

IEEJ: 2009年5月掲載

MINISTRY OF INDUSTRY AND TRADE

**ENERGY BALANCE OF
VIETNAM BY 2020**



April-2009

CONTENTS



- **General information about Vietnam's energy resources**
- **Current status of Vietnam's energy supply vs. demand**
- **Forecasted energy supply-demand balance in Vietnam by 2020**
- **Major difficulties and bottlenecks**

VIETNAM ENERGY RESOURCES



- **Hydropower**

- Total estimated potential: 300 billion kWh/year:
 - + The North: 60%
 - + The Central: 26%
 - + The South: 14%
- The eco-technical potential: about 80 billion kWh
- Total capacity of existing hydropower plants: 5245 MW (2008)

VIETNAM ENERGY RESOURCES



- **Coal resources**

- Total explored reserves as of early 2005:
about 4,5 billion ton, of which:

- + *Quảng Ninh*:

- Exploited Anthracite reserve: 3,1 bil tons

- Domestic mines: 200 mm tons

- + *Under-explored reserves*:

- Khoái Châu –Đông Hưng: 30 billion tons

VIETNAM ENERGY RESOURCES



- **Oil and gas**

- Total oil and gas in place: 3-4 billion m³ oil equivalent, of which
 - + Oil/condensate: 1,2 – 1,5 billion m³
 - + Gas: 1,8 – 2,5 thousands of billion m³
- 70 oil and gas discoveries found with total reserves of 900MM m³ oil equivalent (500 MM m³ for oil and 400 billion m³ for gas).

VIETNAM ENERGY RESOURCES



- **Oil and gas (continues)**
 - As at 2004 year end, 10/20 oil and natural gas fields have been put into production with total output of:
 - 169,9 billion tons crude oil
 - 18,67 BCM gas which have been used for power generation and residential purpose.
 - Undiscovered oil and gas (about 50% of the oil and gas in place) locate in coastal deep water (Phu Khanh basin), offshore and sensitive areas of the East Sea and overlapping areas.

VIETNAM ENERGY RESOURCES



- **New and renewable sources of energy**
 - ***Geo-thermal***: More than 300 sources of hot mineral water existing (30°C – 105°C)
 - Focus Area: North Western and Central part
 - No available assessment of potential
 - ***Solar energy***
 - + Average sunshine hours: 2000 – 2500 hours/year
 - + Total of average heat radiating energy: 150kCal/cm²/year
 - + Estimated potential: around 43,9 billion TOE/year

VIETNAM ENERGY RESOURCES



- **New and renewable sources of energy**
 - ***Wind energy***: Small potential, Distribution of wind energy density:
 - Island area: 800 – 1400 kWh/m²/year
 - Coastal and highland area: 500-1000 kWh/m²/year
 - Other area: below 500 kWh/m²/year
 - ***Uranium***: World medium potential
 - + Total estimated reserves: more than 200 thousand tons of U₃O₈.

VIETNAM ENERGY RESOURCES



– *Bio-mass energy*

- + Total potential reserves (wood, straw, sub-farming products): 43-46 MM TOE/year:
 - Wood energy: 60% (26-27 MM TOE)
 - Straw and sub-farming products energy: 40% (17-19 MM TOE)
- + Producing reserves: 10%

CURRENT STATUS OF VIETNAM'S ENERGY SUPPLY AND DEMAND



Primary energy supply: Total of primary energy produced increased by 13.7%/year during the period of 1990-2004 (from 7,1 to 43,6 MM TOE):

- Coal: 22,7%/year (4,5 MM tons - 25,05 MM tons) **50 MM tons -2008**
- Crude oil: 15.5%/year (2,7 MM tons – 20,3 MM tons)
- Natural gas: 44,1%/year (unremarkable - 4,67 bil m³)
- Electricity: 13,8%/year (8,7 billions kWh – 47,1 billions kWh) **75,9 billions kWh -2008**

