





ENERGEIA

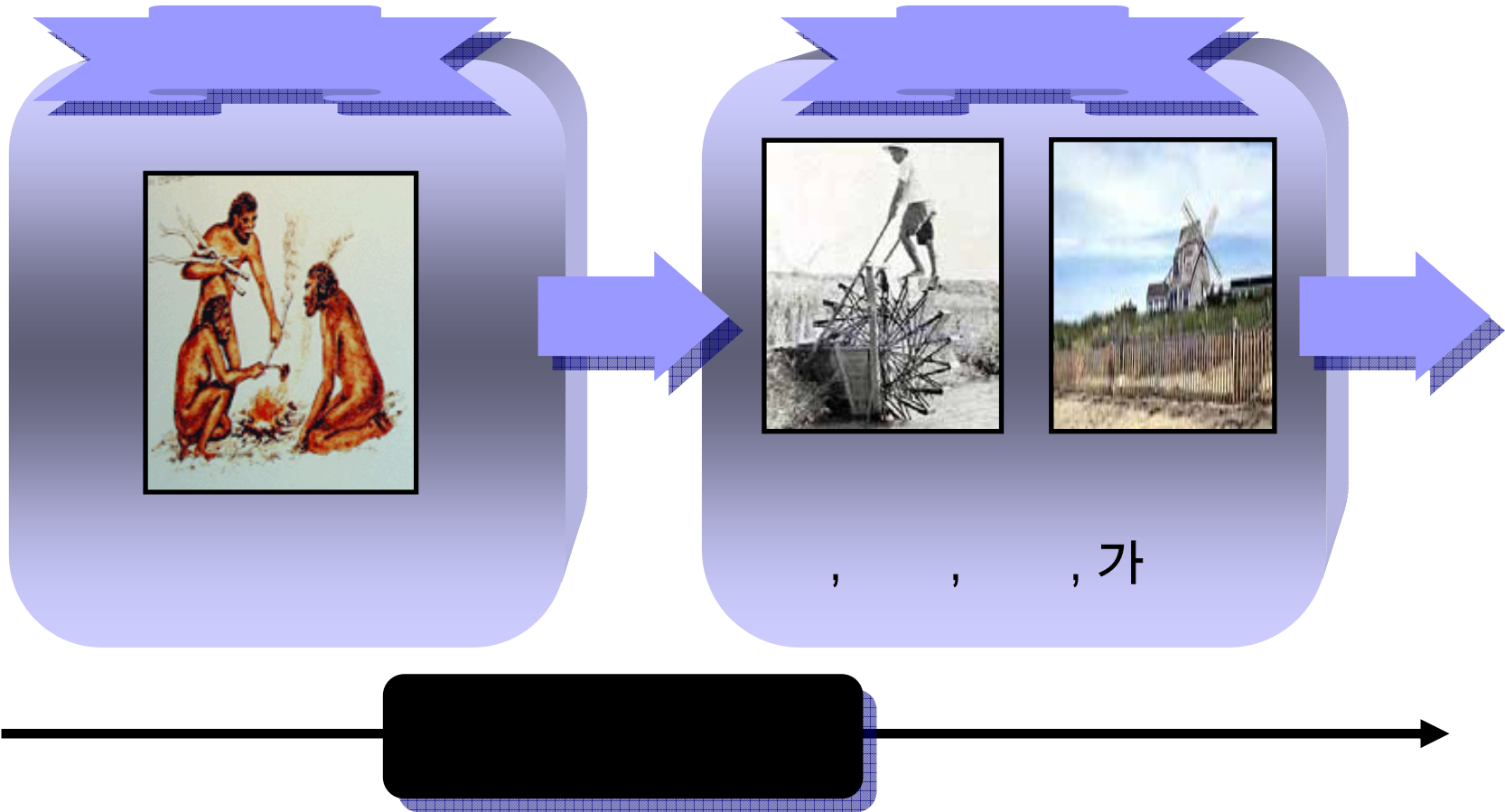
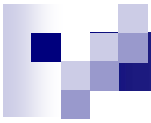
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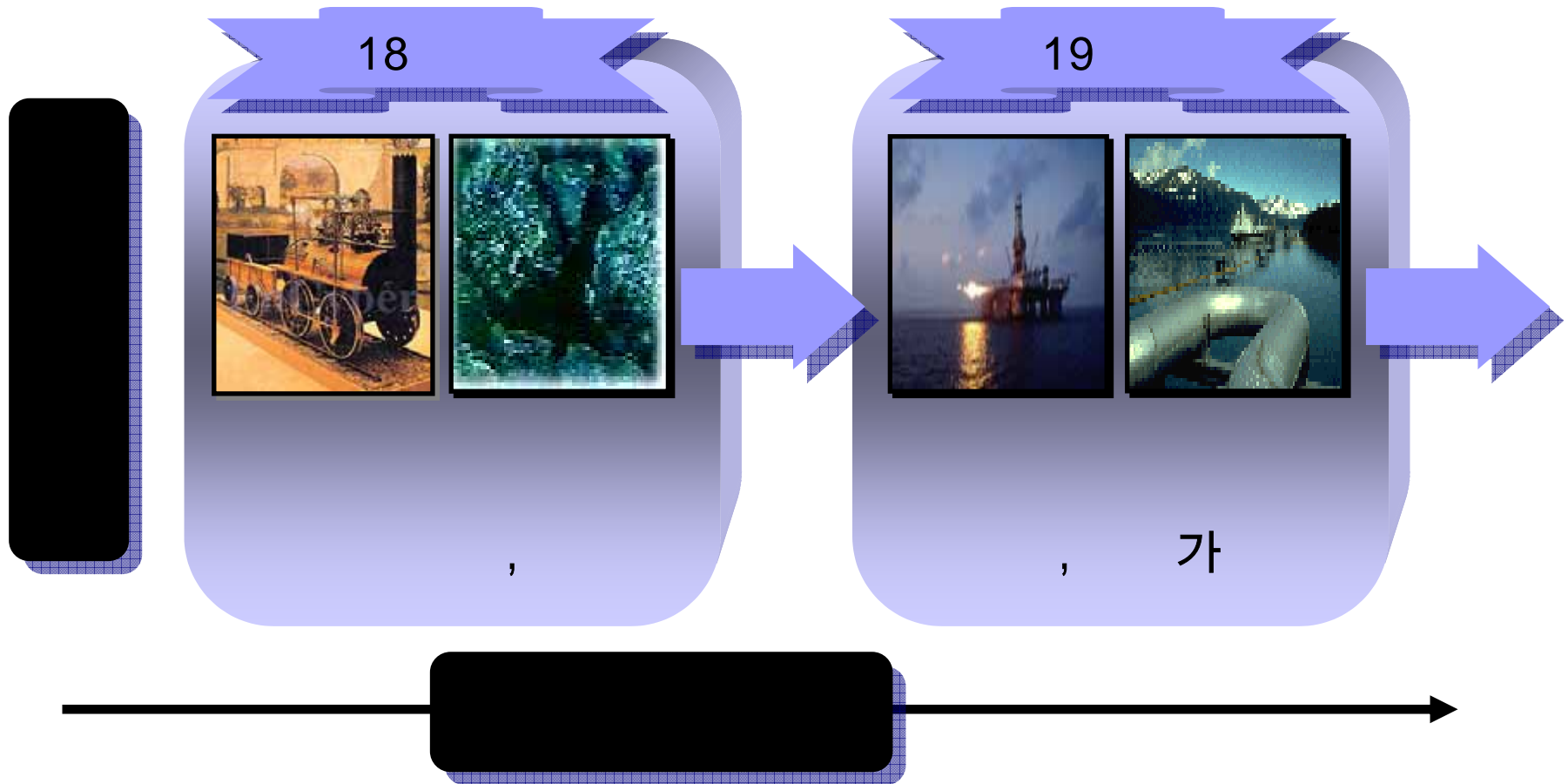
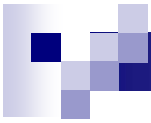
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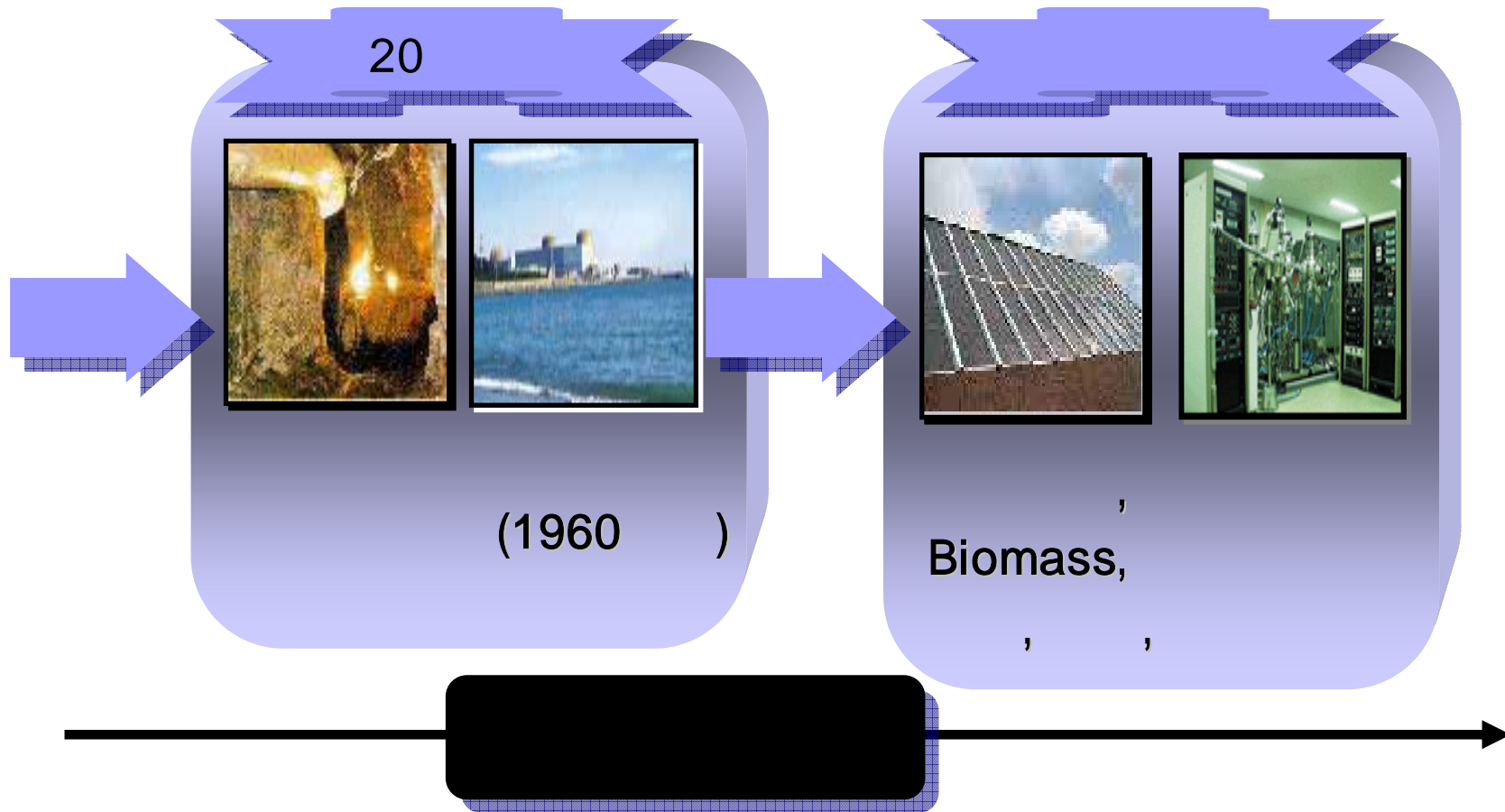
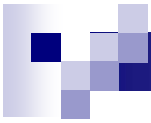
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ENERGY

