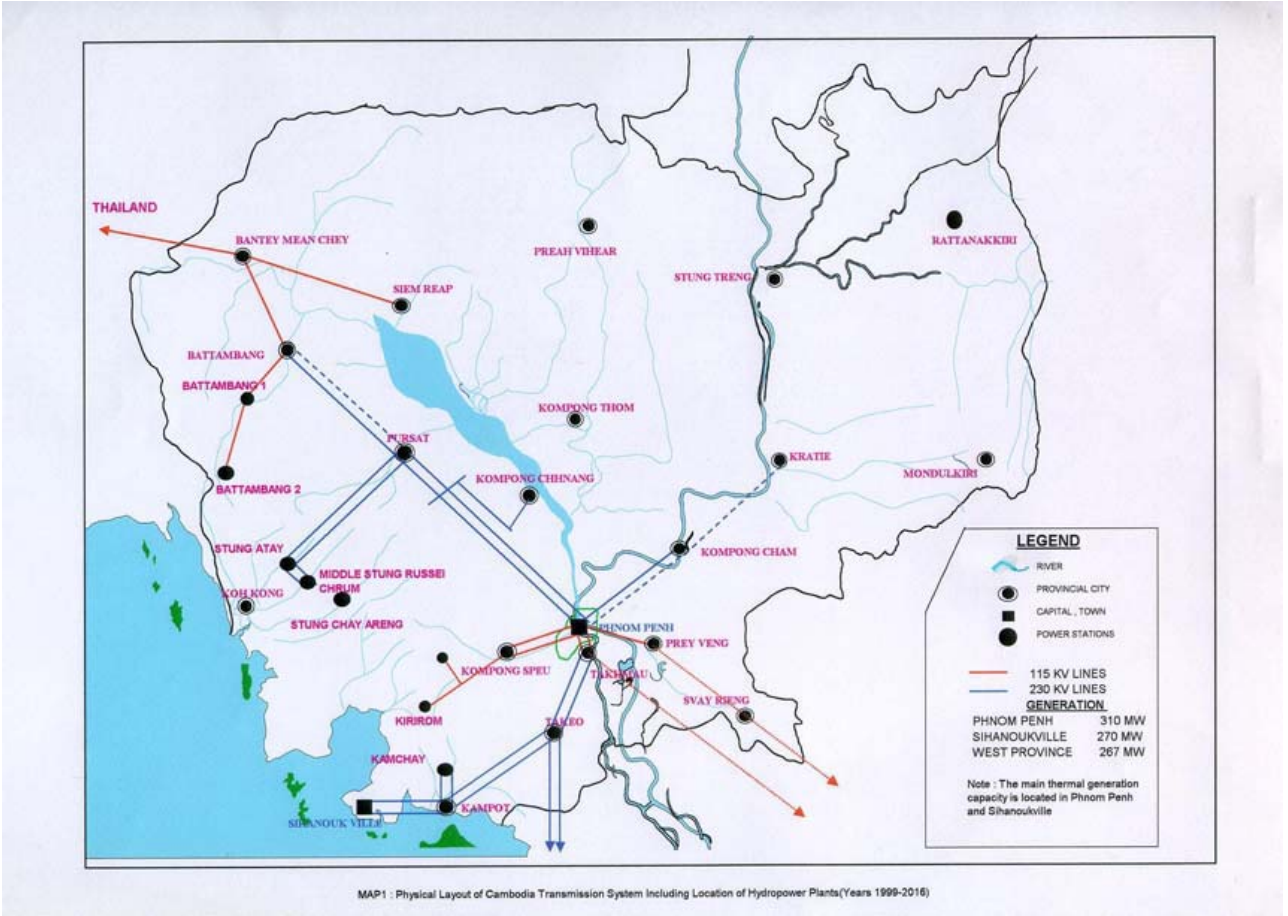
	MW	
C2	18	HFO*
C3	14	Diesel
C5	10	Diesel
C6	18	HFO
IPP1	35	HFO
Jupiter	15	Diesel