CURRENT STATUS OF VIETNAM'S ENERGY SUPPLY AND DEMAND

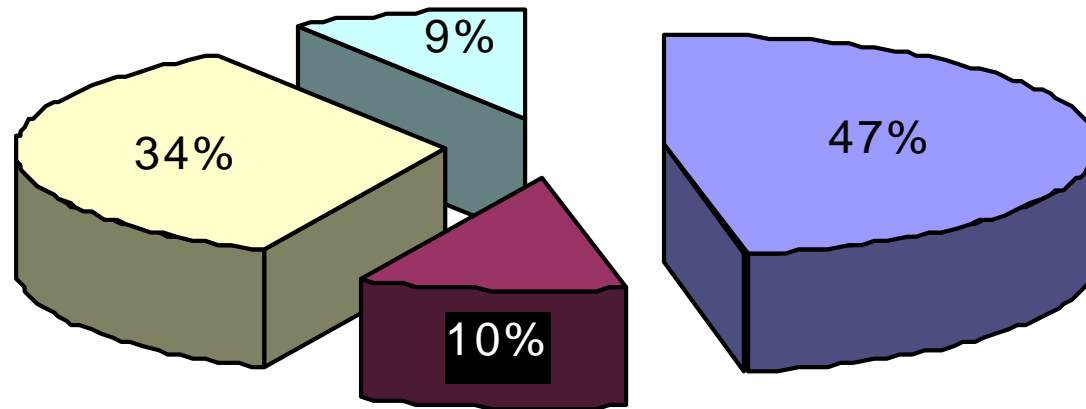


- + Hydropower: 6,9 bil. kWh – 18,1 bil. kWh (2001); 18 bil. kWh (2004), **25 billions kWh (2008)**,
- + Coal-plants: 4,3 bil. kWh (2001); 7,8 bil. kWh (2004), **11,5 billions kWh (2008)**,
- + Gas & Diesel: 8,1 bil. kWh (2001); 20,3 bil. kWh (2004), **33,3 billions kWh (2008)**,
- + Commercial electricity: 6,2 bil. kWh – 39,7 bil. kWh (1990 -2004:14,2%/year; 01-04: 15,4%/year), **65,9 billions kWh -2008**