- 가



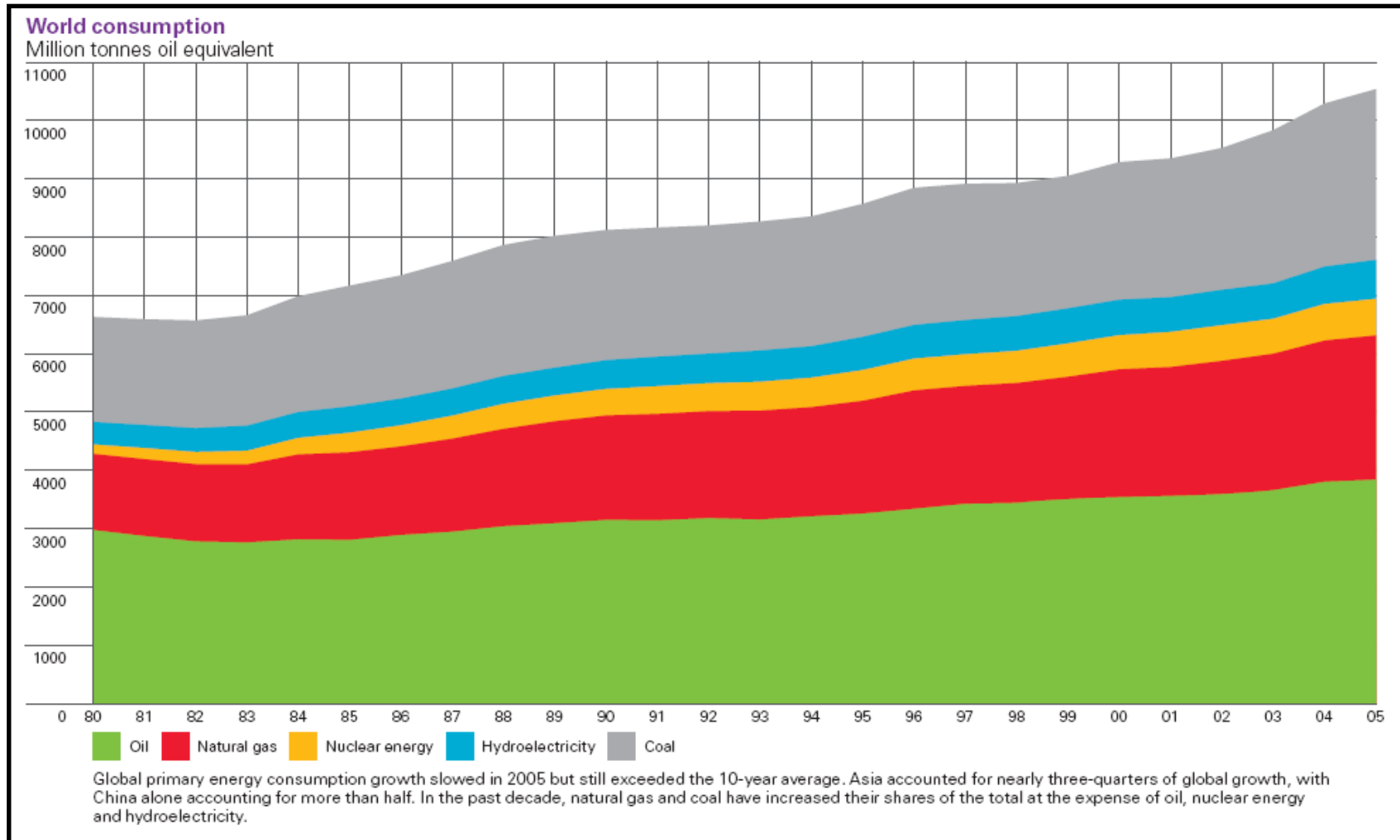




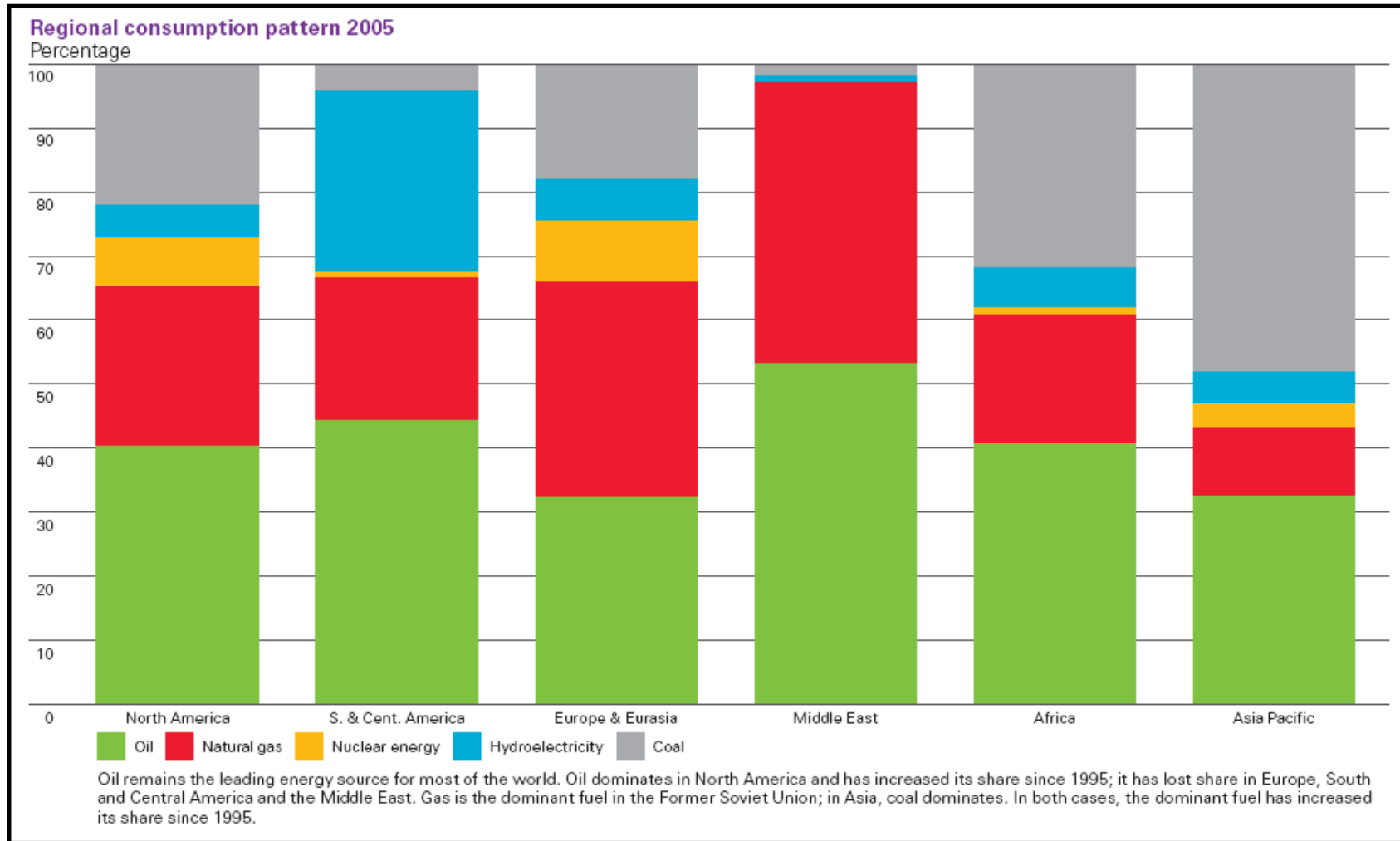




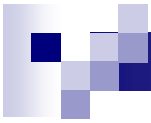
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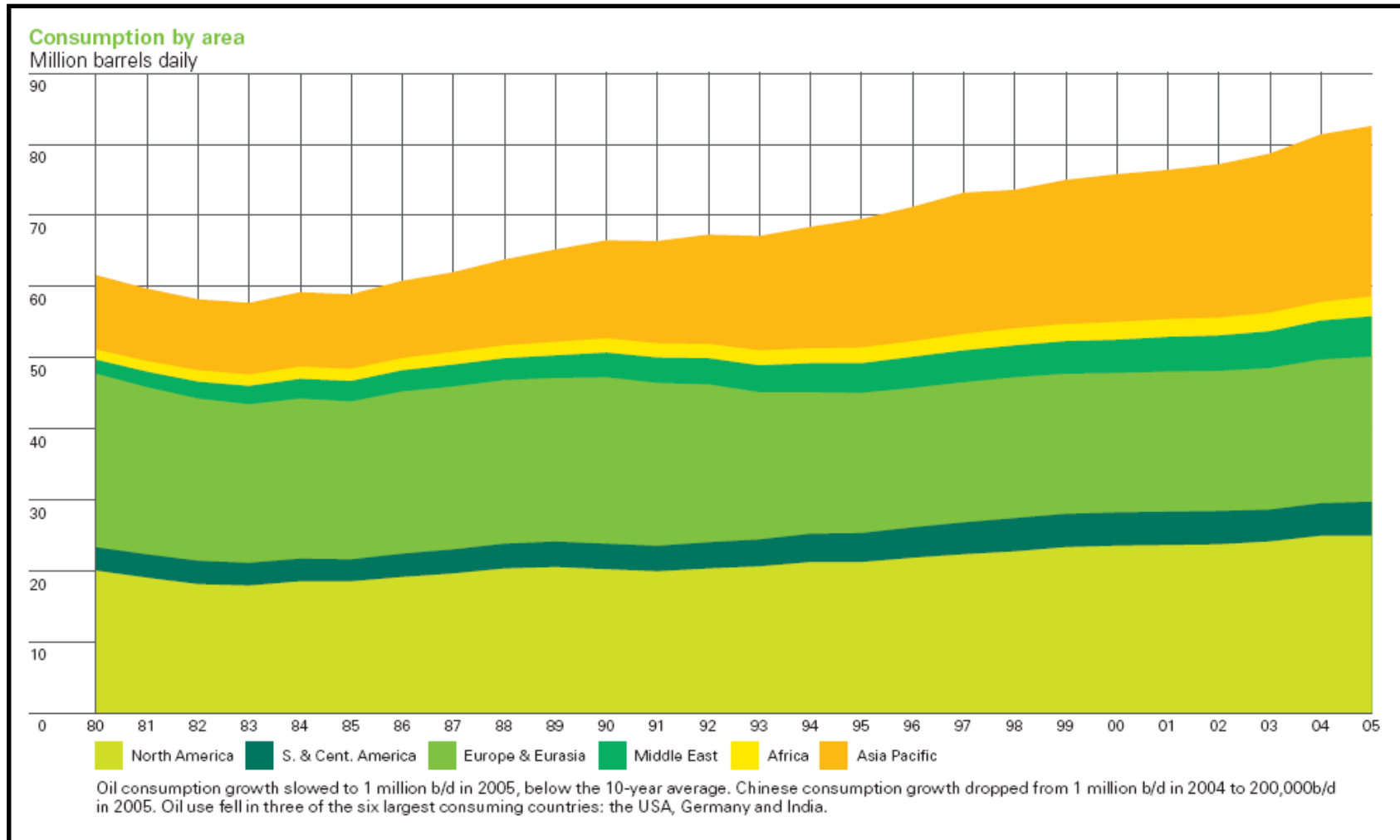
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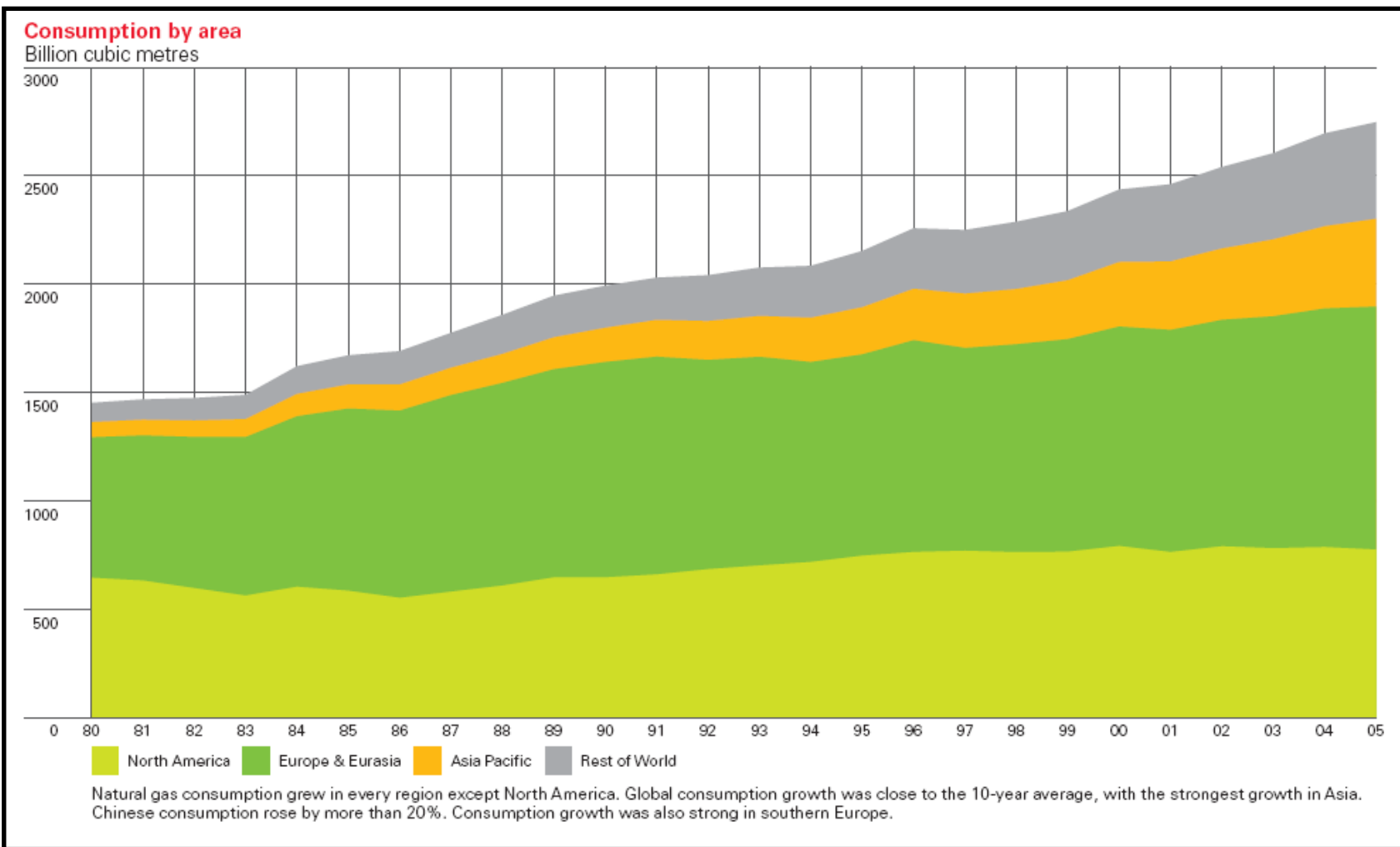




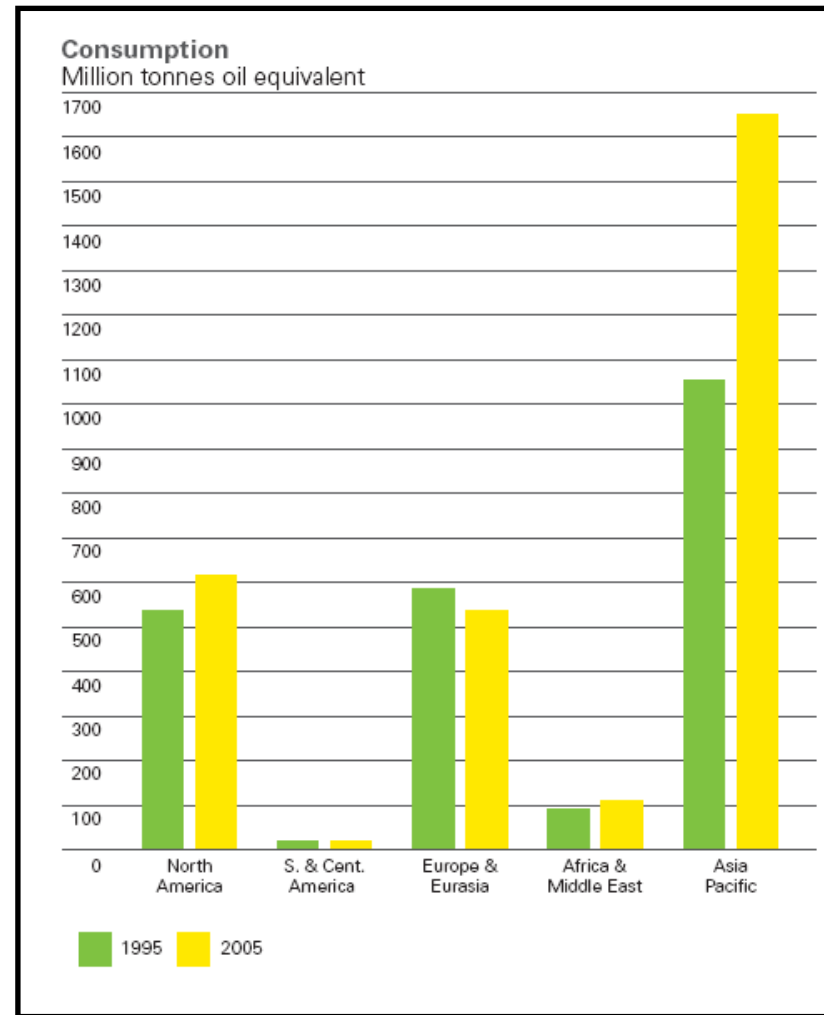
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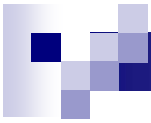


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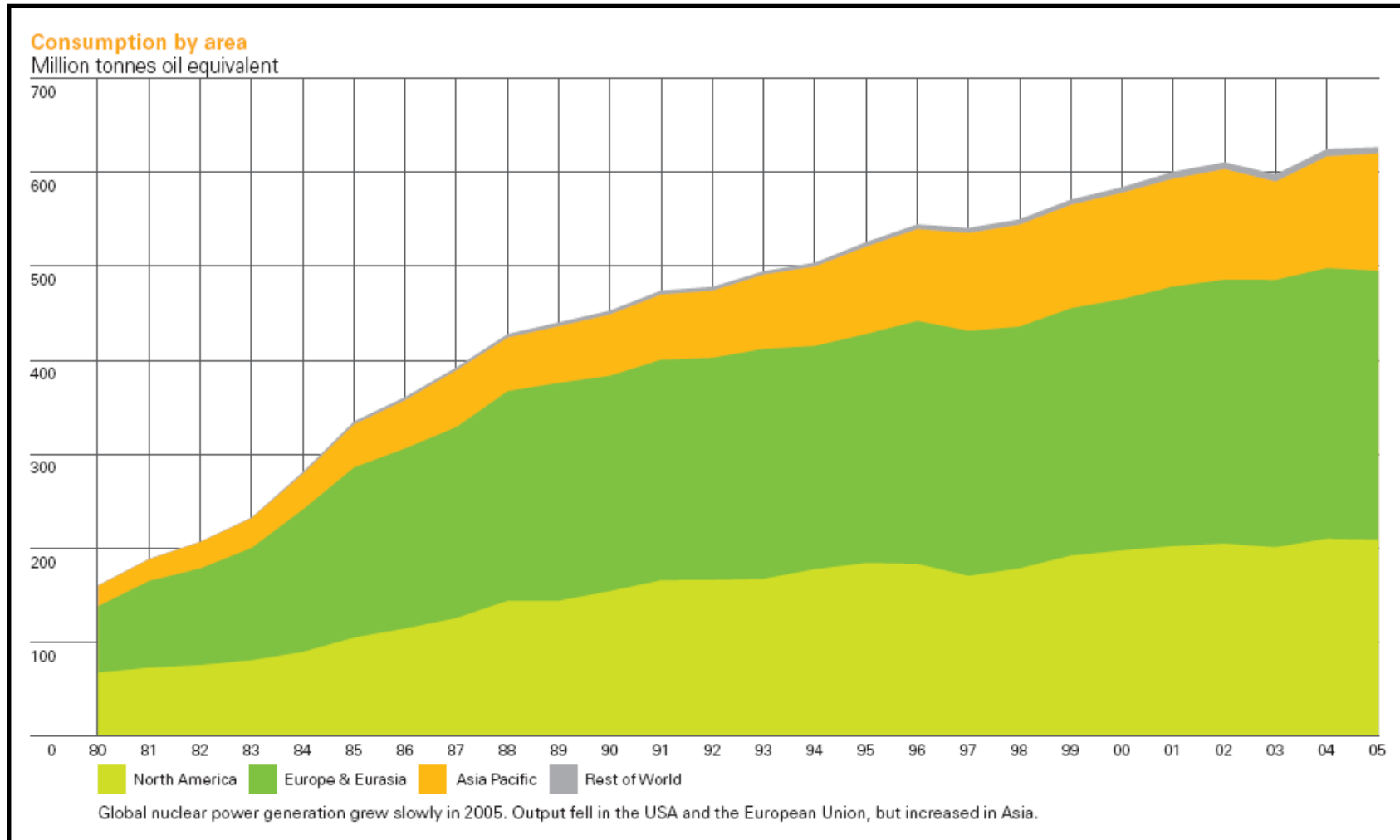


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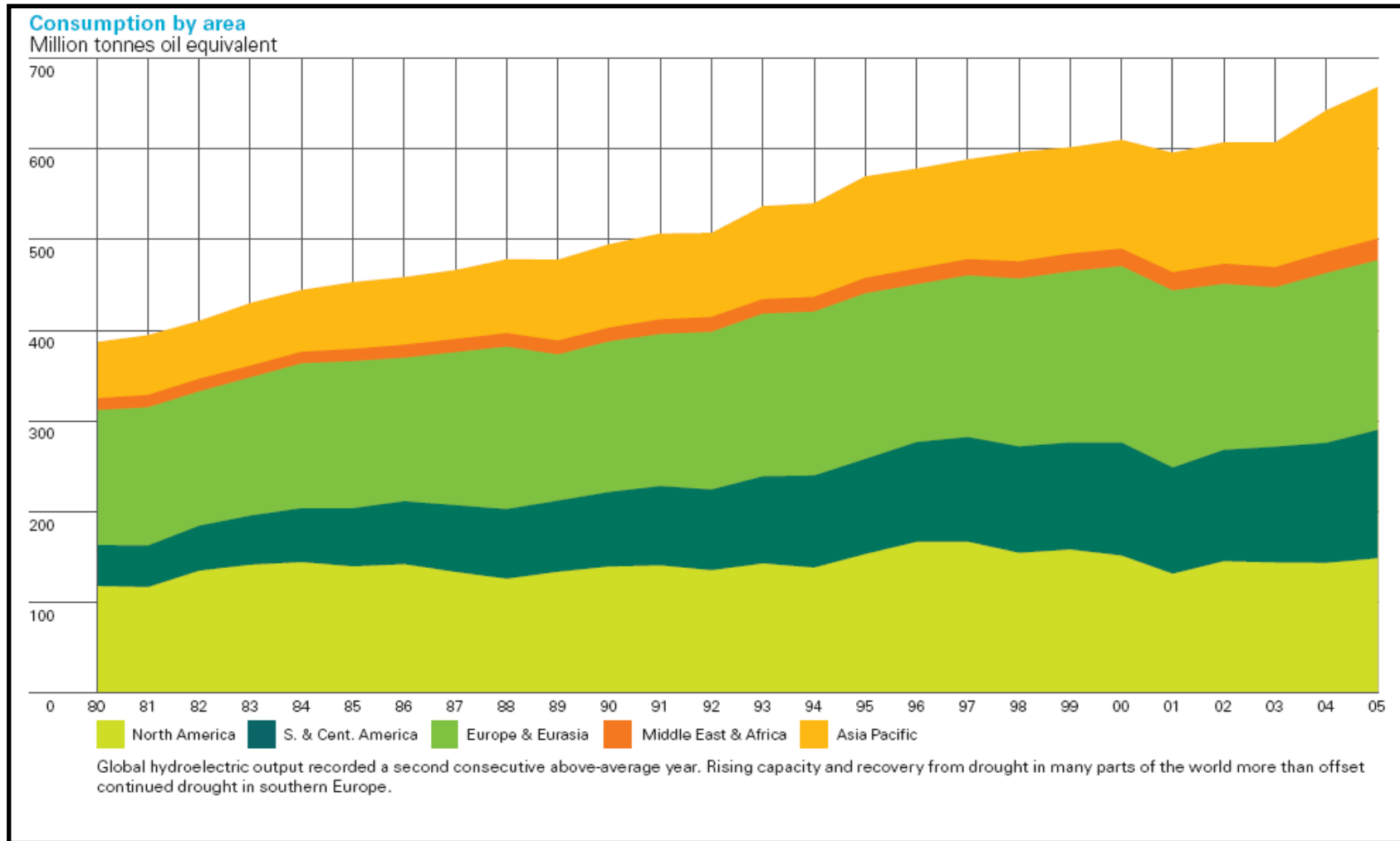