***HFO -** heavy fuel oil

3. Electricity Transmission Network

- At present, there is no National Transmisson System
- The Country's Transmission Planning includes the development of a national grid linking the larger generating units to population centers in phases
  - ❑ southern grid
  - ❑ northern grid

3. Electricity Transmission Network (cont.)



MAP1 : Physical Layout of Cambodia Transmission System Including Location of Hydropower Plants(Years 1999-2016)

3. Electricity Transmission Network (cont.)

Transmission Plan

- **First Phase, Southern Grid**
- **Phnom Penh to border of Vietnam, 220 kVtransmission through to Takeo with a brancj link from Takeo to Sihanoukville through Kampot**
- **Second Phase, Northern Grid**
- **A 115 kV interconnection from Thailand to Banteay Meanchey, Siem Reap and Battambang provincial towns, to benefit from regional power trade opportunities**

3. Electricity Transmission Network (cont.)

Transmission Plan (cont.)

2001 - IPP2 – GS1 – GS3 in Phnom Penh
2002 - 120 km of 115 kV from Kirirom 12-MWe hydro power to Phnom Penh, inaugurated late May 2002;

Project of 115 kV interconnection, for the years 2001 to 2005, from Thailand to Banteay Meanchey, Siemreap and Battambang provinces;

2004 - Southern grid of Phnom Penh – Border of Vietnam, 220 kV transmission to Takeo (import-export), and

2003 - with a branch link Sihanoukville-Kampot-Takeo-Phnom Penh (import);
2005 - Sihanoukville
2007 - GS1 to North Phnom Penh In East Phnom Penh – Kampong Cham

3. Electricity Transmission Network (cont.)

Transmission Plan (cont.)

2008 - Kamchay – Kampot
2011 - Battambang 1&2 – Battambang
In Phnom Penh (South)
2012 - Stung Atay – Pursat
2013 - In Phnom Penh (West)
2014 - Sihanoukville
2015 - In Phnom Penh (Central)
2016 - Mid S.R.C. – Stung Atay
Kampong Chhnang connected
Battambang-Pursat

3. Electricity Transmission Network (cont.)

Transmission Plan (cont.)

MV interconnections of 22 kV & 15 kV from Vietnam to :

- Memot and Thbong Khmum, of Kampong Cham province;
- Snuol of Kratie province;
- Kaam Samnar of Kandal province;
- Kampong Ro and the capital of Svay Rieng, Svay Rieng province;
- Chrey Thom of Takeo province;
- Kampong Trach of Kampot province.

3. Electricity Transmission Network (cont.)

Transmission Plan (con.)

MV interconnections from Thailand to:

- The capital of Koh Kong province;
- The capital of the Pailin municipality;
- O Smach, Oudor Meanchey province;
- Poipet, Banteay Meanchey province;
- Sampeou Loun, Phnom Prek, and Kamrieng, Battambang province.

Transmission project from Vietnam to southern Phnom Penh, via Svay Rieng province, along High way # 1

4.a Power Plants

Fuel Used by Power Plants under the EDC

C2	18	HFO*
C3	14	Diesel
C5	10	Diesel
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***HFO -** heavy diesel oil

4.b Cogeneration Plants

There are no Cogeneration Power Plants yet in the country

However, most factories in Cambodia use fuel to generate electricity for its own use, which makes cogeneration a possible energy option particularly in rice mills, wood product, textile, palm oil, etc.

4.b Cogeneration Plants (cont.)

Cogeneration Potential

In 2001, the Cambodian Investment Board approved the following investment projects that have cogeneration potential:

	Fixed Assets (US$, million)
Energy	50.0
Food Processing	2.0
Garment	19.6
Metal	1.5
Paper	2.3
Plastic	2.1
Tobacco	3.6
Wood Processing	1.2
Hotels	70.8

4.b Cogeneration Plants (cont.)