CURRENT STATUS OF VIETNAM'S ENERGY SUPPLY AND DEMAND



STRUCTURE OF ENERGY CONSUMPTION IN 2004

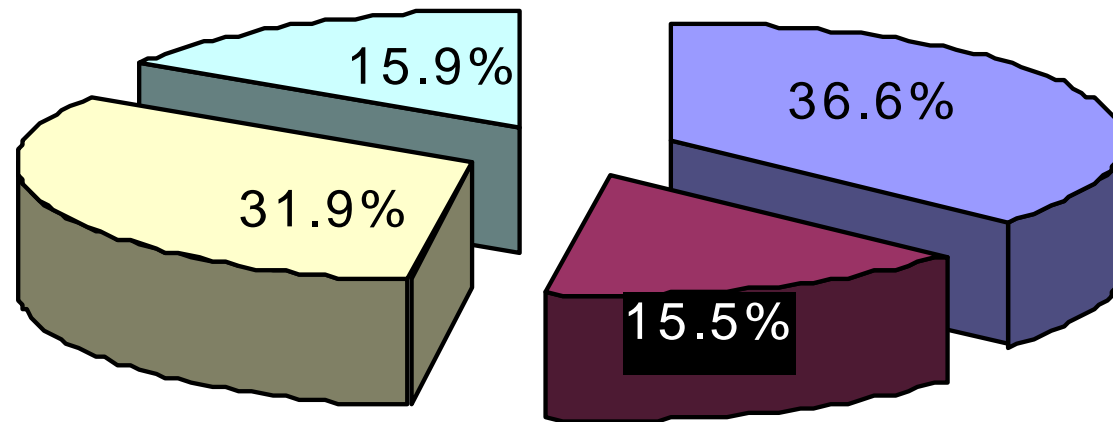


■ Industry ■ Commerce and service ■ Transportation ■ Agriculture

CURRENT STATUS OF VIETNAM'S ENERGY SUPPLY AND DEMAND



STRUCTURE OF ENERGY PRODUCTION IN 2004



■ Crude Oil ■ Natural gas ■ Coal ■ Hydro power

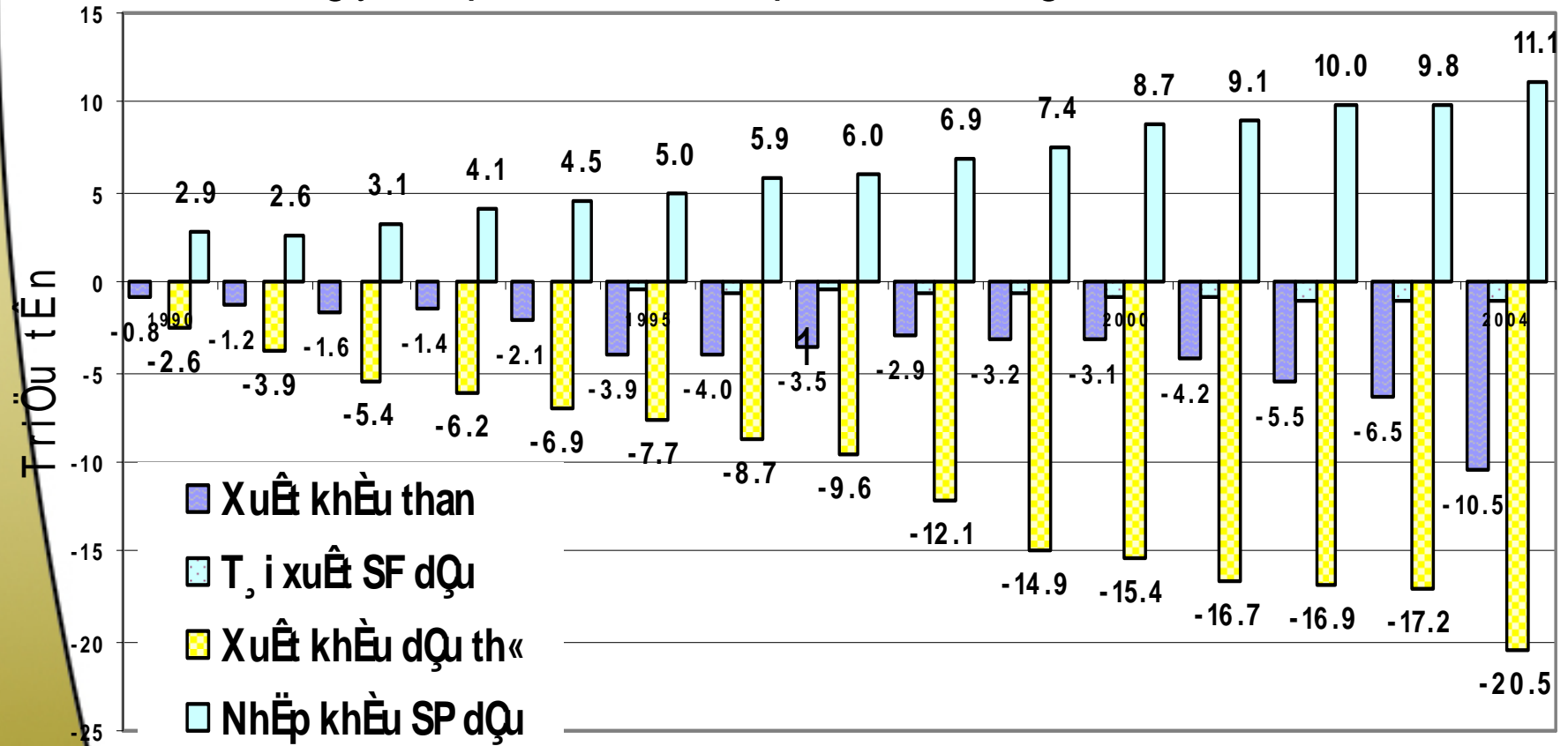
ENERGY IMPORT AND EXPORT DURING PERIOD 1990 -2004

Import and Export	1990	2004
Crude Oil export	2,6 MM tons	20 MM tons
Coal export	0.8 MM tons	10.5 MM tons (2003)
Energy export turnover		Around 6 billions USD (increase by 50%/year in 2003)
Petroleum product import	1,9 MM tons	11 MM tons
Petroleum product import turnover		3,57 billions USD (11% total turnover)
Net export	0.3 MM TOE	16,2 MM TOE

ENERGY IMPORT AND EXPORT DURING PERIOD 1990 -2004



Energy Export and Import during 1990-2004



ENERGY IMPORT AND EXPORT DURING PERIOD 1990 -2004



- **Total final energy consumption during 1991-2004**

increased by 10,8%

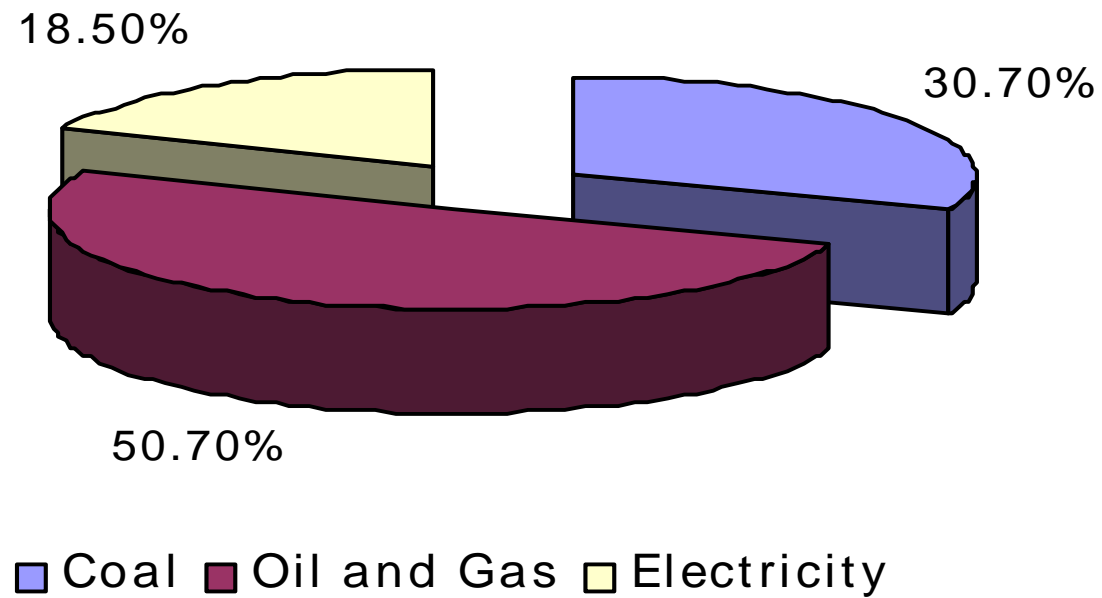
- Year 1990: 4,14 MM TOE
- Year 2000: 12,2 MM TOE
- Year 2004: 17,7 MM TOE