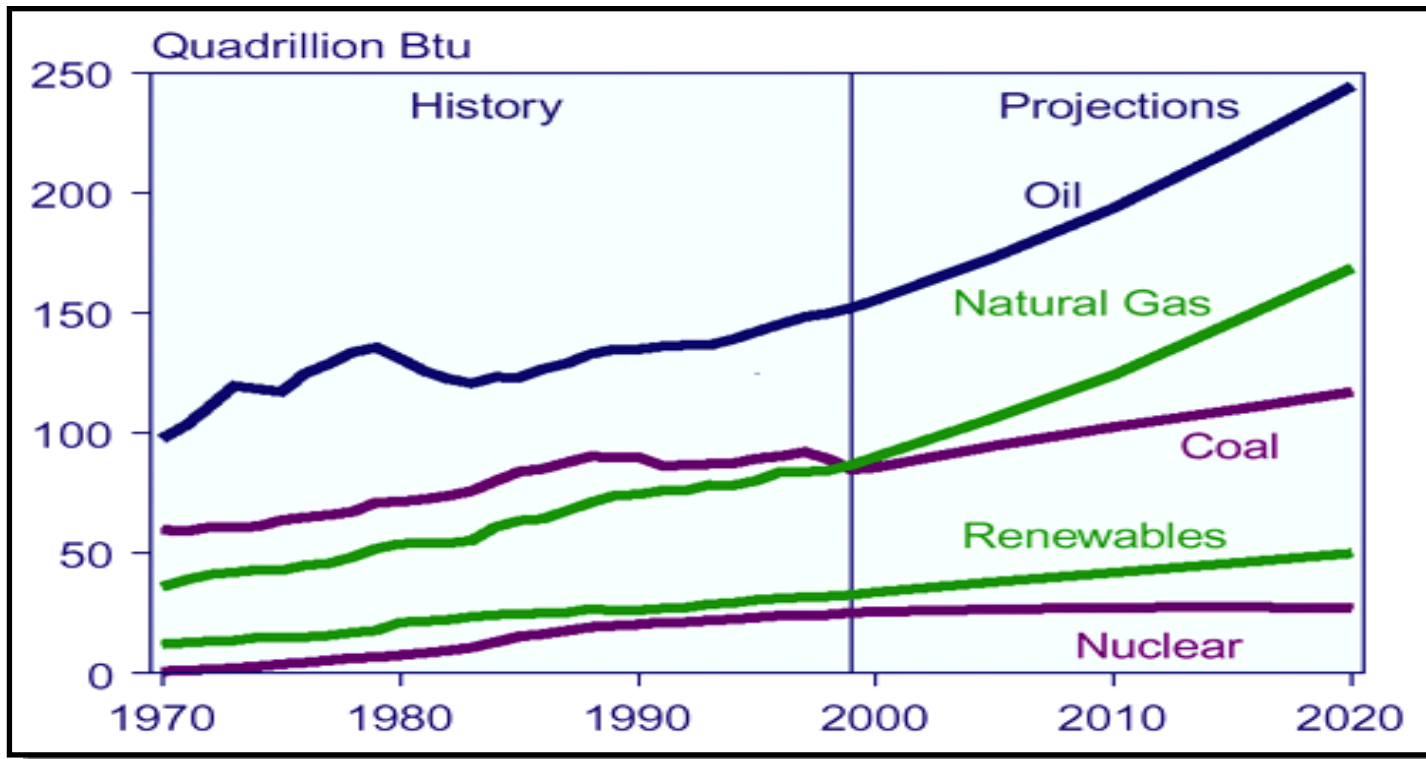
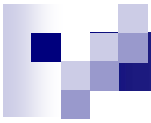
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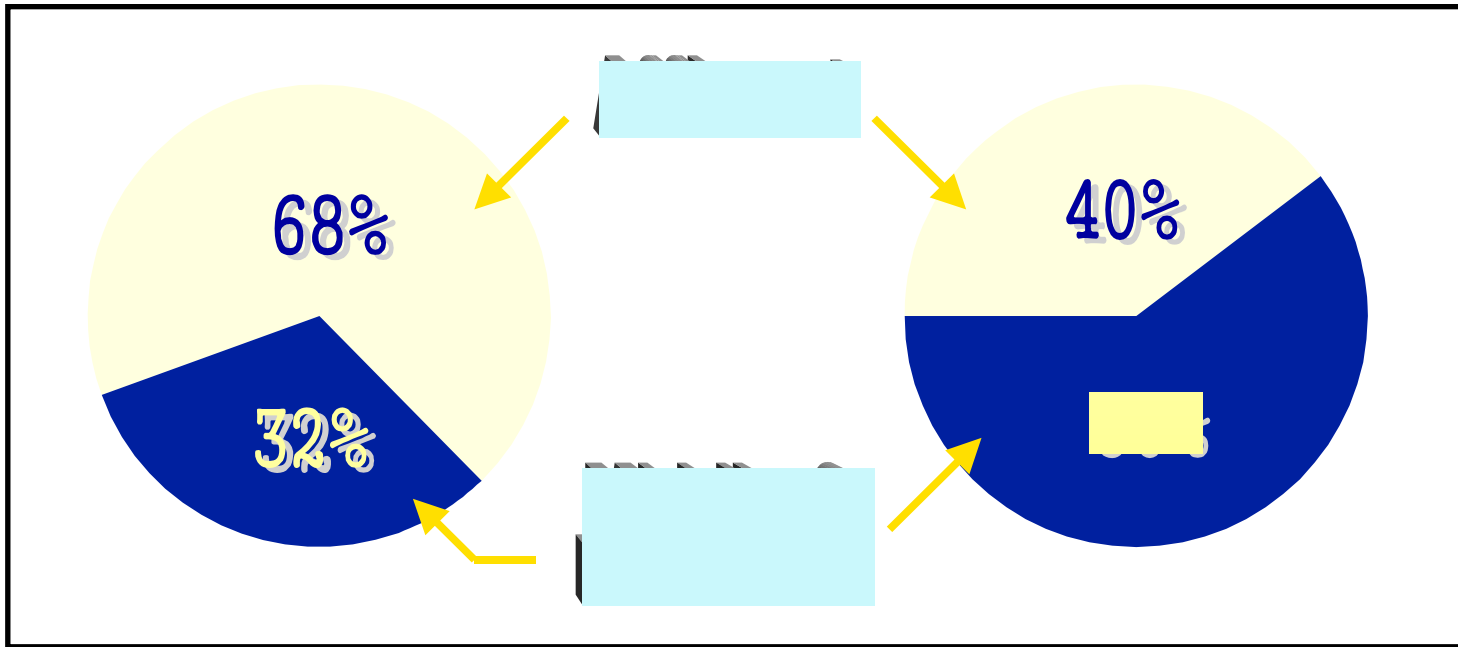




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1995

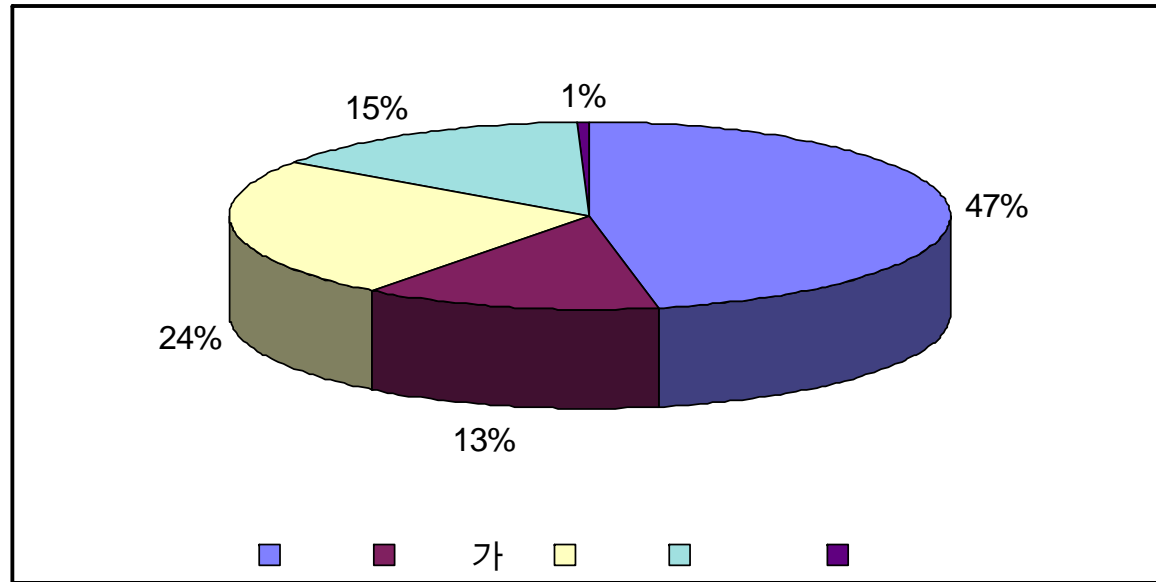
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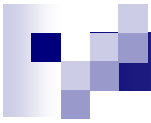




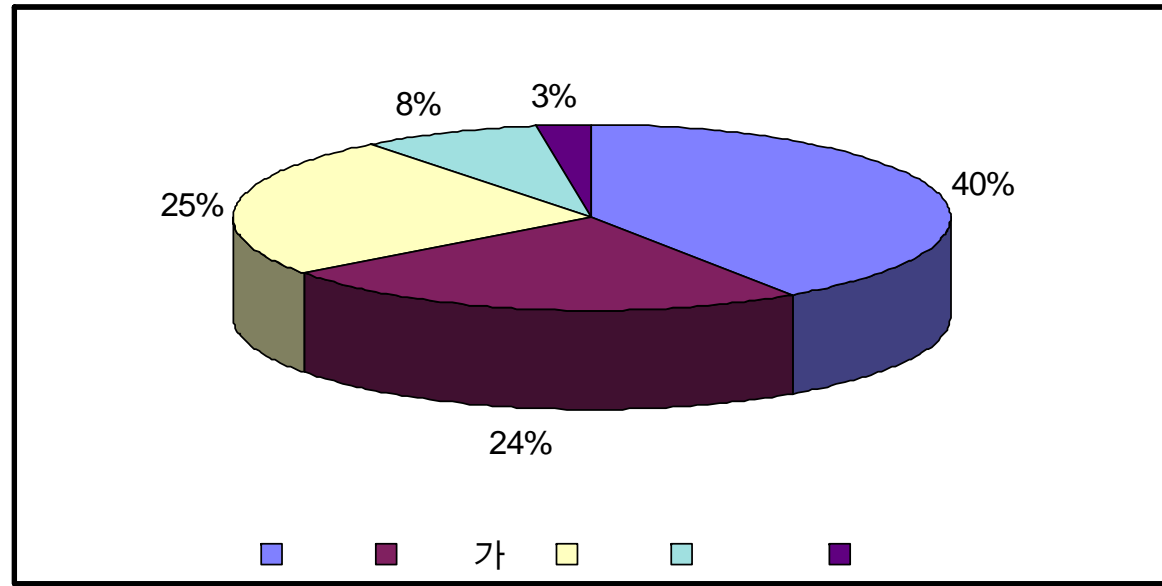


( : 224 TOE, 2005 )





( : 2,336 TOE)

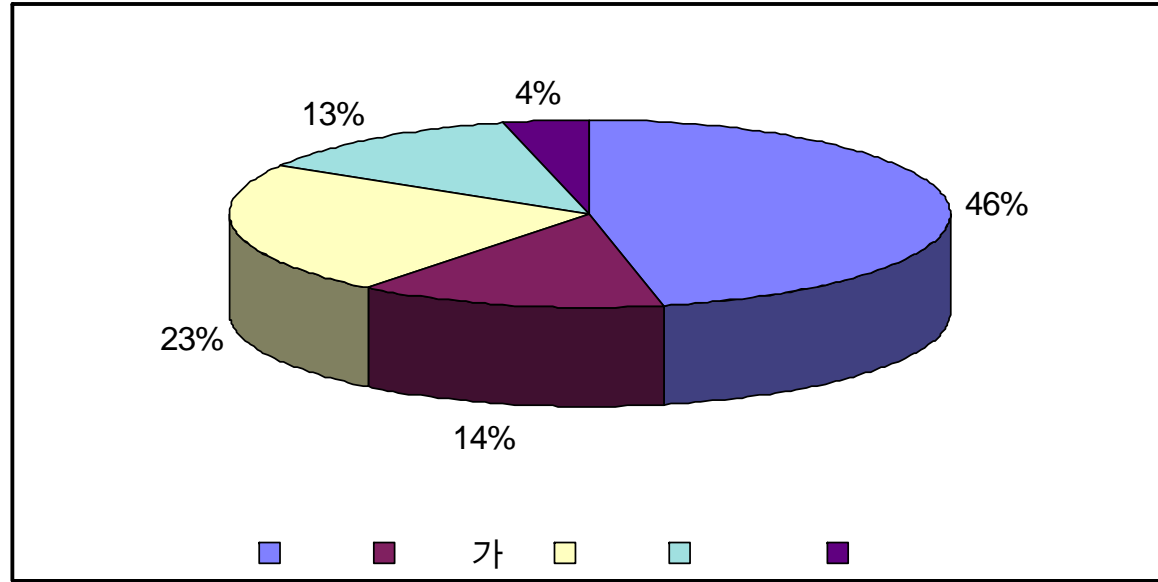




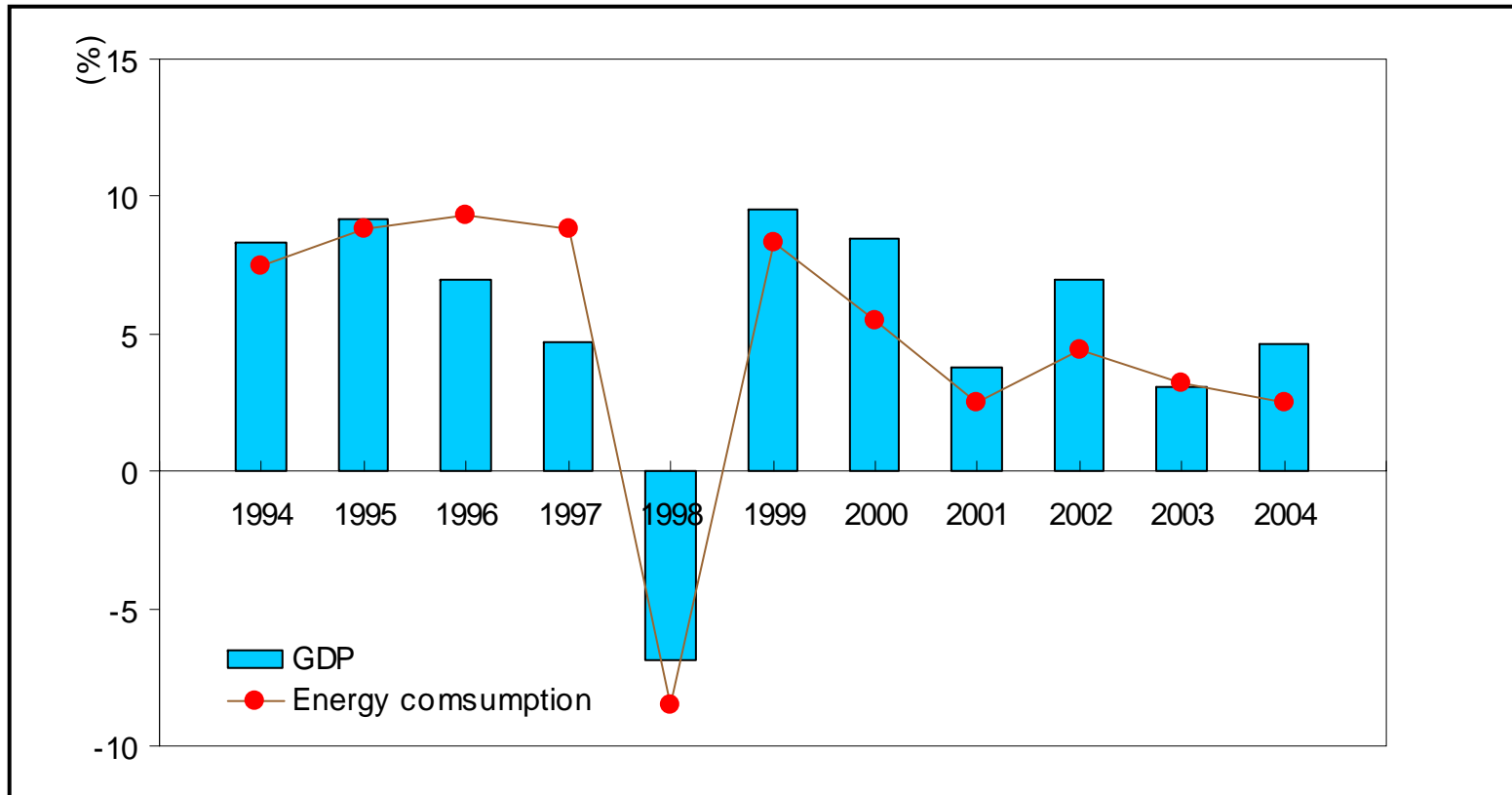
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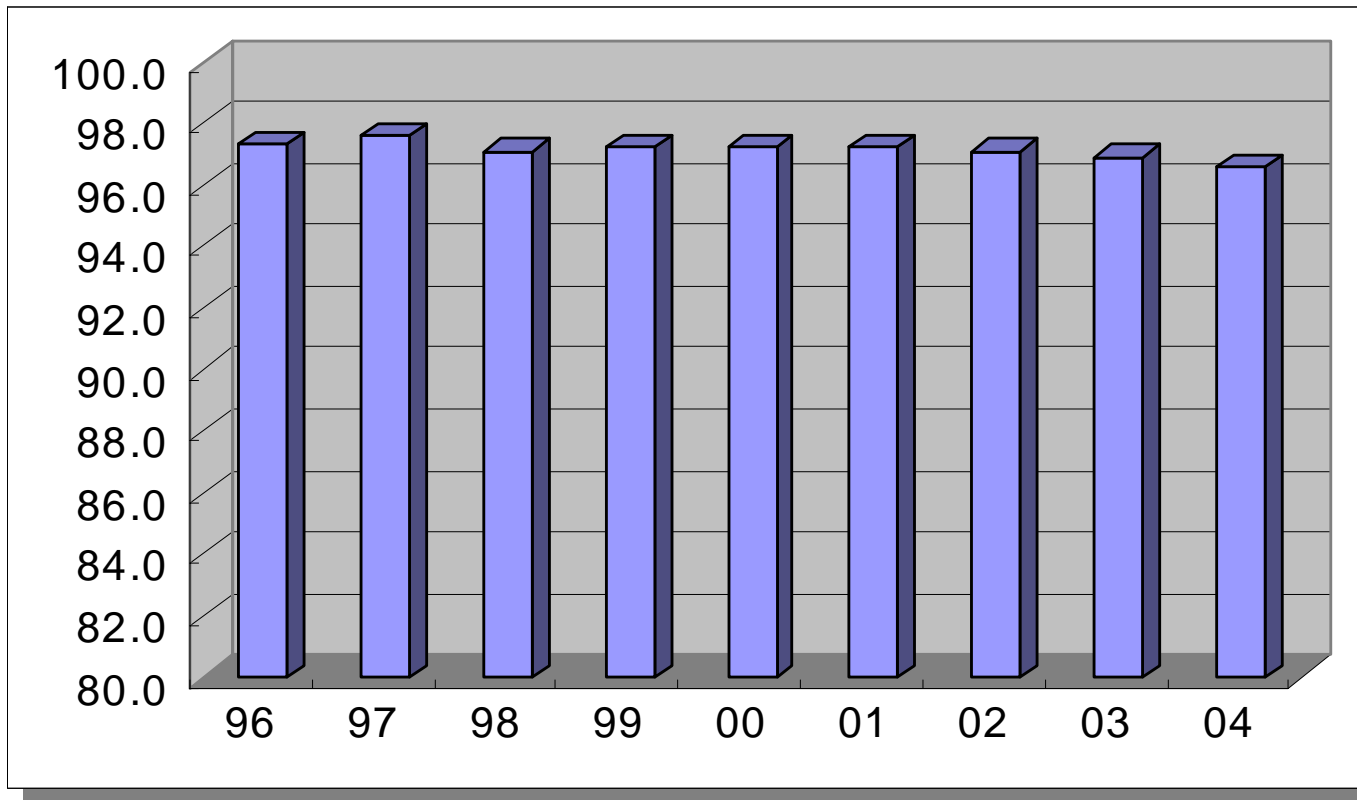
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TOE)



