

**DEVELOPMENT  
IN VIETNAM ENERGY SECTOR**

*English. Volume 15-18 under EOP*

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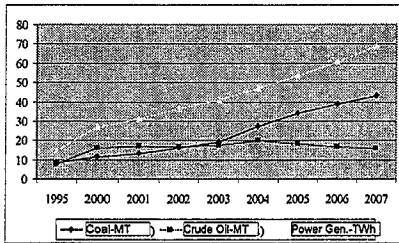
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**I ENERGY PRODUCTION PERIOD 1995-2007**



**Growth Rate 1995-2007:**  
 - Coal Production 14,6 %  
 - Electricity 13,8 %  
 - Crude oil 6,3 %

**2007**  
 - Coal: 43,2 Mill.tons  
 - Elect. Power 69,1 TWh  
 - Crude oil: 15.9

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**I FINAL ENERGY CONSUMPTION 1990-2007**

Unit: KTOE

Năm	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007
Coal	1324	2603	3223	3743	4017	4337	4851	5351	5528	6090
Petroleum	2479	4247	6920	7427	8884	10235	11888	12254	12317	14016
Gas	5.0	21.2	19.4	18	18	18	270	515	310	543
Electricity	532	963	1927	2223	2600	3002	3405	4051	4630	5256
Non-Commercial	12421	12872	14191	14297	14399	14694	14734	14780	14841	14848
Total	16760	20707	26280	27708	29918	32286	35148	36951	37627	40762

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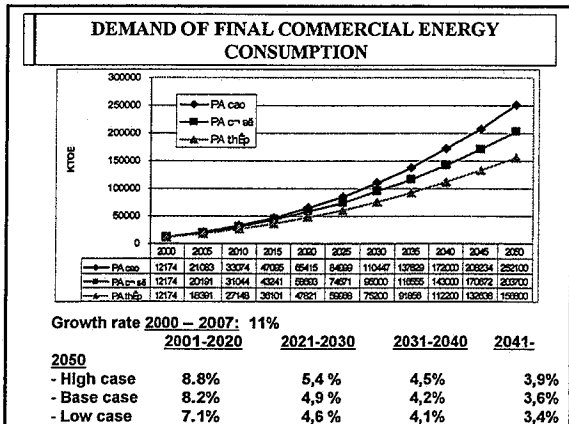
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### Renewable/biomass Energy: Potential & Current Use

VN is relatively endowed with multiform RE resources.

Main RE resources like biomass/biogas/bio-fuel, wind, solar, small hydro and geothermal energy.

The most basic use of renewable energy is biomass for heat. Fuelwood, agricultural residue and animal waste are used as heat source of households.

Up to day, only biomass (bagasse) and small hydro is used for power generation to supply to national - grid. Others, e.g. Solar and wind to off – grid.

Target for bio-fuels (ethanol and bio-diesel) was set up and considered for development.

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### Small Hydropower

**Potential**  
Small hydropower potential (<30MW): over 4,000MW with 12,000-14,000GWh. However, since some potential sites are located far from load center and their economic feasibilities are expected to be low.

**Current Use**

- + There are more than 50 grid-connected small hydropower plants (total capacity: 64MW, unit capacity: 100kW-10MW).
- + And there are about 300 off-grid small hydropower plants (total capacity: 70MW, unit capacity: 5-200kW).
- + Also, about 150,000 small hydropower systems (0.1-1kW) for households have been sold




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## Solar Energy

### Potential

Vietnam is relatively rich in the solar energy potential with 4.5kWh/m<sup>2</sup>/day of annual average sunshine nationwide. Especially solar potential in central and central-southern provinces, where amount of solar radiation is stable throughout the year, is high. (5.15kWh/m<sup>2</sup>/day of annual average sunshine hours.)

### Current Use

1250 kW of solar PV power systems installed.

Market shares:

Exclusive systems (50%)

Institution, school, hospital and battery charging systems (20%)

Household PV power systems (30%).