Key Players in the Cogeneration Market:

The following is a list of existing industries and hospitals, universities and hotels, which have potential applications for cogeneration:

	Number of Companies
Food, Beverages, Tobacco	31
Textile, Wearing Apparel & Leather	240
Manufacture of Wood Products Including Furniture	7
Manufacture of Paper Product, Printing & Publishing	16
Non-metallic Mineral Products (Cement, Tiles, Bricks)	11
Hospitals	30
University, Colleges, Educational Entities	27
Hotels (Phnom Penh, Siem Reap, Sihanoukville)	222

The ***Standard and Efficiency Office*** of the Technical Energy Department, Ministry of Industry, Mines, and Energy (MIME,) is responsible for promoting practice of energy efficiency in factories, enterprises, buildings and households.

The key license for eligible projects is the investment license issued by the **Council for the Development of Cambodia (CDC).**

5. Gas Utilization

Natural Gas is currently not available in Cambodia.

Only bottled LPG is used for cooking purposes.

6. Gas Transmission Network

All LPG products imported into the country are transported by land transport from seaport terminal to the distribution points.

Natural Gas is currently not available in Cambodia, but several options were identified: to develop national gas resources and/or to import NG from neighbouring countries.

7. Coal Harbors and Consumers

Negligible quantity of coal, imported from Vietnam, is used by a diffuse and very small number of artisans in rural areas bordering Vietnam.

There is no port facility for handling coal in large quantity.

8. Energy Pricing

Energy pricing: petroleum fuels & electricity, in the municipality of Phnom Penh, as of 29th July 2002, exchange rate 3,900 Riels = 1 US$

Petroleum fuels:

- Gasoline Super, 97 Octane: USD 0.59/liter (2,300 Riels/liter)
- Gasoline Regular, 92 Octane: USD 0.56/liter (2,200 Riels/liter)
- Lighting Kerosene: USD 0.33/liter (1,300 Riels/liter)
- Diesel Oil: USD 0.41/liter (1,600 Riels/liter)
- Light Fuel Oil: USD 0.23/liter (900 Riels/liter)

8. Energy Pricing

Electricity:

Tariff adopted by State enterprise Electricité du Cambodge (EdC): in USD Cents/kWh

- Residential sector: between 9 and 17, between 0 and 100 kWh/month;
- Industrial & handicraft sector, and also commercial & services sectors, as well as hotel & guest house: between 13 and 17;
- Embassy, foreigners' house, NGO, International organizations: 21
- Government institutions: 18

Tariff adopted by local entrepreneurs, in the outskirts of the center of Phnom Penh, as well as in many rural areas: between 33 to 50.

Tariff adopted in the provincial capitals: between 13 and 22.

Electricity tariffs in Cambodia are the highest in the region, and probably one of the highest in the world.

9. Energy Sector Legislation

- In electricity: For licensing and tariffs setting - under the Electricity Law. The Electricity Authority of Cambodia (EAC) is a regulating authority

- In environment: Environmental Impact Assessment sub-decree

- Renewable Energy Action Plan is currently under preparation

- Institutions concerning cogeneration: Ministry of Industry, Mines and Energy; Ministry of Environment (Climate Change Unit), Ministry of Agriculture, Forestry and Fisheries, Ministry of Economy and Finance; Ministry of Planning; Ministry of Rural Development, etc.

NOTE: Project developers who wish to get financial benefits, such as duties and taxes free for imported equipment, must make the licensing process for their projects through the Council of Development of Cambodia (CDC). This is a one desk authority, chaired by the Cambodian PM Office. It is designed to help ''ease the red tapes''.

10. Coming and Future Legislation

There is a tax incentive for power projects and for environmental protection projects, as stated in the new draft Law on Investment. This draft law has been referred to the National Assembly and promulgation expected by the end of 2002.

Source: Cambodia Investment Guide, 2002 Mekong Law Report.

11. Promotion Actions for CHP/COGEN

- Full Scale Demonstration Project (FSDP)
- Awareness raising among end-users
- Global Environment Facility (GEF) - cogeneration projects can apply for funding
- Clean Development Mechanism
- Environmental protection benefit
- Potential for cooperation with other projects (PREGA, WB, ADB, UNDP, etc.)