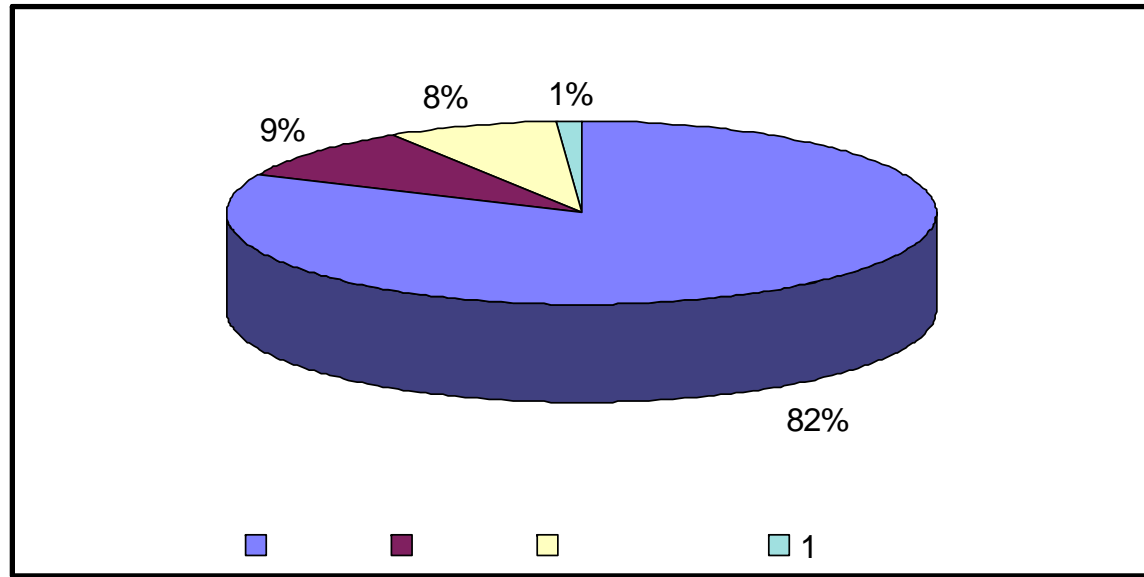
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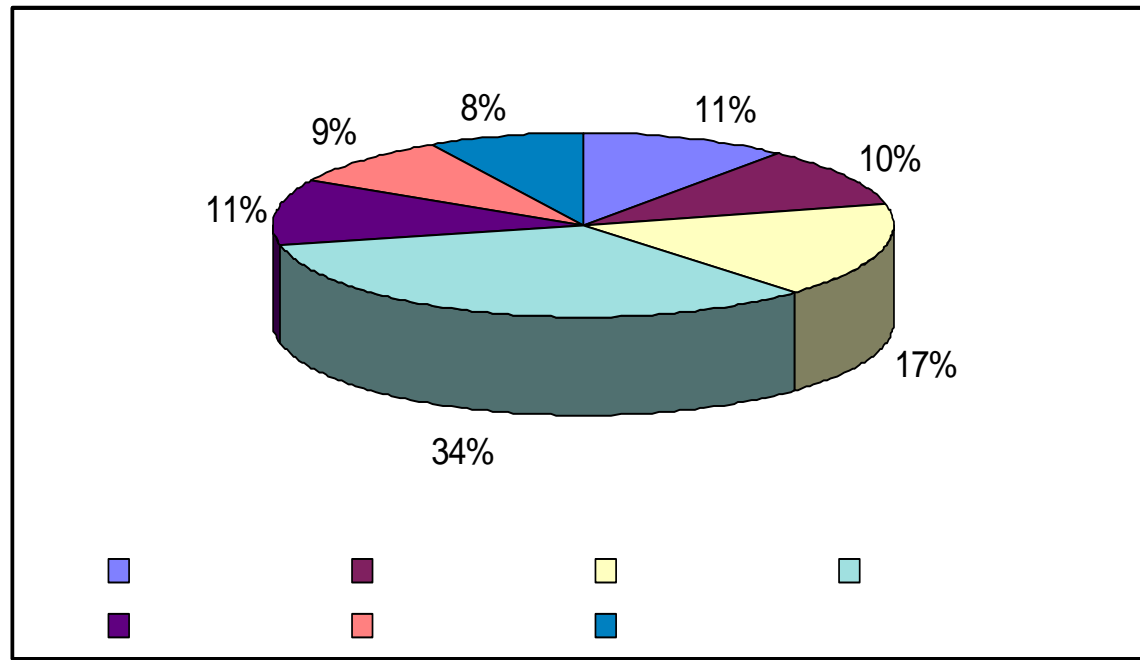


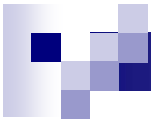


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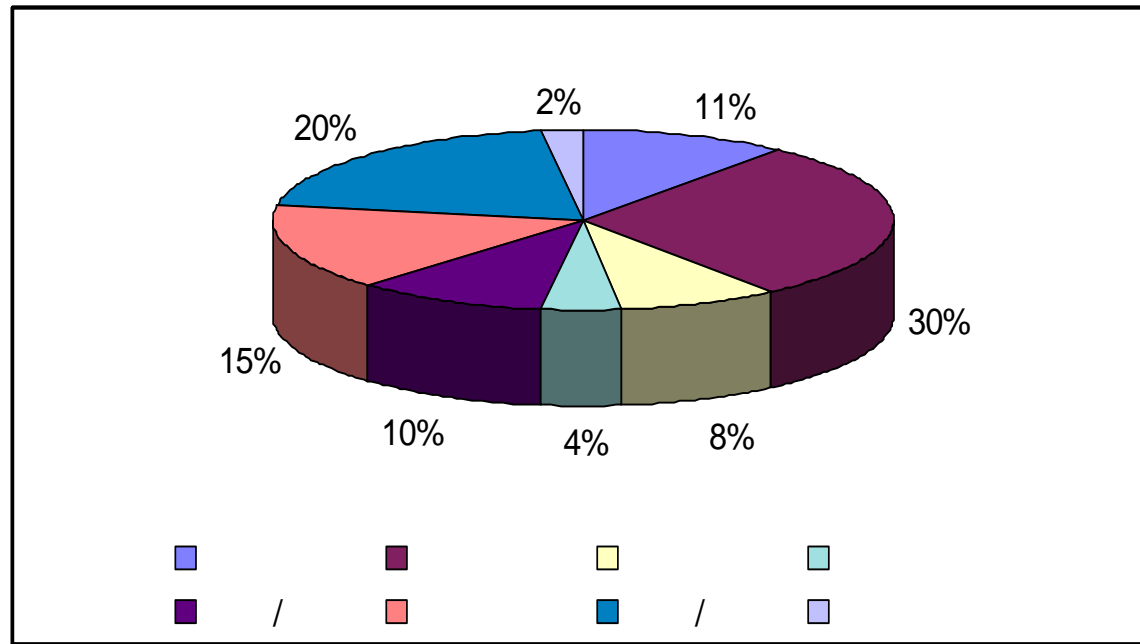


(2006.3~7)





[2006.3~7]







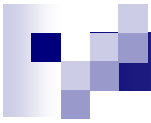
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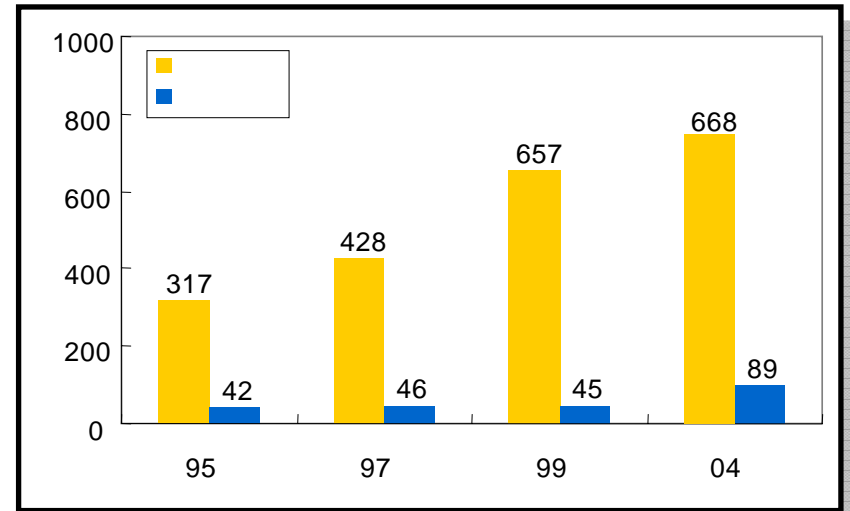
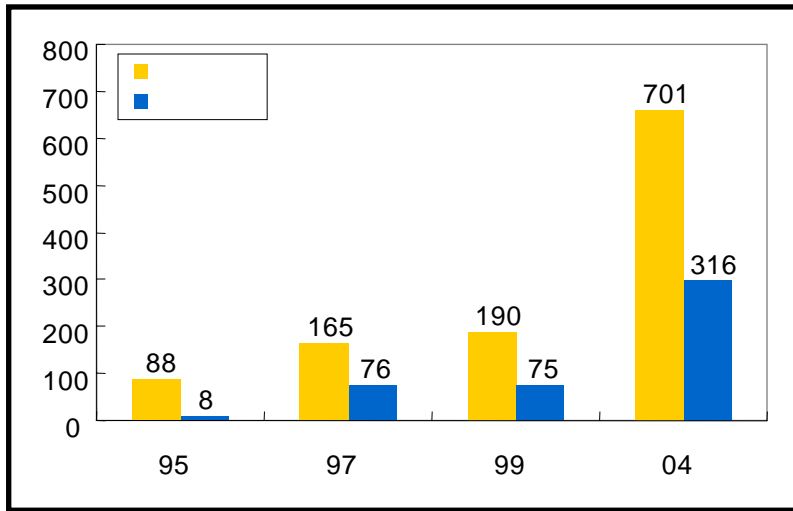
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	7.4	('05)	49	('99)
가	8	('04)	38	('99)
	4.1%	('05)	15%	('03)
	114	('05)	125	('03)

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# 가

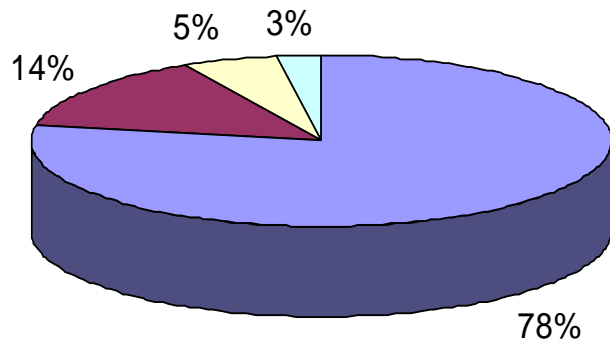
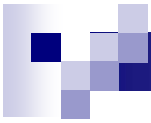


# 가 (2004, : )

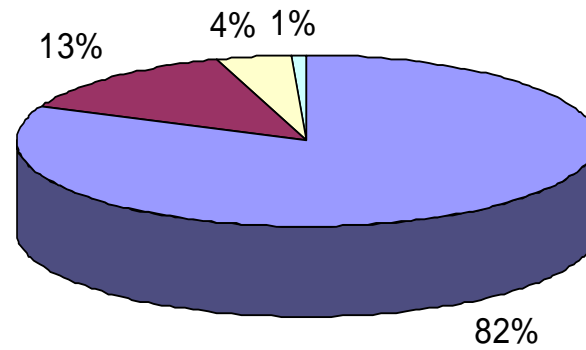
광구별 확보 가재매장량 현황

구분		원유(천 Bbl)			가스(천 Ton)		
		광구전체	국내사	석유공사	광구전체	국내사	석유공사
인도네시아	서마두라	18,900	4,725		4,915	1,229	
예멘	마리브	88,311	21,636	2,164			
아르헨티나	팔마라르고	2,663	373	37			
이집트	자파라나	21,000	5,250				
페루	8	86,644	34,658	17,329			
영국	캠틴	164,160	24,624	24,624			
아르헨티나	엘비날라르	2,170	2,170				
오만	부카	2,000	1,000		1,060	530	
코트디부아르	CI-11	1,168	151		2,945	382	
볼리비아	팔마	2,700	2,700		2,000	2,000	
카타르	RasLaffan				108,466	5,423	
인도네시아	폴랭	2,600	1,300		317	159	
미국	Maddox				157	55	
알제리	이사우에네	8,100	2,066				
마리브	가스전				204,000	32,541	2,264
베네수엘라	오나도	42,212	5,952	5,952			
베트남	11-2	22,800	22,800	9,063	17,120	17,120	9,074
리비아	Elephant	951,115	317,038	158,519			
페루	Camisea	583,000	102,608		173,740	30,578	
베트남	미월 15일	583,875	135,751	83,202			
미국	Park-Spring	472	413		162	142	
미국	Miscellaneous	105	53				
미국	Northlbex	22	11		3	2	
미국	SouthClayton	2,467	370				
캐나다	CarsonCreek				144	14	
인도네시아	SES	170,950	15,232	15,232	9,131	814	814
캐나다	Enchant	4,067	349		25	2	
미국	Sherman/Muncaster	377	179		46	22	
미국	SourLake	545	213		94	37	
미국	CH0307	864	190		208	46	
총	계	2,763,182	701,758	316,122	524,638	91,149	12,152

\* 2004년 12월말 기준

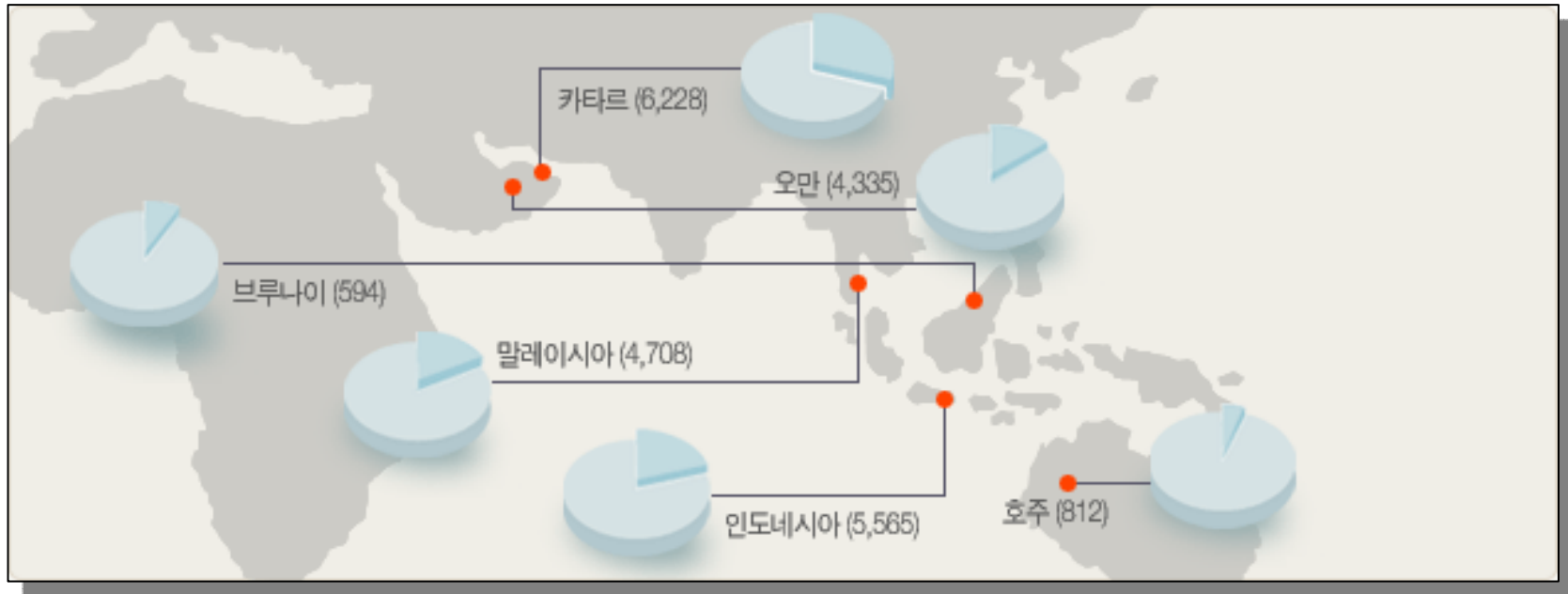


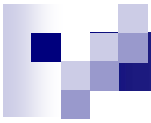
8.25 (=1.13 , 2004 )



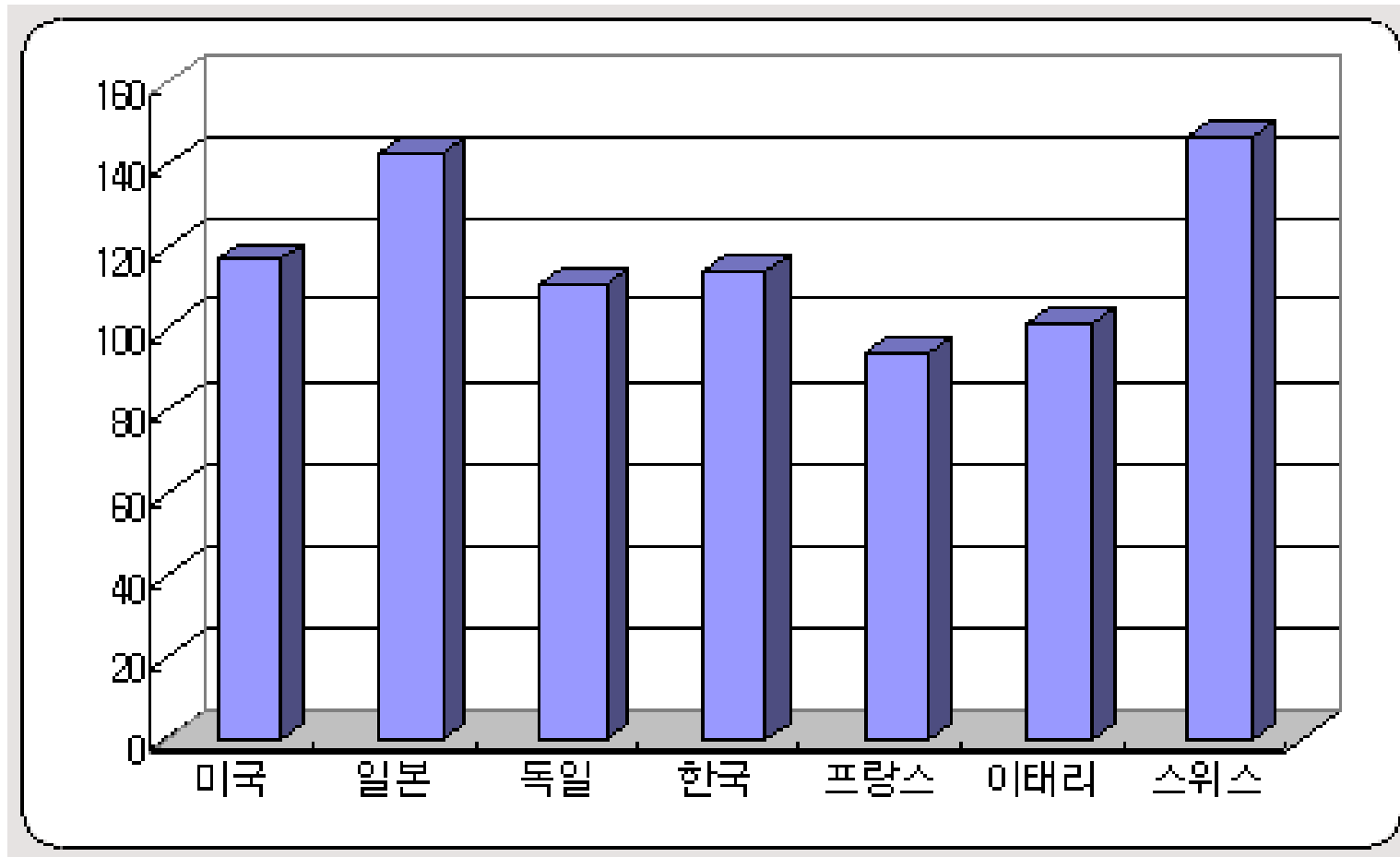
8.53 (=1.16 , 2005 )