STRUCTURE OF ENERGY COMSUMPTION DURING 1990-2004



Product	1990 (%)	2004 (%)
Coal	31,4	30,7
Oil and gas	55,9	50,7
Electricity	12,6	18,5

STRUCTURE OF ENERGY COMSUMPTION DURING 1990-2004



ENERGY COMSUMPTION DURING 1990-2004



The average consumption per capita of Vietnam is estimated at 20% of the world's average level

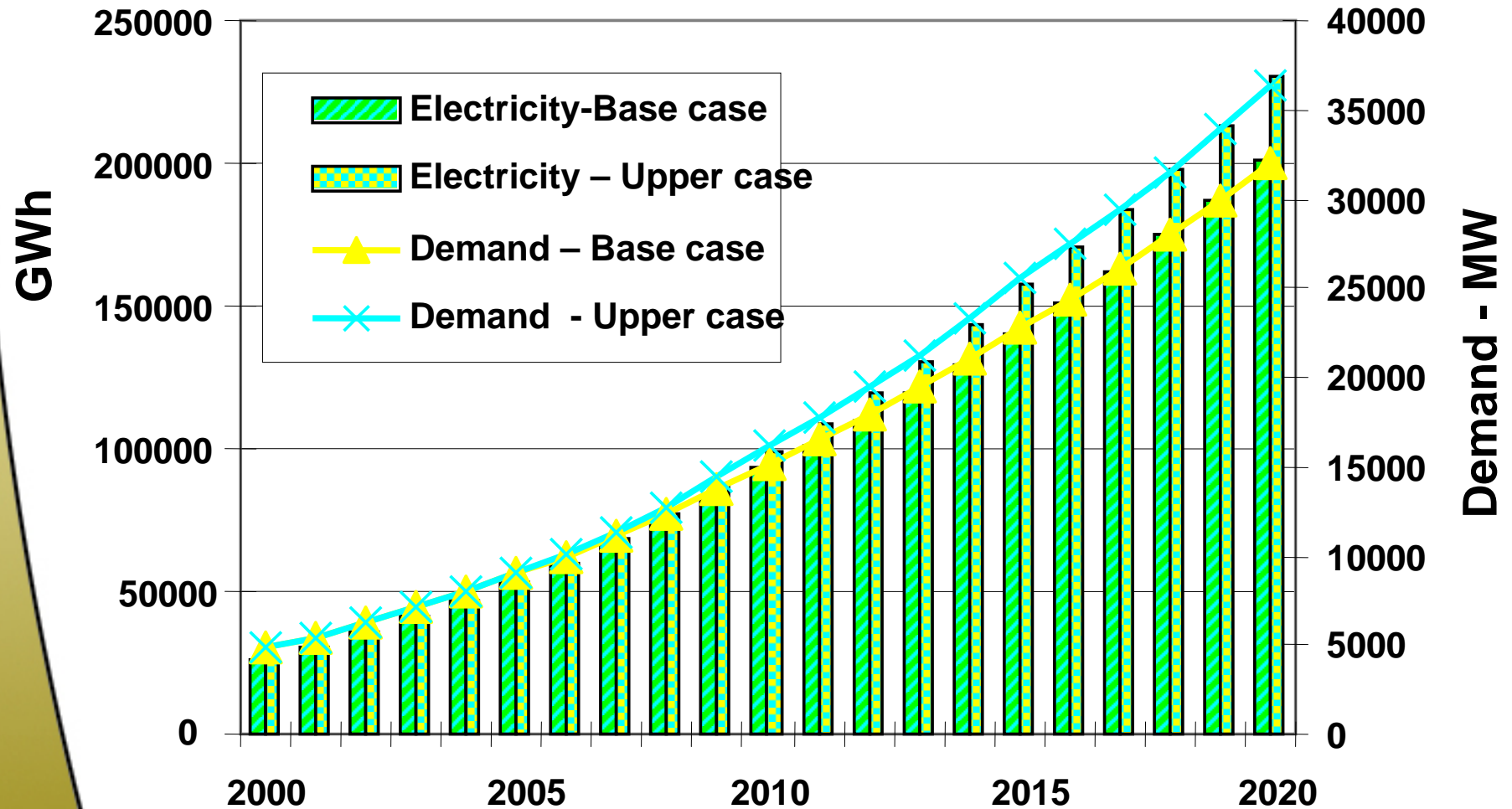
Item	1990	1995	2000	2004
Supply of primary energy, kgOE/capita/year	100	152	249	318
Primary energy consumption kgOE/capita/year	64	110	157	218
Commercial power, kgOE/capita/year	94	155	286	488