Solar water heaters: Some design prototypes of solar water heater were studied and installed in Vietnam for hospitals, kindergartens, schools, restaurants, health care centers etc



## Wind Power

> Larger potential (3000km of coastal line and islands)

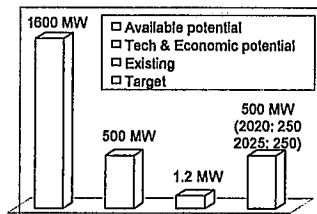
> On grid and off grid

> Some activities have been being done

❖ Promoting R & D

❖ Installation of measurement towers (50-60m)

❖ Pre/and feasibility reports (6) ~Σ100 MW



## Geothermal Power Resources

300 hot mineral water resources, surface water temperature 40-180 °C.  
Total capacity of about 200-340 MW may be developed

## Biomass Energy

### Potential:

+ Total biomass potential: more than 60 million tons produced annually, including:

- Rice husk: 7-7.5 million tons
- Bagasse: 4-4.5 million tons
- Rice straw: 35-37 million tons
- Wood and wood wastes (saw dusts, wood wastes): 10-15 million tons
- Others (coffee husks, coconuts...): 1-1.5 million tons

### Biomass for heat

\* Consumption in rural households (cooking): 10,500 KTOE

\* Consumption in rural small scale industry (brick making, ceramic burning, food processing...): 2,500 KTOE




**Biomass for power**

**Potential:**  
More than 500 MW

- > Bagasse in sugar mills (Cogeneration) : 250 MW
- > Rice Husk Fired Power Plants: 200MW
- > Others (Wood Processing, Coffee Husk): 50 MW

**Current**

- > For Cogen: 150 MW Installed In 42 sugar mills


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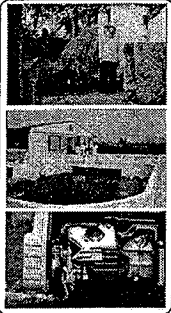
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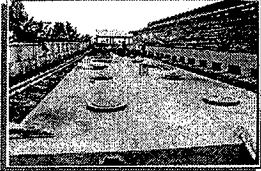
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**Biogas Energy**



About 100,000 household size biogas digesters have been constructed. (average capacity: 5-10 m3)

In many localities, there are groups of private builders providing construction services.




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 **Bio-fuel (Ethanol and Bio-diesel)**

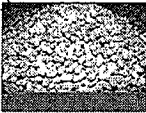

**A. Available raw material for Ethanol**

1. Sugar plants (sugar cane, molasses...)
2. Starch plants (cassava, sweet potatoes, corns, cereal)

**B. Available raw material for Bio-Diesel**

1. Coconuts
2. Basa, tra fish

**C. Target:**  
Bio-Ethanol and Bio-diesel production has been being promoted and utilization action plan for 2015 & 2025


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**PRIMARY ENERGY SUPPLY CAPABILITY**

**Up to 2025**

- Coal: ~80 - 90 MT/ann
- Crude oil: 18-21 MT/ann.
- Gas: 16,5 BCM/ann.
- Hydropower: 60 TWh/ann.

**... to 2030**

- Coal: >100 MT/ann.
- Crude oil: 18-22 MT/ann.
- Gas: 18 - 20 BCM/ann.
- Hydropower: 70 - 80 TWh/ann.

**Renewable energy for power generation**

	2007		Potential to 2025		Potential to 2030	
	MW	TWh	MW	TWh	MW	TWh
Small HPPs	430	1350	4000-4500			
Wind	1,2	0	500			
Solar	1,25	NA	40-80	18 - 20	9500	30,5
Biomass	150	NA	500			
Geothermal	0	0	200			
<b>Total</b>	<b>580</b>	<b>~1,4</b>	<b>5200-5700</b>			