# 가 (2005)



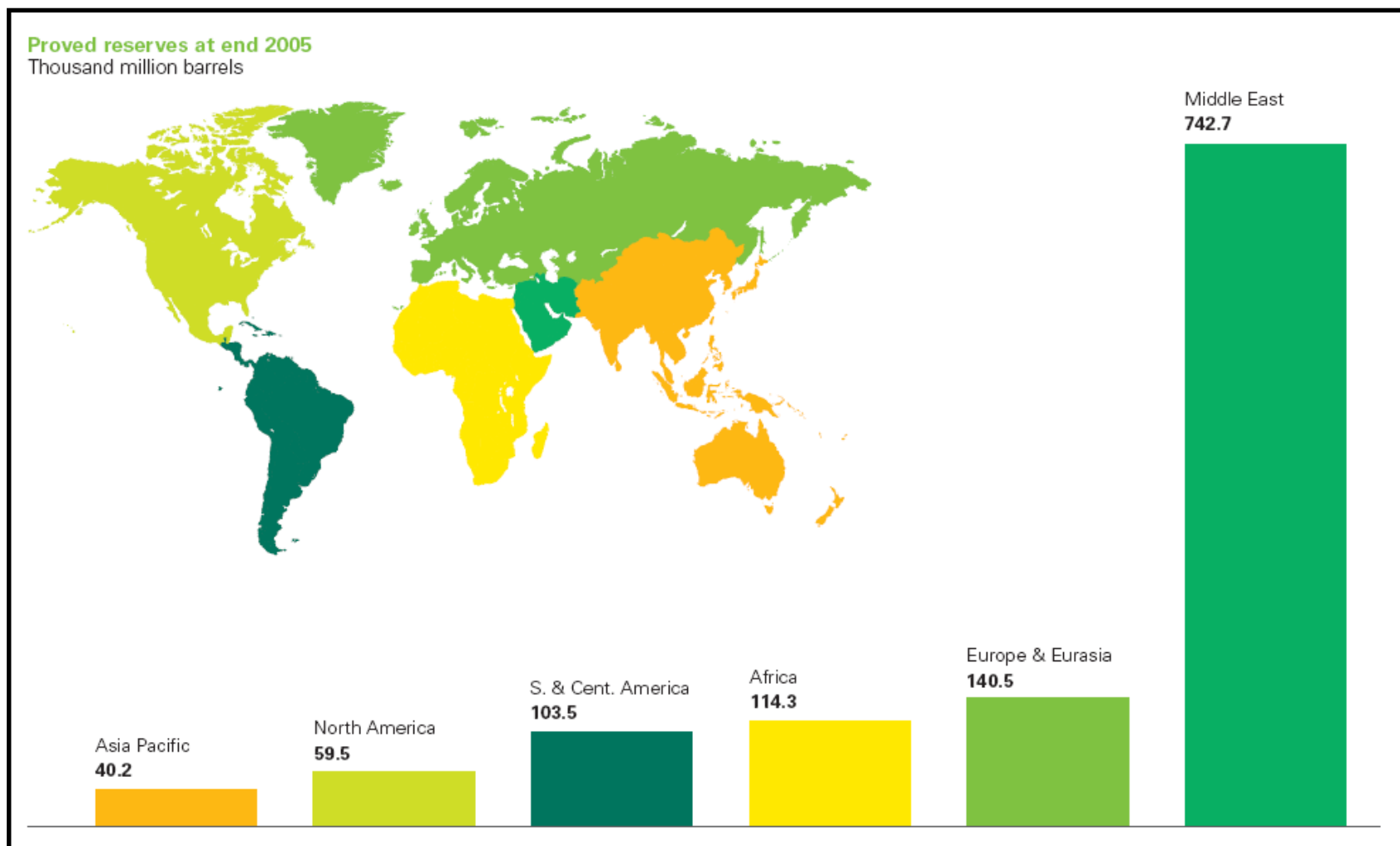


가 (2005 , : day)



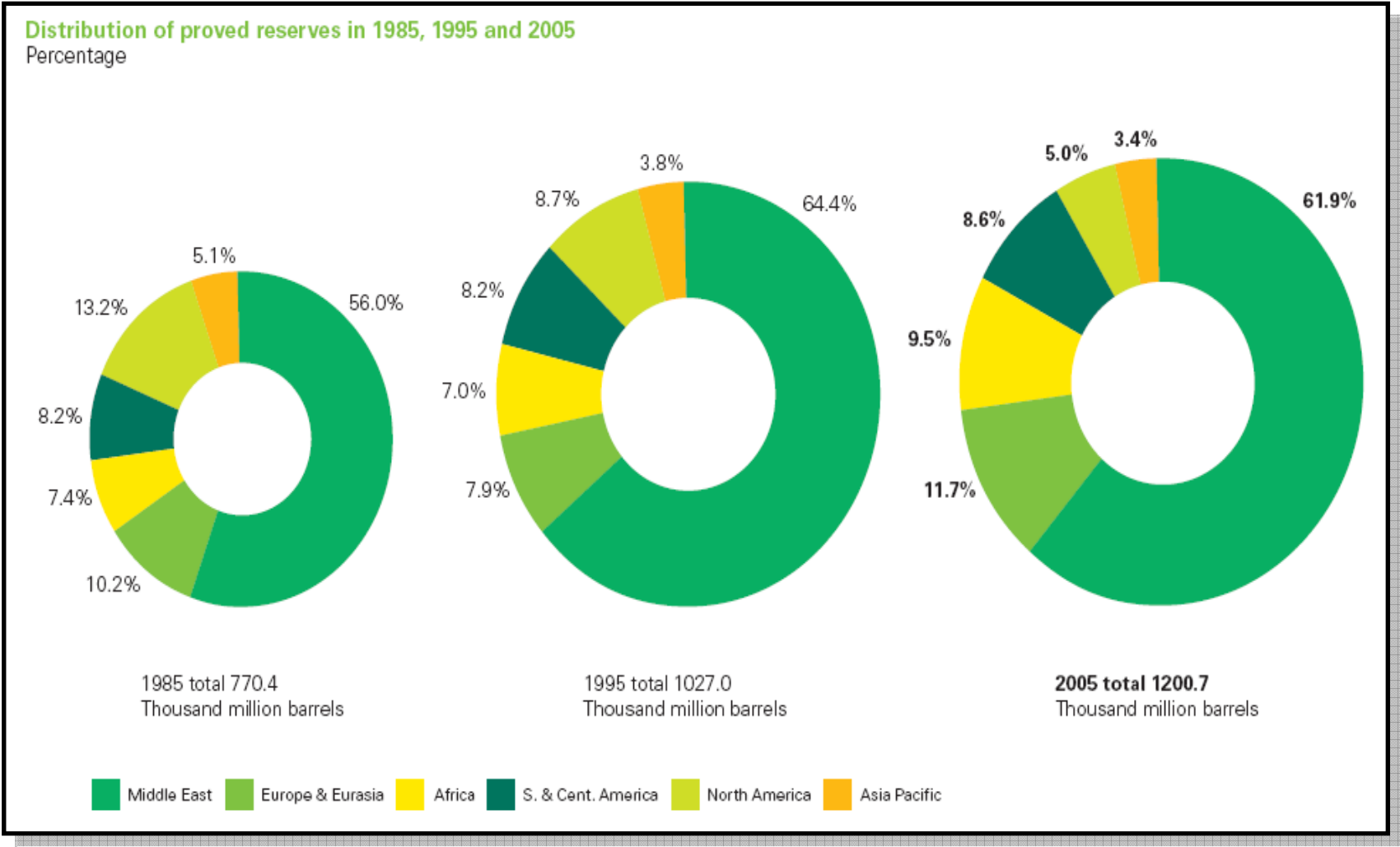


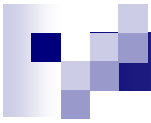
(2005) -



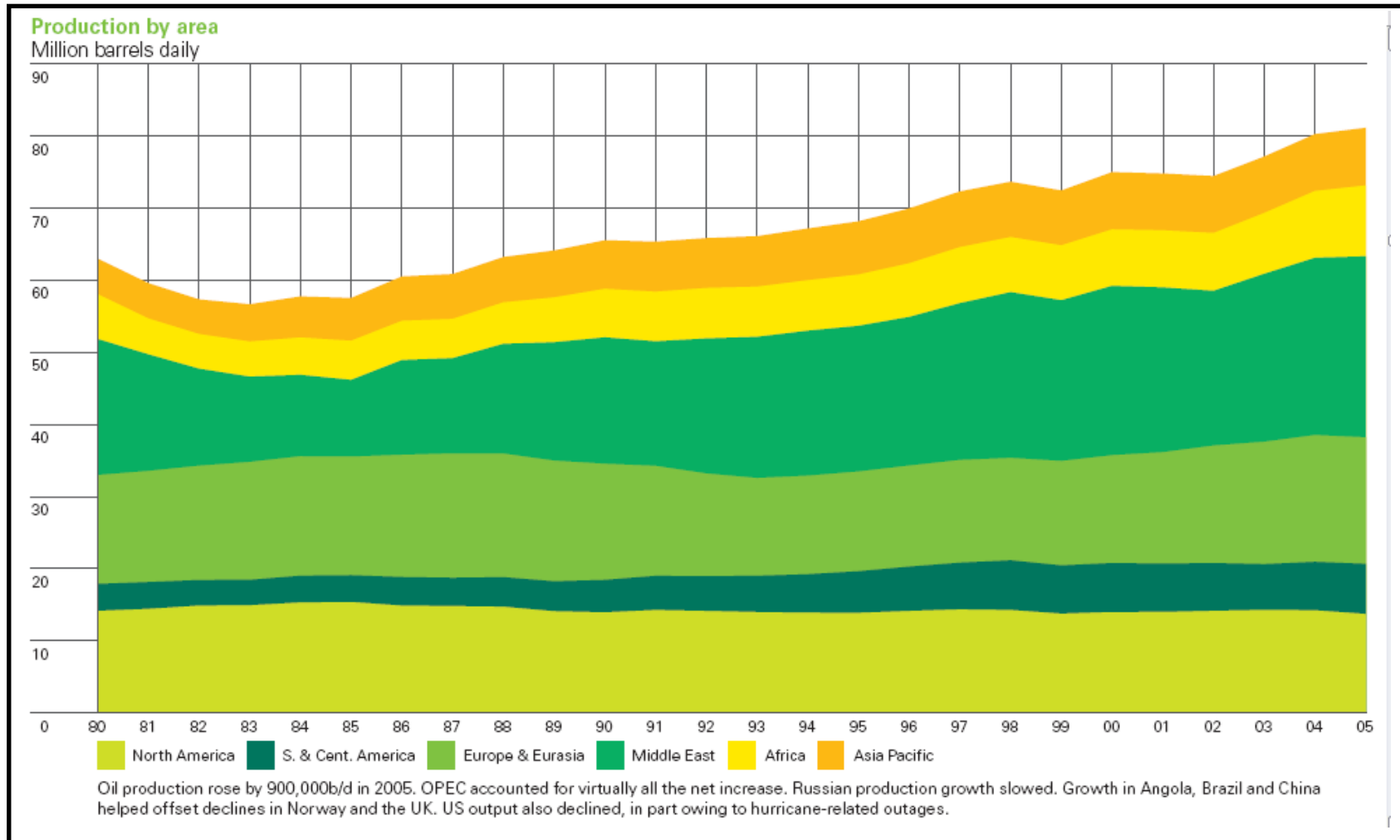


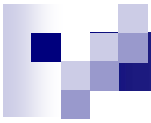
# (1985, 1995, 2005) -





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### Reserves-to-production (R/P) ratios

Years

50

40

30

20

10

0



World North America S. & Cent. America Europe & Eurasia Middle East Africa Asia Pacific

The world's oil R/P ratio declined slightly in 2005 to 40.6 years from 40.7 in 2004, although reserves continued to increase. Iran and Russia accounted for most of the increase. Reserves were 17% higher than the 1995 level; production was 19% higher.

Years

100

80

60

40

20

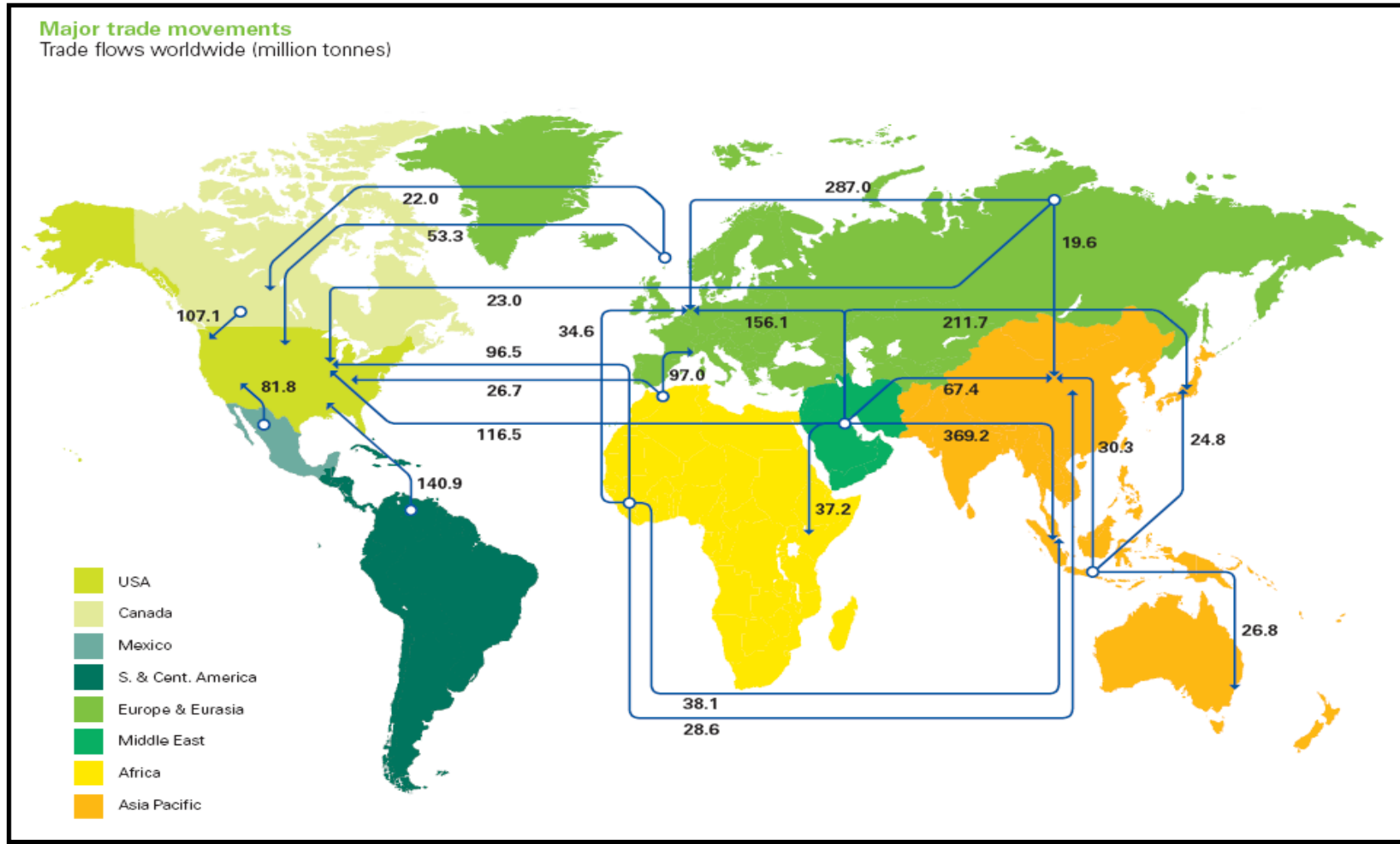
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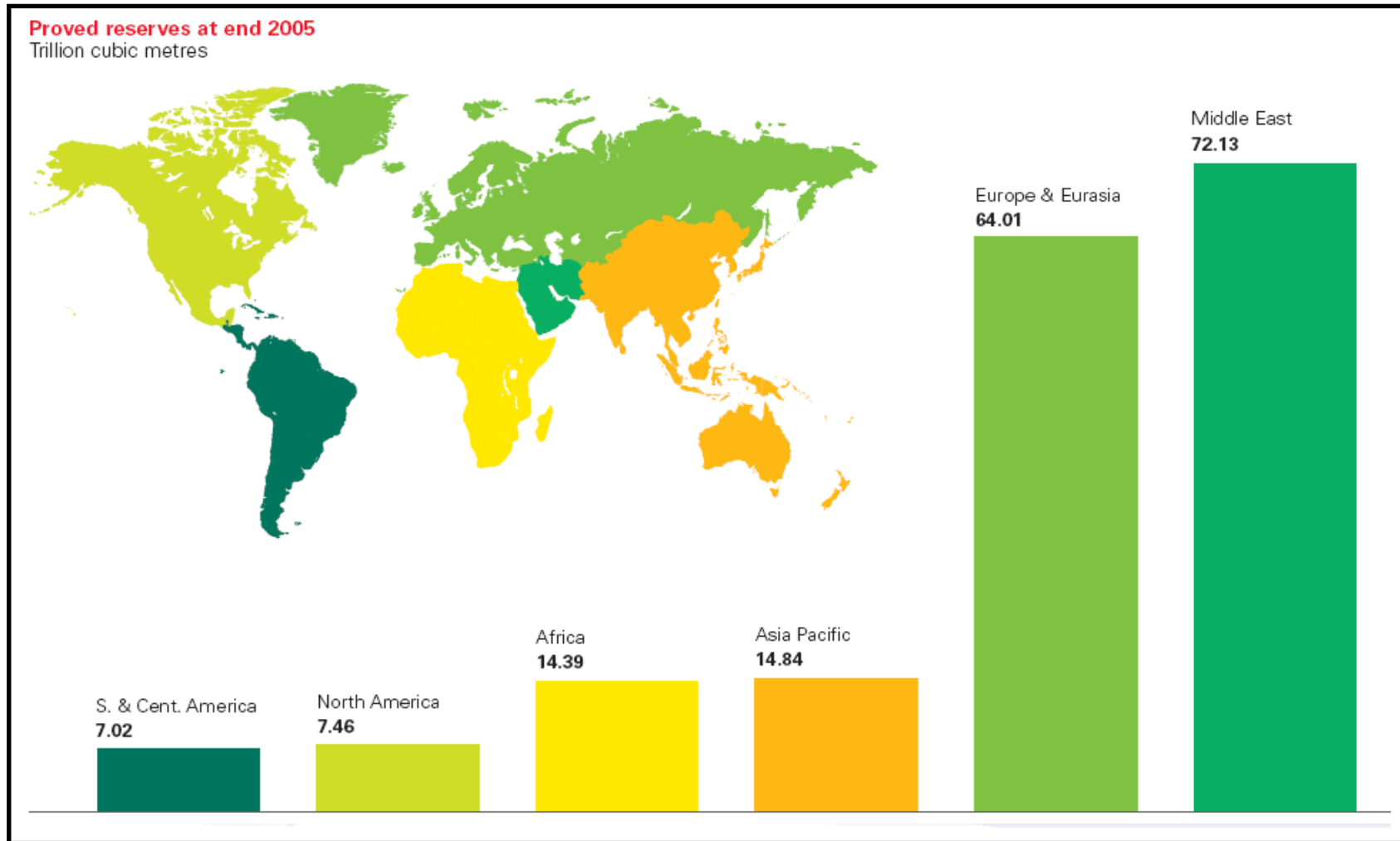
North America S. & Cent. America Europe & Eurasia Middle East Africa Asia Pacific



( )