FORECASTED OIL AND GAS PRODUCT DEMAND

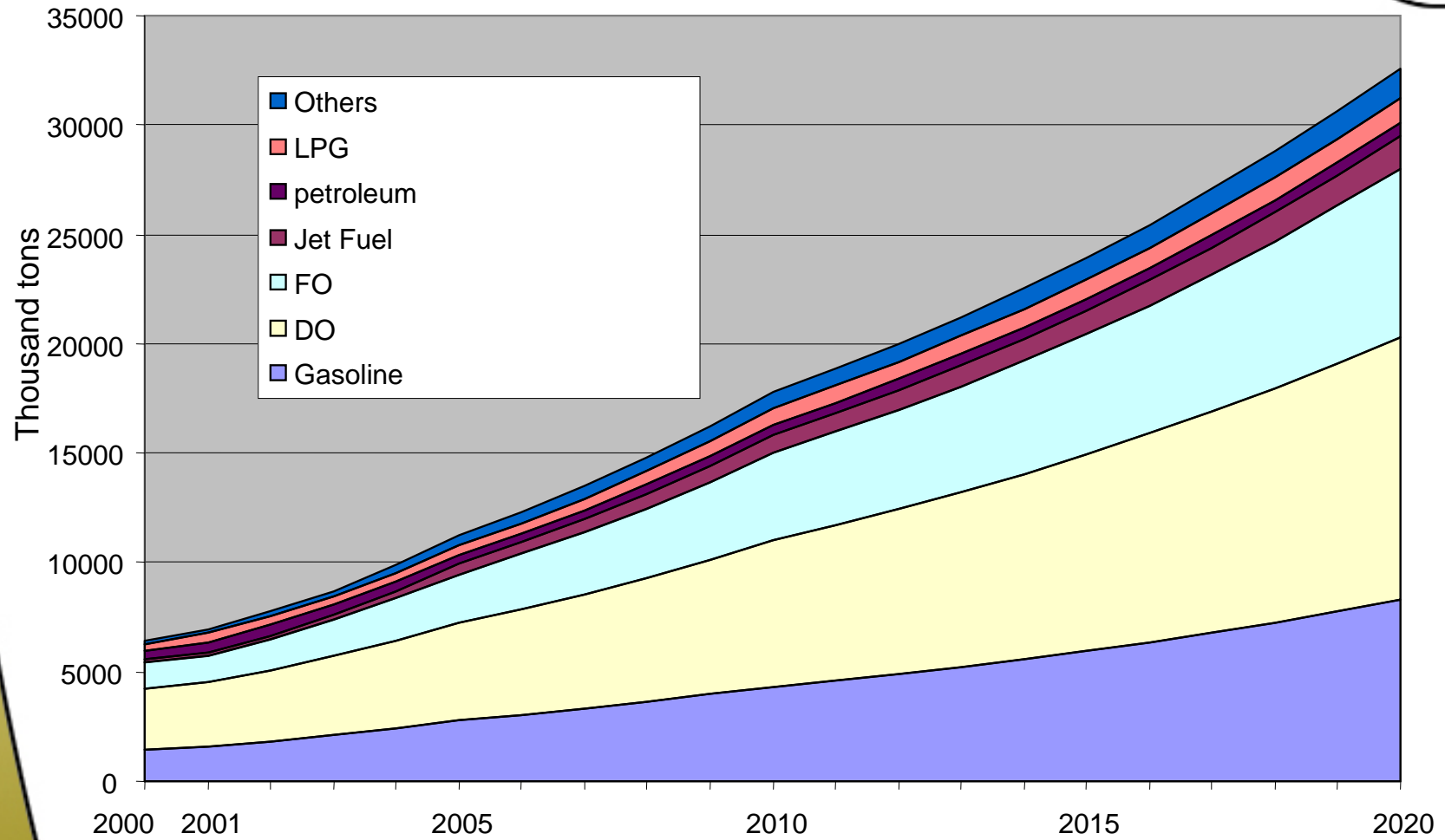


Product	2010 (MMtons)	2020 (MMtons)	2001-2010 (%/year)	2010-2020 (%/year)
Gasoline	15-16	26-28,6	7,5 - 8	6,4 – 6,8
Petrochemical	8	17	10%	5%
Gas	10 billion m ³	15-16 billion m ³		