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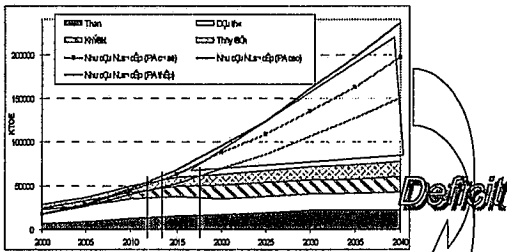
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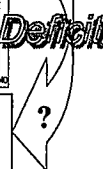
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**ENERGY DEMAND – SUPPLY BALANCE**



- Energy Saving/Efficiency
- Import (fuel/energy)
- Renewable
- Nuclear PP




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**ENERGY development PLANNING & Implementing**

- Diversifying
  - Energy type (Renewable, Import/Exchange, Nuclear power plant...)
  - Investment sources (IPP, BOT...)
- Refineries (1,2 &3): The 1<sup>st</sup> is in operation by Feb. 2009 (Dzung Quat Refinery – 6.5 Mill. Ton/annum)
- Commercial Energy Efficiency program/ Energy Efficiency program: Energy audit program, Promote the development of ESCO in Industry & Commercial sectors
- National DSM program: Load research, TOU, Labeling... in power sector

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**ENERGY development PLANNING & implementing  
(Cont's)**

- **Import fuel: meet the regional coal exporters to find out a source**
- **Power Interconnection/Trade: a new power trading between VN and Cambodia: prepare sending power to Phnompenh via 220kV Chaudoc – Takeo – Phnompenh in 2009; Developing HPPs in Lao PDR & Cambodia...**
- **Restructure Power sector: Government has a Road map for restructure power sector (ERAV was established by 19 Oct. 2005)**
- **Nuclear PP: going to submit Pre-F/S of 1<sup>st</sup> NPP to VN National Assembly**
- **Promoting Renewable Energy Development: Decision of government no 1885-2007 and 177-2007:**

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**Policy/Strategy for Renewable Energy Development**

a). The Decision No. 1885/QĐ-TTg dated 27 December 2007 by Prime Minister approving Strategy on Vietnam National Energy Development up to 2020, and outlook to 2050

Some main contents of strategies on national energy development related to promotion of renewable energy development:

- i). *Diversification of renewable energy resources*
- ii). *Encouraging study and use of renewable energy types, focus on remote mountainous, island areas.*
- iii). *Strive to increase share of renewable energy to about 3% of total commercial primary energy in 2010; 5% in 2020 and 11% in 2050.*
- iv). *By 2020, most rural population will have access to electricity (based on both grid and off-grid local power resources).*

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**Policy/Strategy for Renewable Energy Development (cont's)**

b). The Decision No. 177/2007/QĐ-TTg dated 20 November 2007, by the Prime Minister approving "Project on Biofuel Development for Period up to 2015, Outlook to 2025".

The main objective of this project is to develop biofuels, one renewable energy type for substituting a part of traditional fossil fuels, contributing in ensuring energy security and environmental protection. The main contents are as follows:

- i). *In period 2011-2015: Mastering technology and manufacturing additives for production of biofuels*
- ii). *By 2015: Production of ethanol and bio-diesel will be 250,000 tons, accounting for 1% of gasoline and diesel demand of the whole country.*
- iii). *By 2025: Production of ethanol and bio-diesel will be 1.8 million tons, accounting for 5% of gasoline and diesel demand of the whole country.*

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**ENERGY issues/ CHALLENGERS**

- Electricity Power price is low (social policy for poor areas):
  - Power sector faces a low finance balance
  - Not attractive the private investors for new power plants
- Difficulty to import coal for the coal-fired power plants in the South of Vietnam
- Uncertainty of off-shore gas supply
- Energy statistic system needs to be upgraded
- Institutional model for power trade in GMS
- Challengers in RE development:
  - Lack of investigation/measurement to quantify RE potential
  - Lack of new technology transfer
  - There is no specific mechanism for promoting RE in pricing, financing subsidiary
  - Limited capital investment
  - High cost
  - Energy price not attractive to the investors (Tariff)

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*Thank you*

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