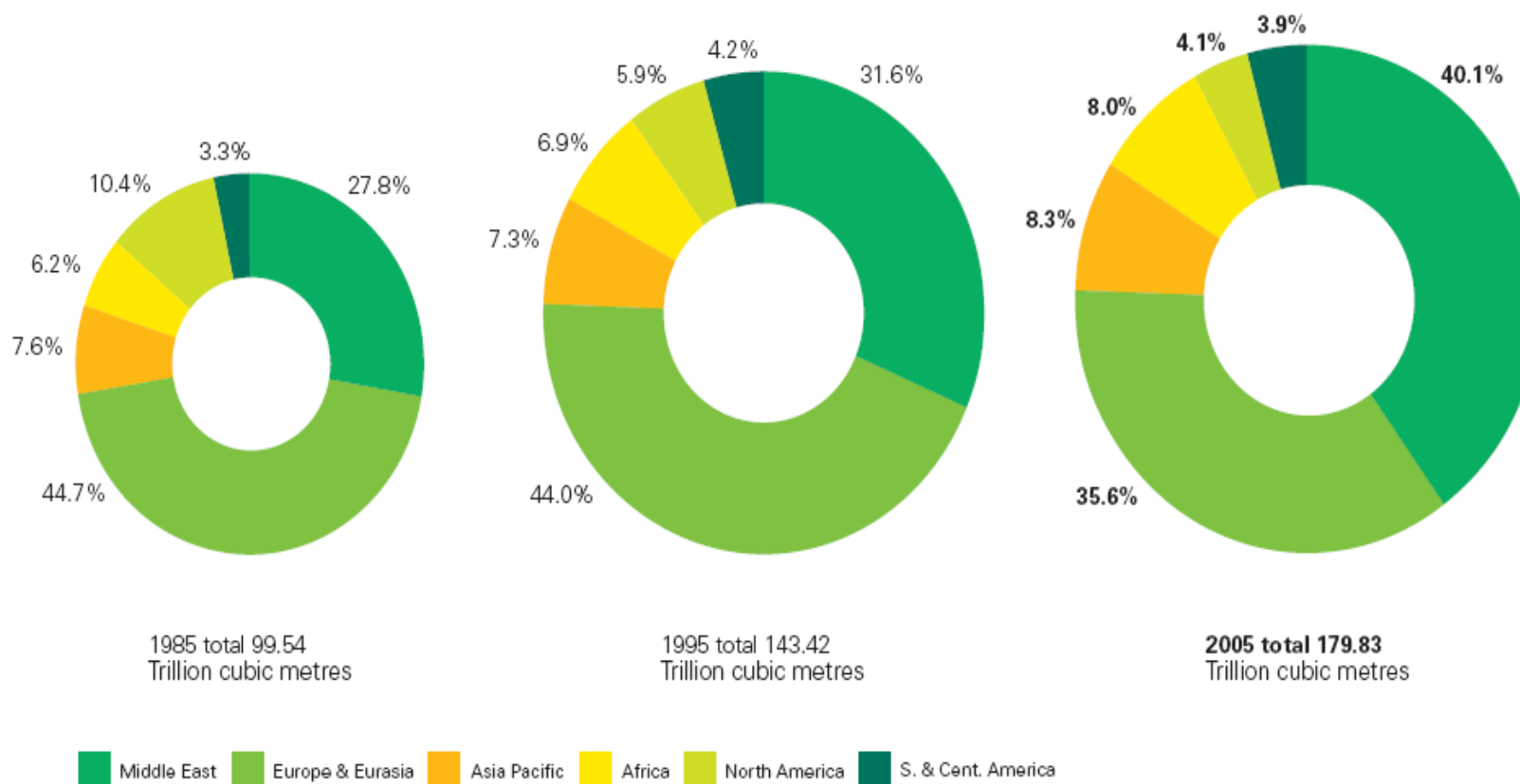
# (2005) - 가

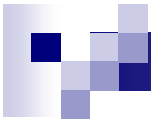


# (1985, 1995, 2005) - 가

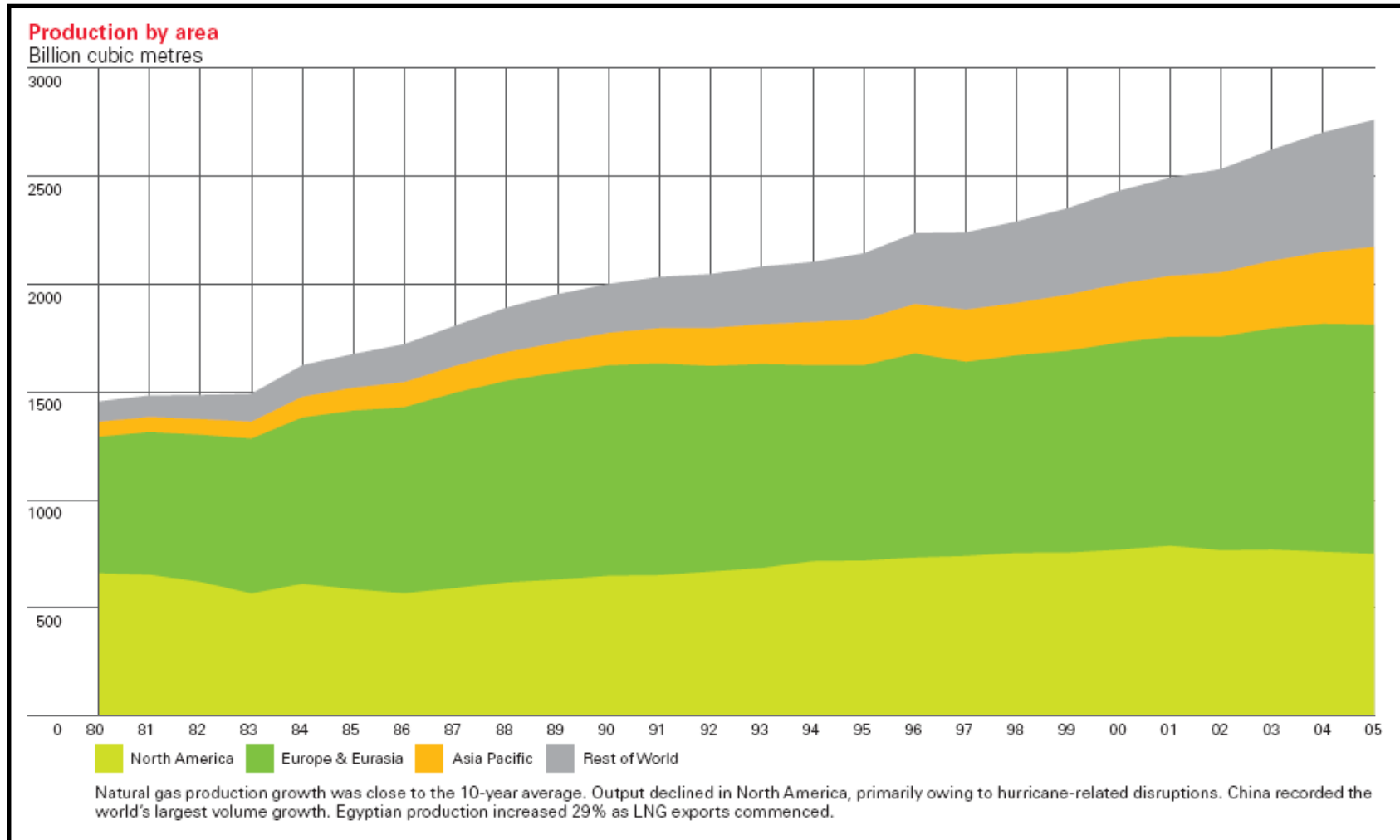
Distribution of proved reserves in 1985, 1995 and 2005

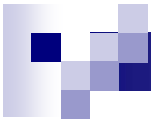
Percentage



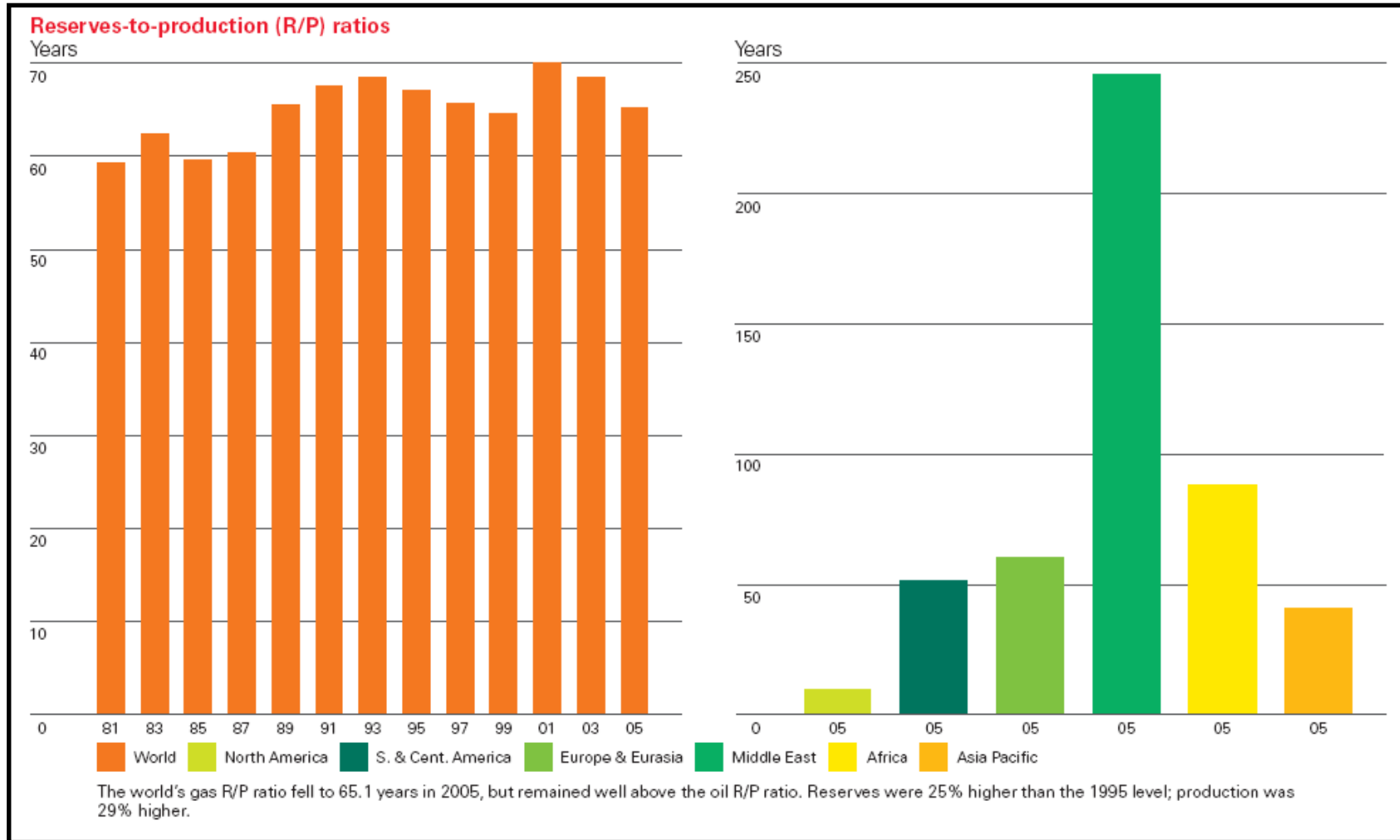


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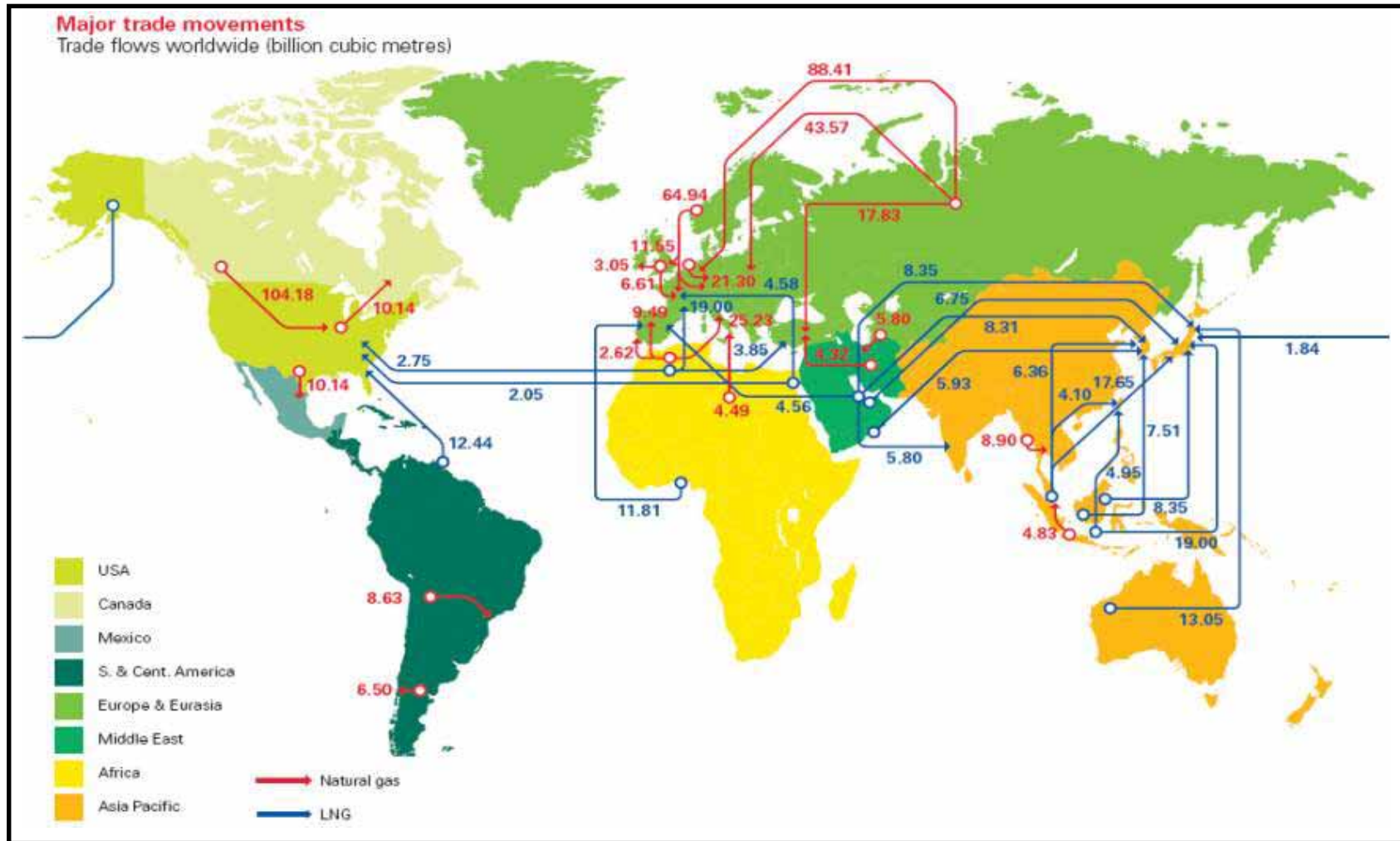


# / ( 가 )





# ( 가 )





## (Tone of Oil Equivalent)

	TOE
(1 )	0.46
(1 )	0.66
가 (1 )	1.3
(1 kwh)	0.867

E.E (Energy Efficiency) = Work done/ Input energy

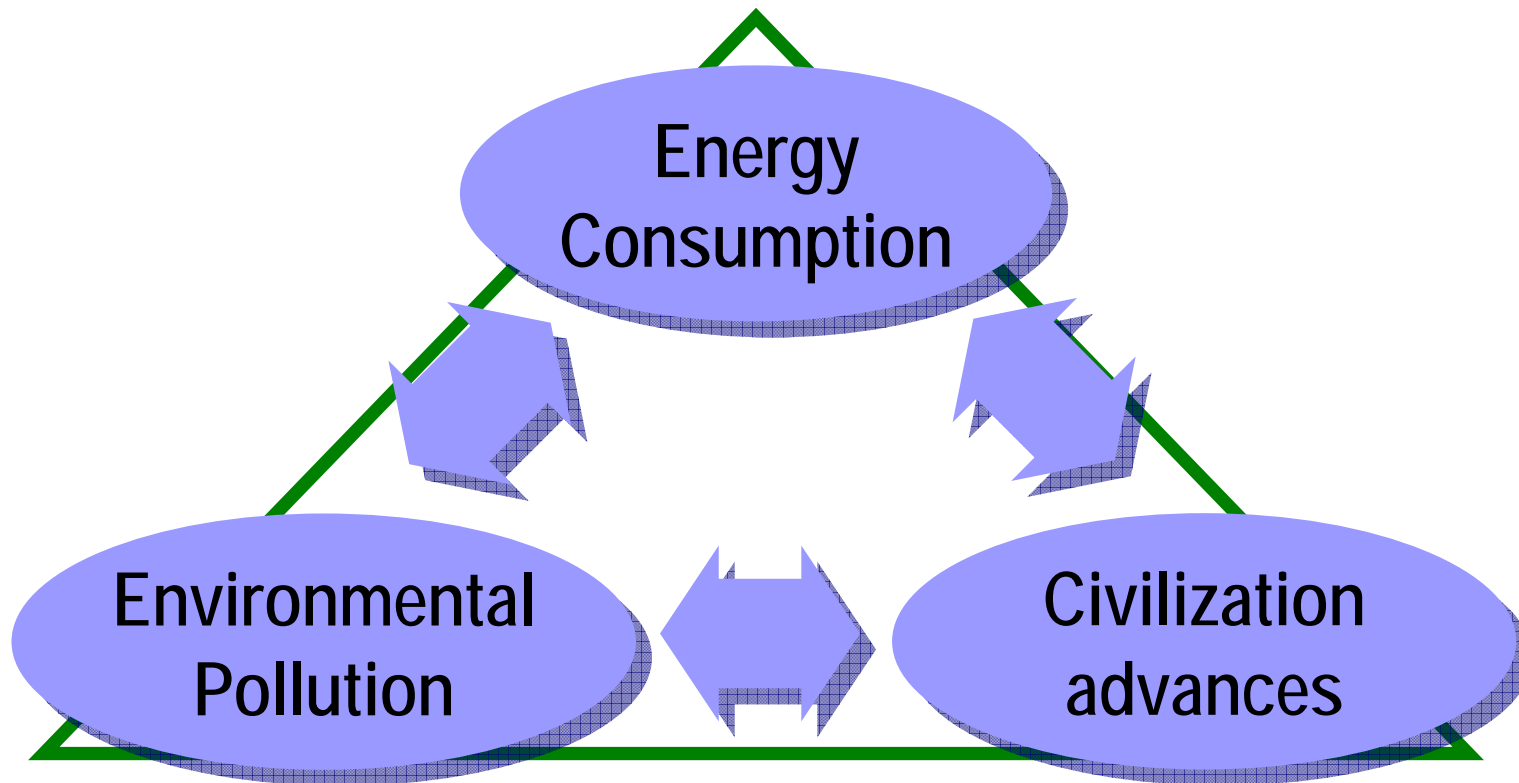


# Energy and Environment

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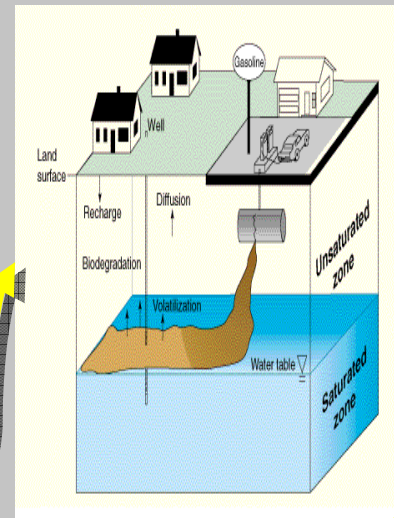


## ✦ Relationship



# ✦ Environmental impact

Development    Transportation    Storage    Utilization



## ✦ Development

### Development



- Efflux of oil or natural gas impurities
  - (1) Sulfuric compound
  - (2) Carbon dioxide
  - (3) Carbonic acid gas
- Blow out

## ✦ Development

- Accident in North-West Italy (Feb. 1994)



## ✦ Transportation

### Transportation

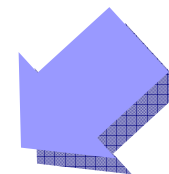
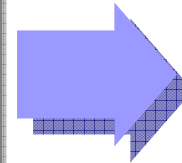


- Leakage from a pipeline:  
Soil and aquifer contamination
- Efflux of oil by a tanker breakdown:  
Ecosystem breakdown



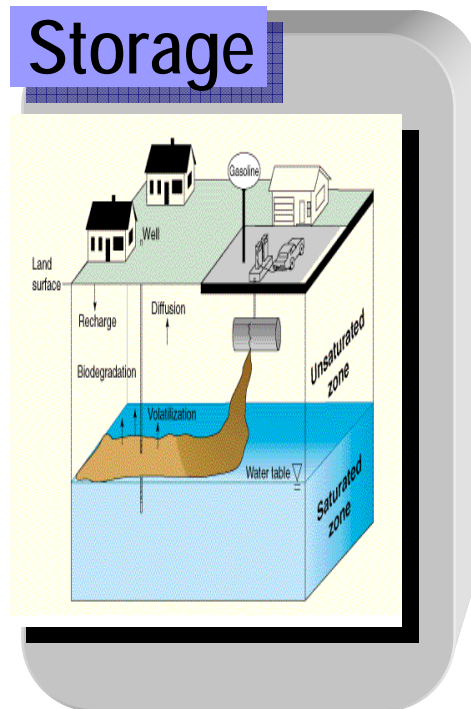
## ✦ Transportation

- Exxon Valdez disaster (1989)