FORECASTED ELECTRICITY DEMAND BY 2020



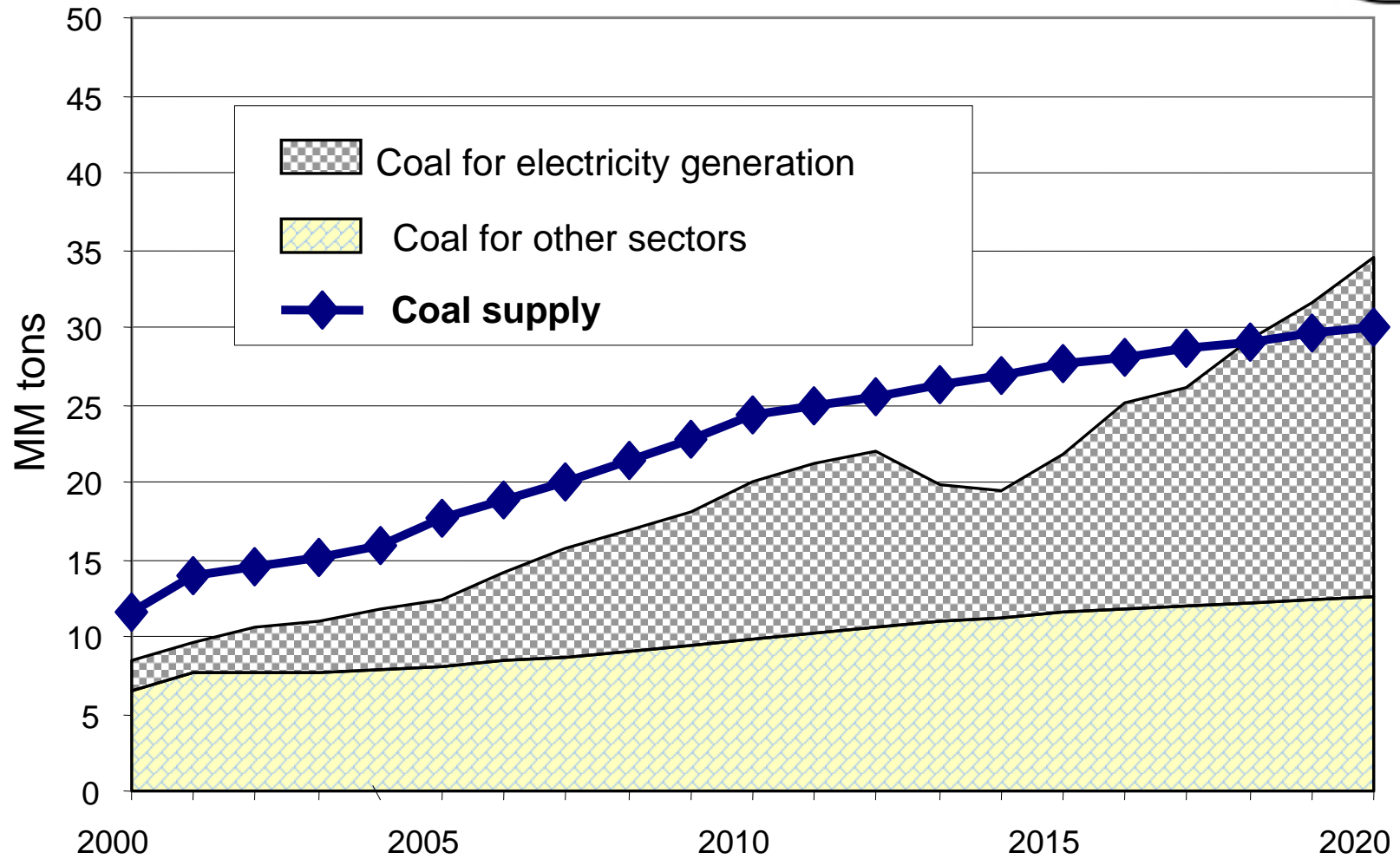
FORECASTED PETROLEUM PRODUCT DEMAND BY 2020





ENERGY BALANCE BY 2020

COAL SUPPLY-DEMAND BALANCE



FORECAST OF CRUDE OIL PRODUCTION



- *Vietnam remains to be the crude oil export country up to 2010*

Duration	Production (MM tons)	Domestic production (MM tons)
2006 - 2010	18,2 - 20	18 - 19
2011 - 2015	17,2 - 21	16 - 18
2016 - 2020	16,5 - 20,5	13 - 15

FORECAST OF CRUDE OIL IMPORT DEMAND



- *Vietnam become crude oil import country from 2015*

Crude oil import	2015 (MM tons)	2020 (MM tons)
Base case	1,2	10
Low case	5	14

CRUDE OIL SUPPLY AND DEMAND BALANCE



- *Vietnam remains crude oil import country by 2020*

Crude Oil product	2010	2020
import	10 MM tons	10-13 MM tons

Assumption:

- *Dungquat refinery comes into operation by 2009*
- *Refinery #2, #3 comes into operation by 2015 and 2020*

NATURAL GAS SUPPLY-DEMAND BALANCE



Production by 2020 (billion m³)	Demand		
	2005 (billion m³)	2010 (billion m³)	2020 (billion m³)
15-16	5,3 - For electricity: 4,1 - Others: 1,2	10 - 8 - 2	15-16 - 12-13 - 3