- 20,000 km along the beach
- Cost: About \$ 2,000,000,000

## ✦ Storage



- Leakage from an underground storage:  
Soil and aquifer contamination
- Difficult to become aware
- Broad contamination
- High cost and time consuming

## ✦ Utilization

### Utilization



- Hazardous gas emission by combustion
- LPG storage vessel explosion]
- LNG pipeline leakage and accident

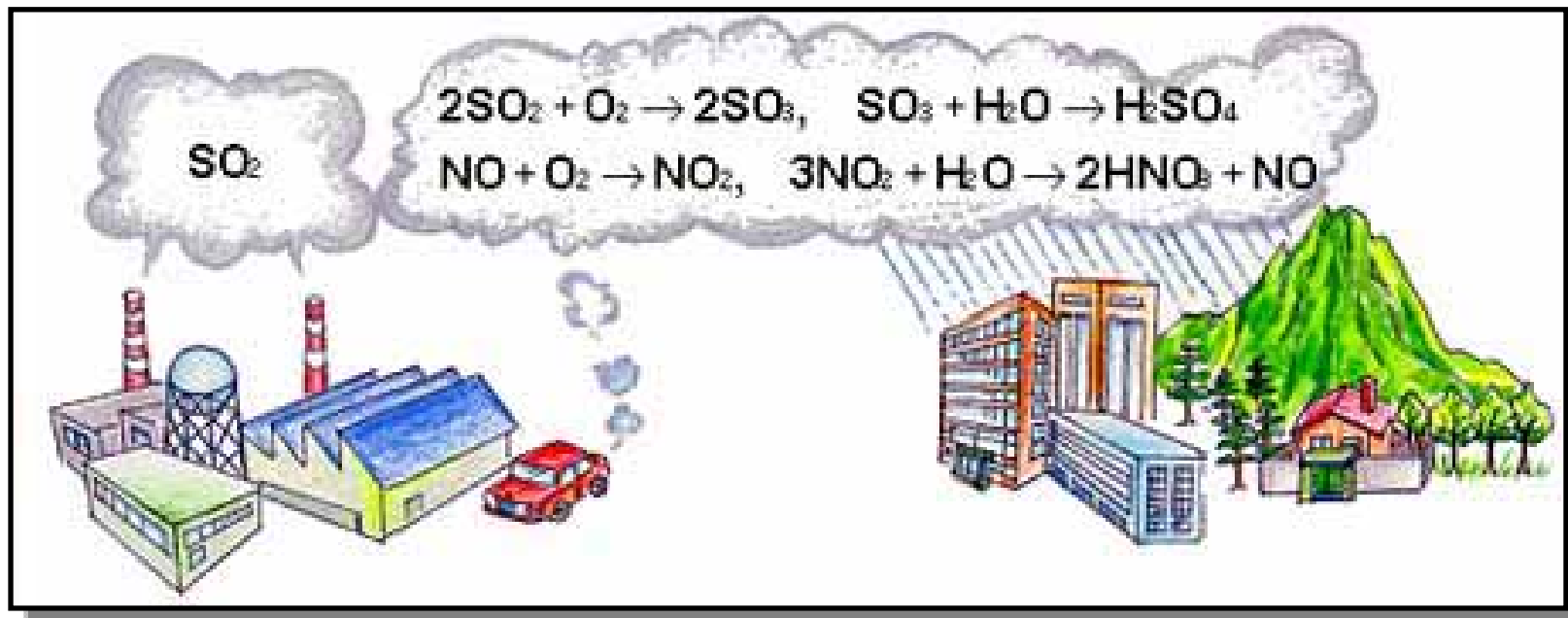
## ✦ Fossil energy and environment

- Smog: "Smoke" + "fog"
  - (1) London type smog
  - (2) LA type smog



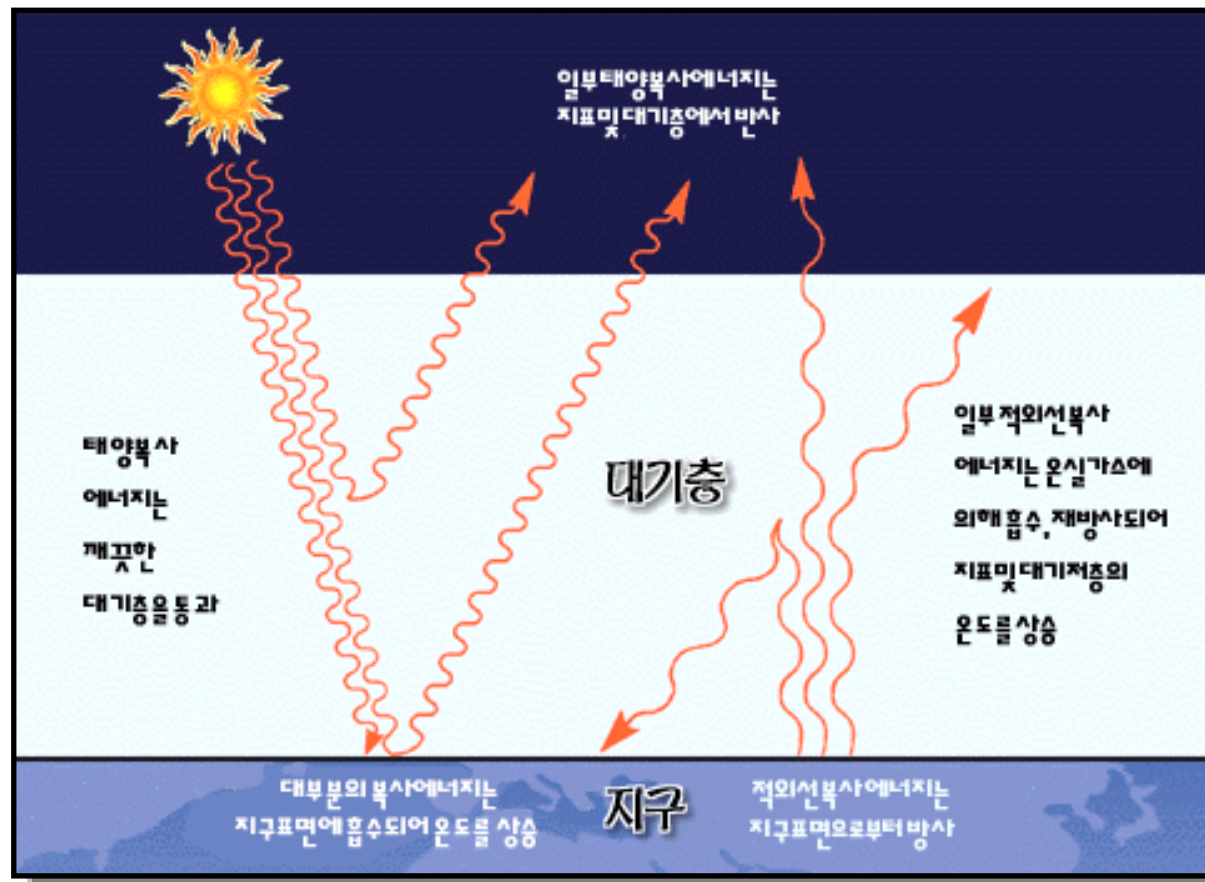
## ✦ Fossil energy and environment

- Acid rain
  - (1) By nature
  - (2) By human activities



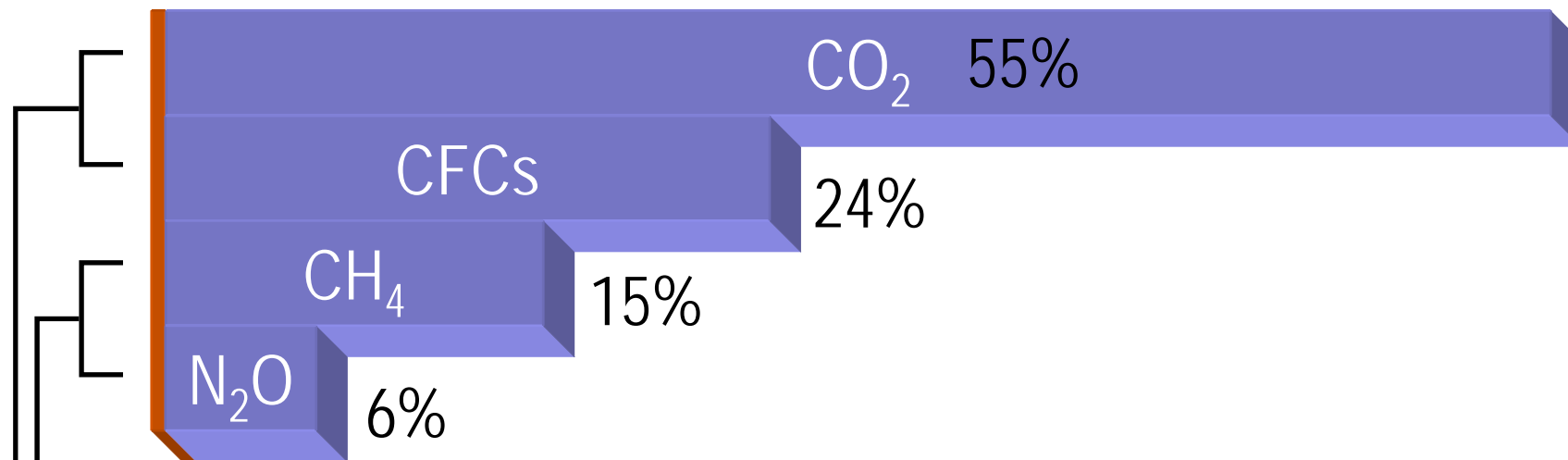
# ✦ Fossil energy and environment

- Global warming



## ✦ Fossil energy and environment

- Greenhouse gas priority



Mostly from human activities

: must be controlled

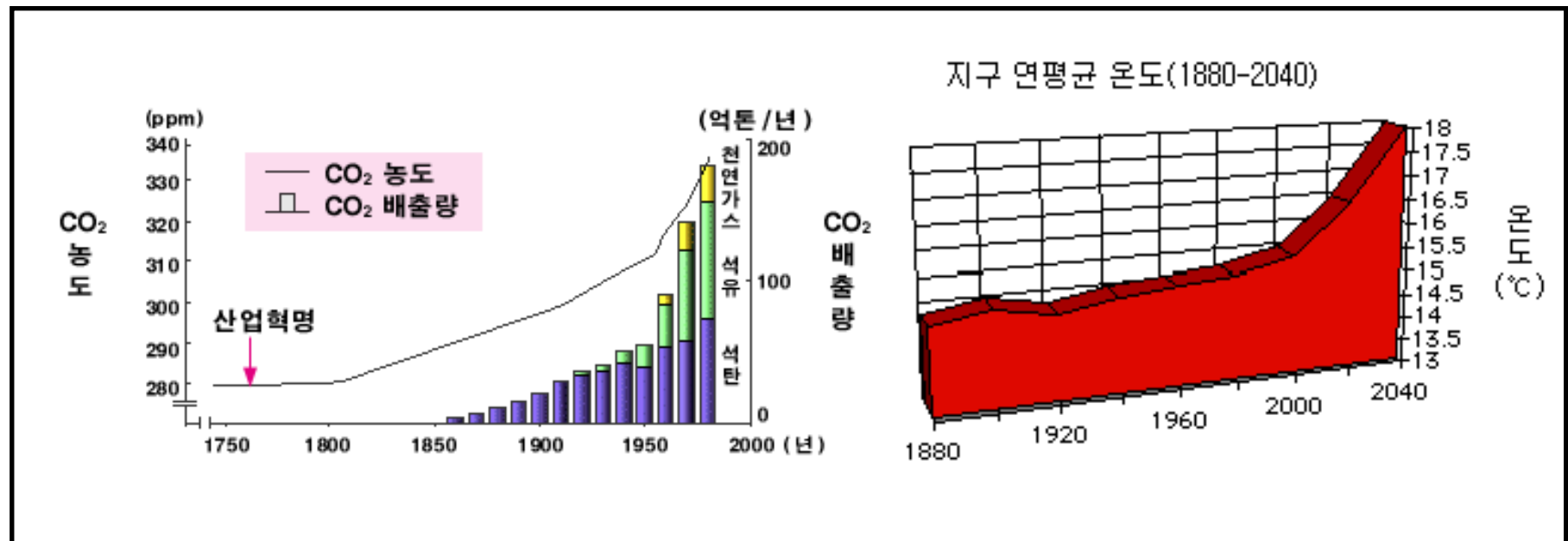
Mostly from natural emission

: difficult to control

# Fossil energy and environment

- Effect of global warming

(1) Temperature





## ✦ Fossil energy and environment

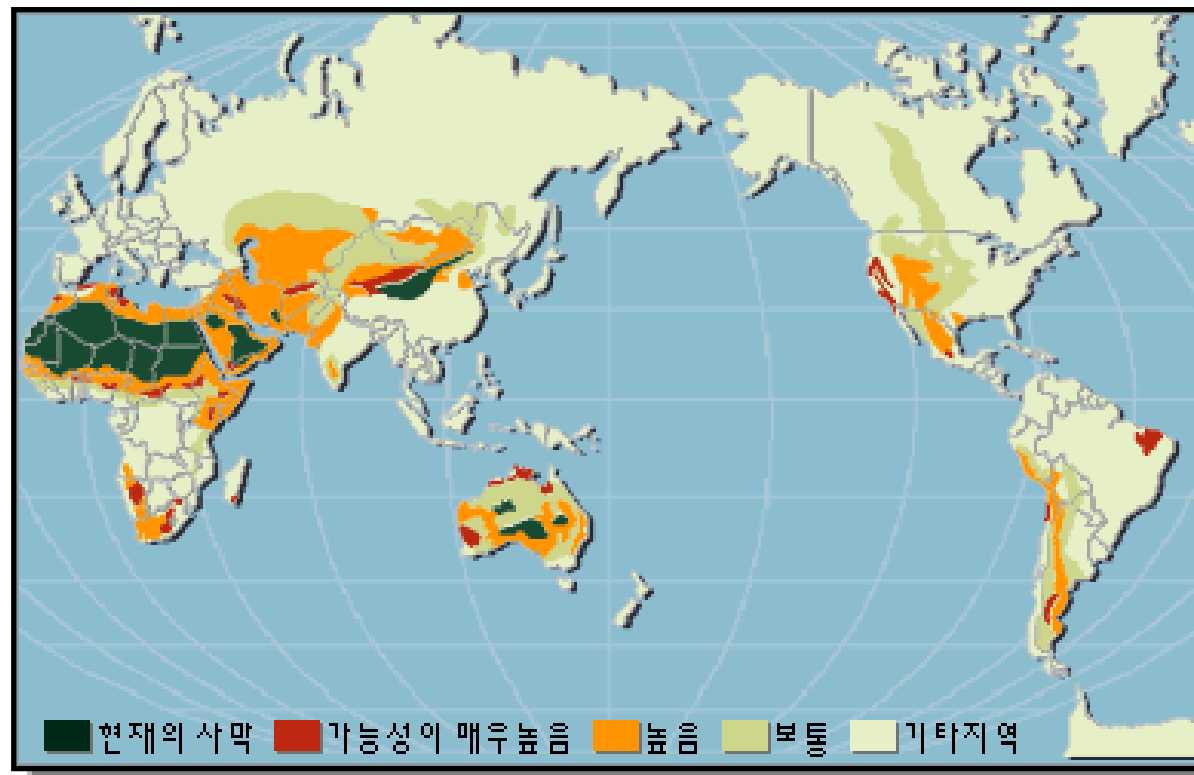
- Effect of global warming
- (2) Sea level



## ✦ Fossil energy and environment

- Effect of global warming

(3) Desertification (19% in progress)



## ✦ Nuclear energy and environment

- Economical efficiencies by prime cost



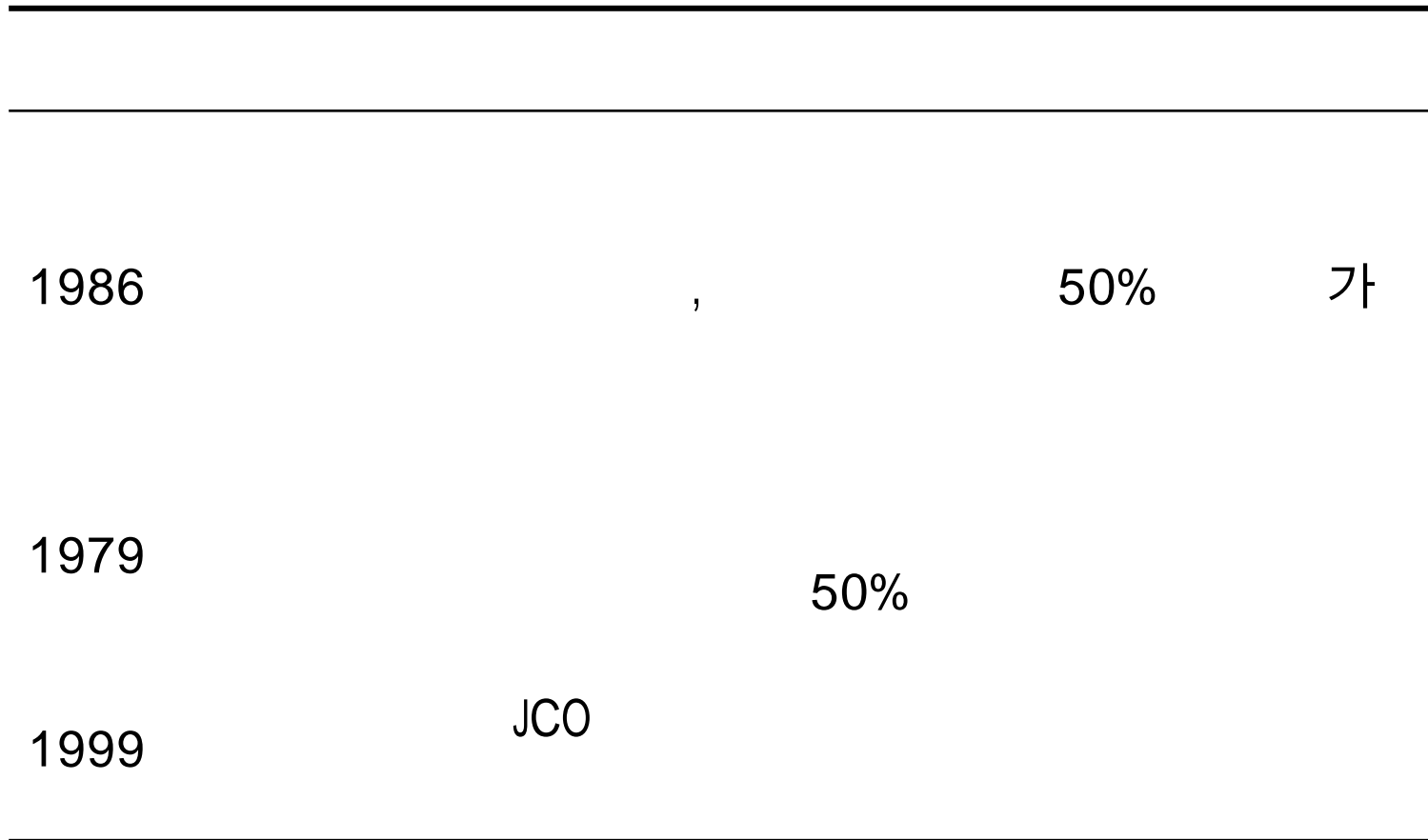
- NIMBY ( Not In My Back Yard)