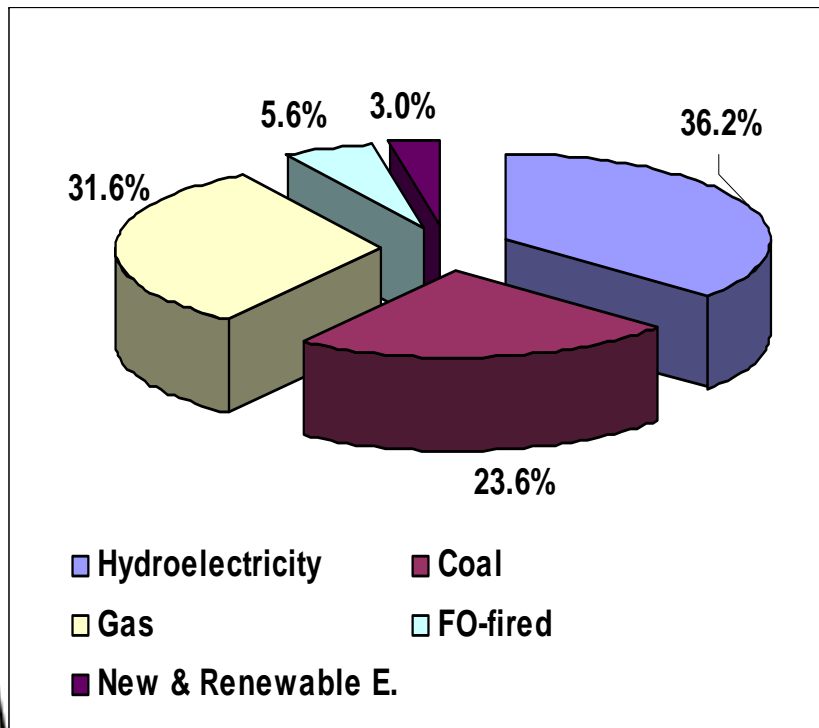
PRIMARY ENERGY BLANCE FOR ELECTRICITY GENERATION



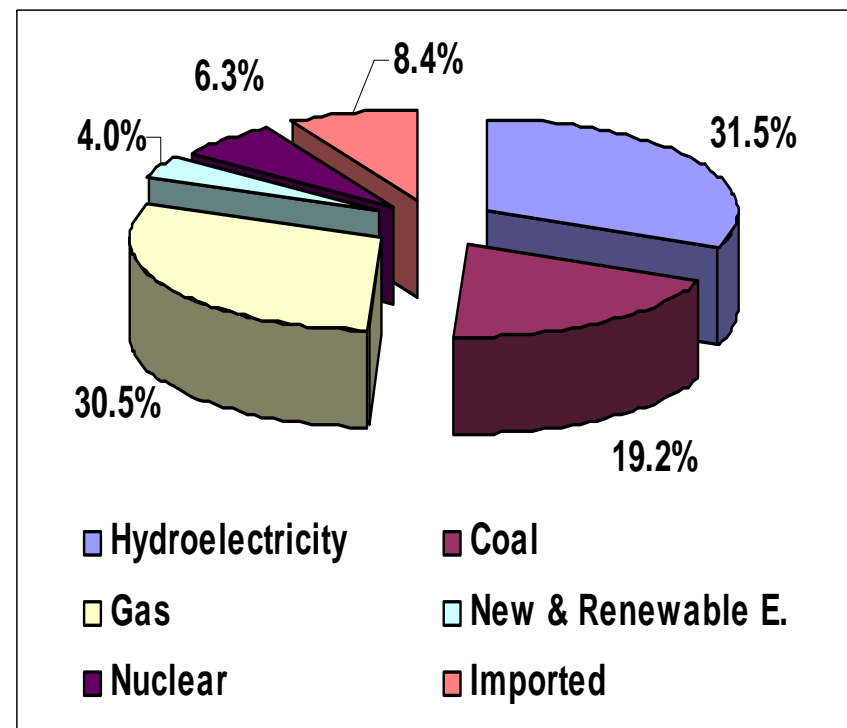
- For base case (gas supply of 12billion m³)

Total energy consumption	Hydropower	Coal	Natural Gas	FO fired electricity	New and renewable energy
2010: 20 MM TOE	36,2%	23,6%	31,6%	5,6%	3%
2020: 35,6 MM TOE	31,5%	19,2%			Nuclear power: 6,3% Renewable energy: 4%

PRIMARY ENERGY BLANCE FOR POWER GENERATION



Year 2010

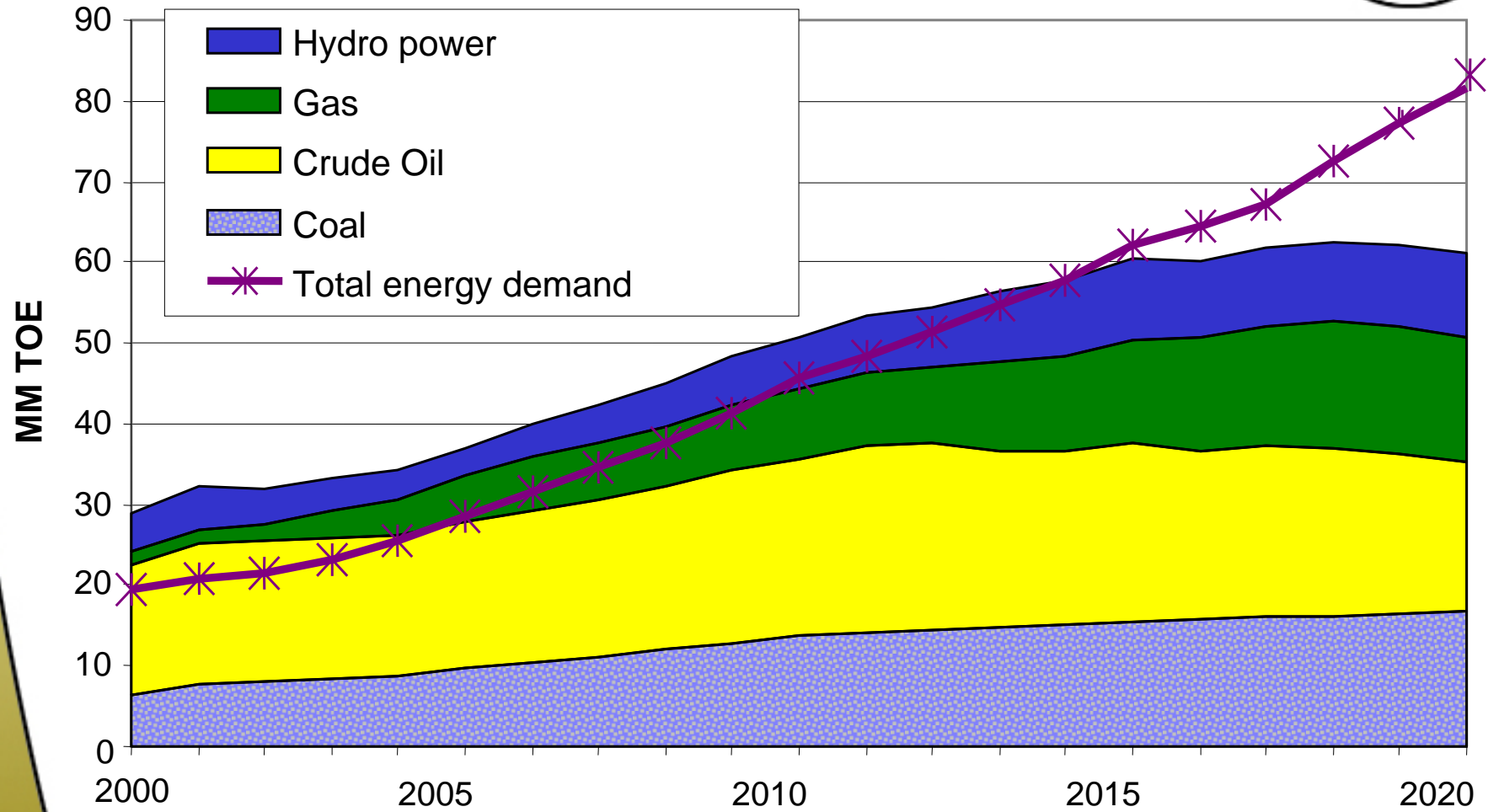


Year 2020

GENERAL ENERGY SUPPLY-DEMAND BALANCE

Energy	2010 (%)	2020 (%)
New and renewable	2,1	3,3
Nuclear power		2,9
Hydro power	<20	15-17
Crude Oil products	35	32
Natural Gas	18-20	14-15
Coal	33,6	29-30

GENERAL ENERGY SUPPLY-DEMAND BALANCE



Major difficulties and bottlenecks



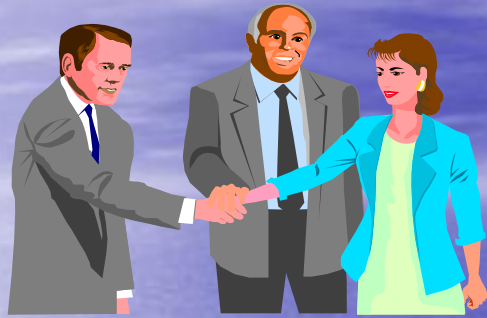
- 1. Balance between conversion energy development and new-renewable energy development issues.**
- 2. Balance between energy development and environment protection issues.**
- 3. Balance between energy export for social-economic development and energy conservation issues.**

CONCLUSION



- 4. Energy price increasing and low-income people issues.**
- 5. Energy development to fulfill increasing demand while shortage of fossil energy.**
- 6. Balance between energy development and Transportable system**
- 7. Energy development to fulfill increasing demand while shortage of capital investment.**

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