## ✦ Nuclear energy and environment

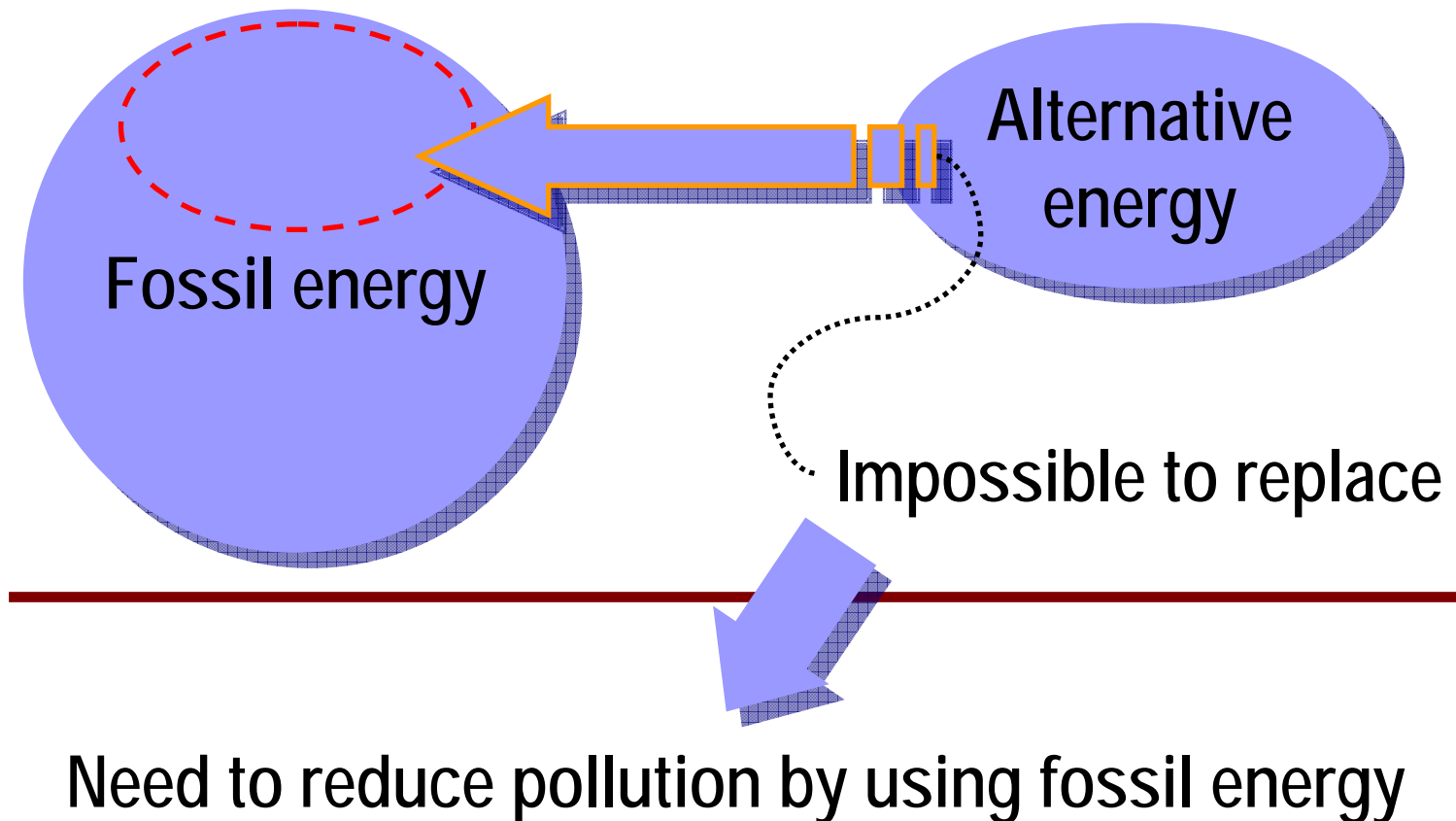
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- Environmental impact
  - (1) Rising sea temperature in the coast
  - (2) Prevention system of disaster for radioactive wastes
  - (3) Management cost for a long period
  - (4) High risk

# ✦ Nuclear energy and environment



## ✦ Pollution reduction technology



## ✦ Pollution reduction technology

- Climatic Change Convention (1994)
  - (1) Objectives: prevent global warming by reducing gas
  - (2) 176 nations, also Korea
  - (3) Divide by developed and developing country
- Kyoto Protocol

## ✦ Pollution reduction technology

- Present status ( 9<sup>th</sup> of worldwide, 2004 )





## ✦ Pollution reduction technology

- Present effort



# ✦ Pollution reduction technology

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# Renewable Energy




## ✦ Definition

- The Energy which excludes oil, coal and natural gas.
- It includes Solar Energy, Biomass, Wind Energy, Geothermal, Fuel Cell, Hydrogen Energy etc.

## ✦ Characteristics

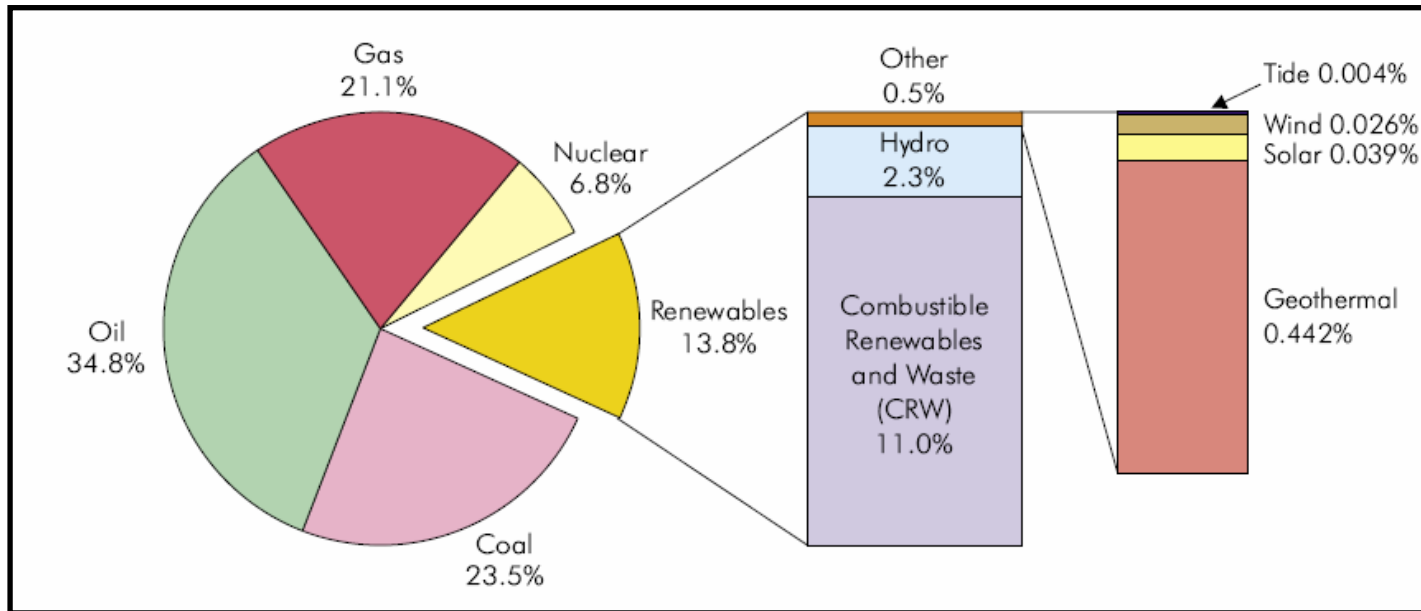
- Eco-friendly energy
  - Non-exhausted energy
  - Technology-driven energy
  - Public energy
- 

## ✦ Necessity of Development and Supply

- By United Nations Framework Convention on Climate Change, the duty of greenhouse gases reduction during 2013-2017 may be imposed on Korea
  - Renewable energy makes certain of energy security and is a clean energy without contaminants
  - Worldwide fast-growing industry
- 

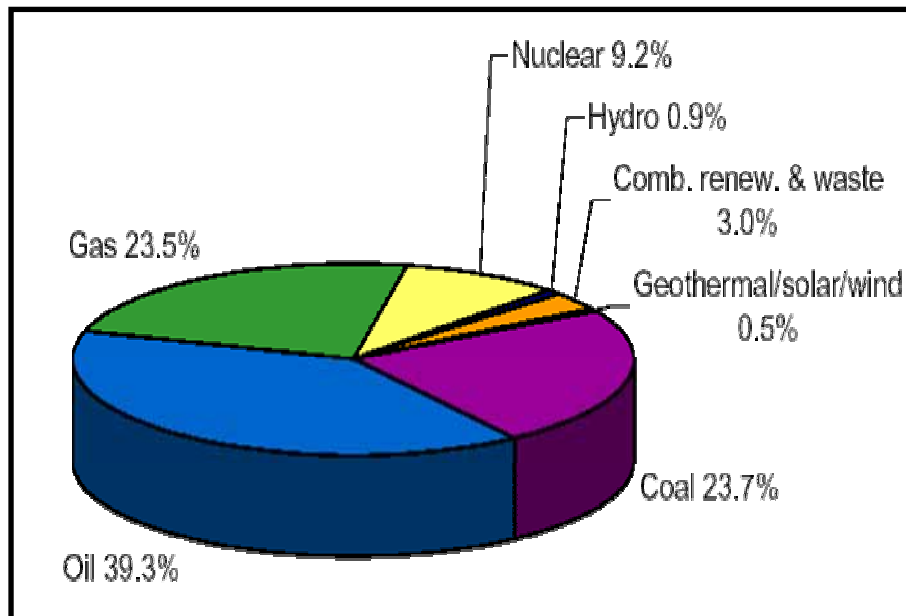
# Renewable Energy in Developed Countries

## Energy supply rate

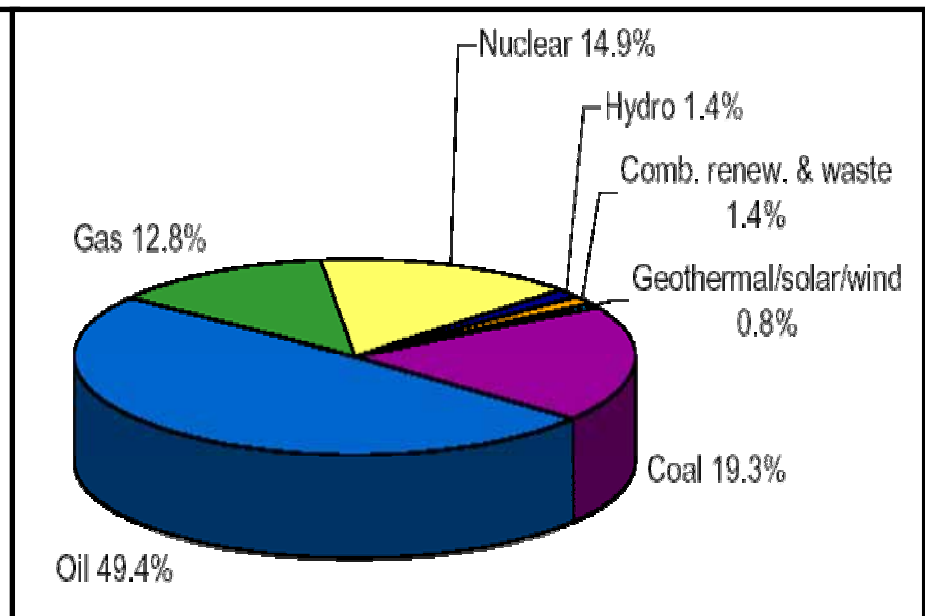


# ✦ Renewable Energy in Developed Countries

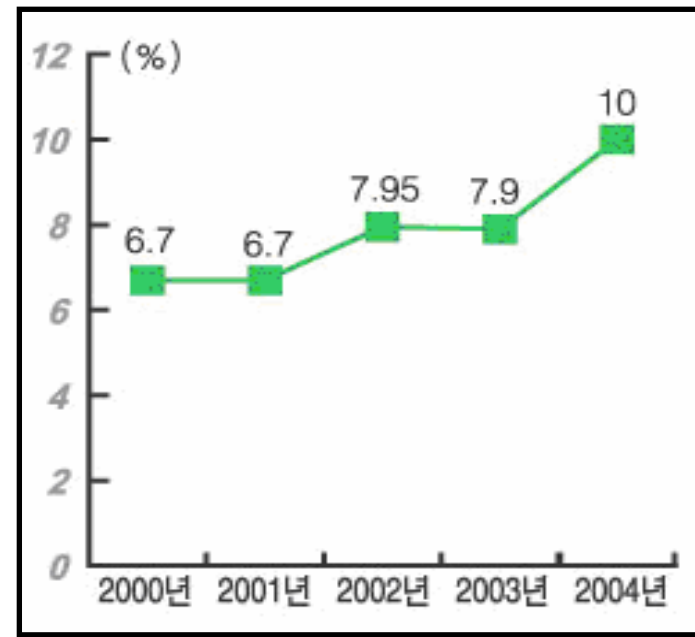
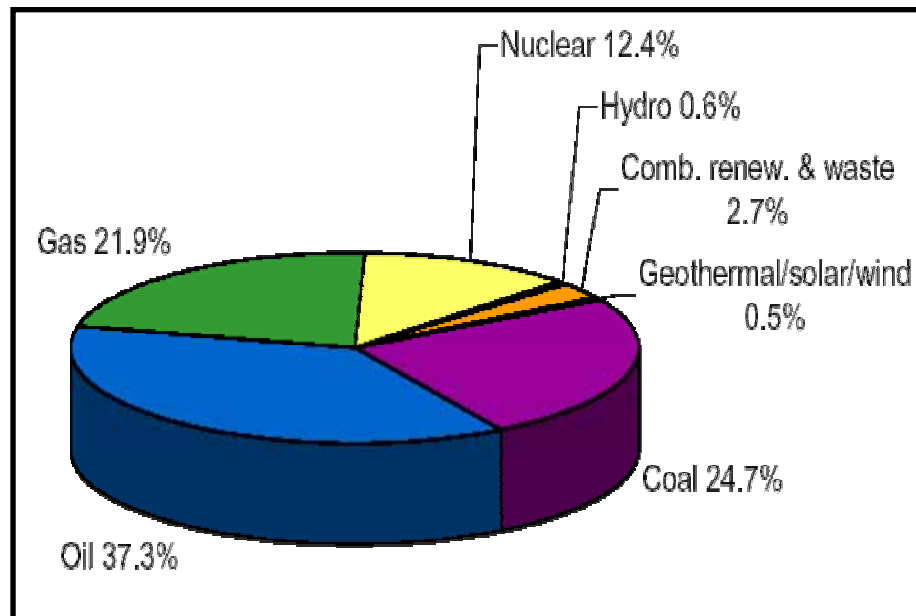
## ✦ U. S. A



## ✦ Japan

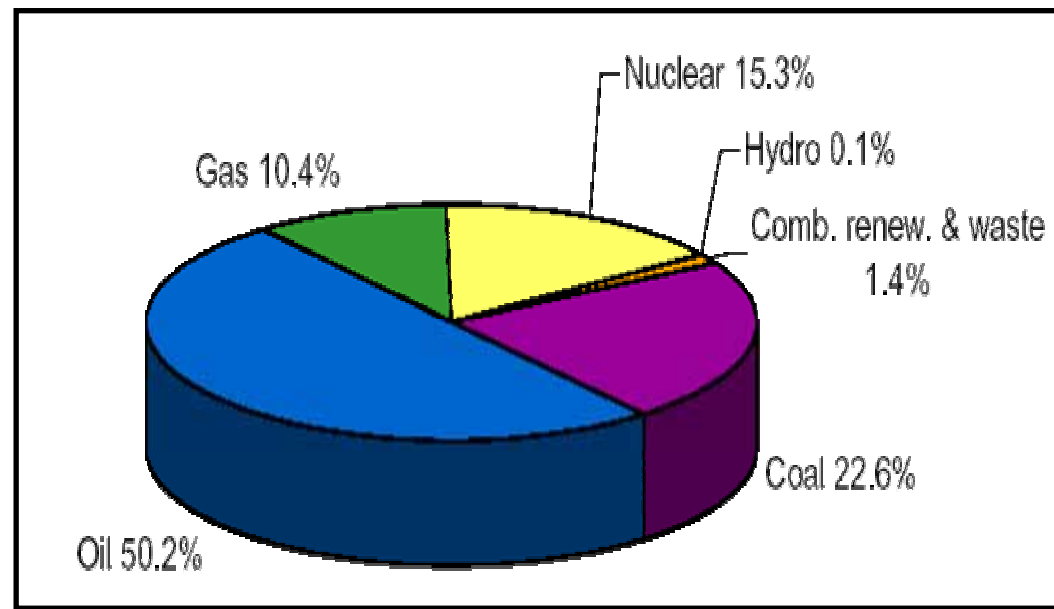


## Germany





## ✦ Renewable Energy in Korea

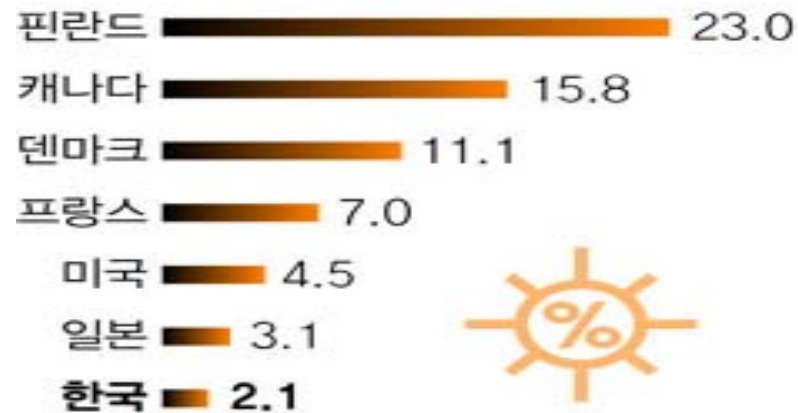


## Today's renewable energy in Korea

[연도별 신재생에너지보급 현황]

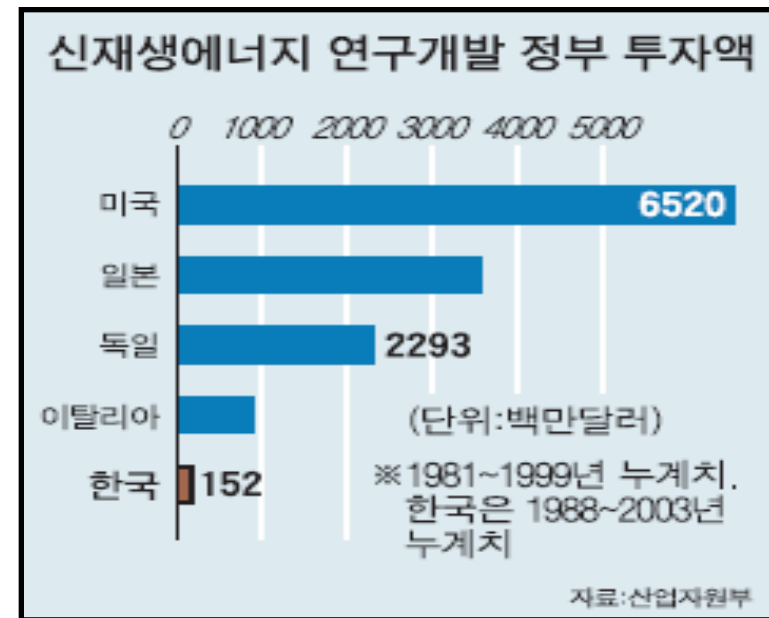
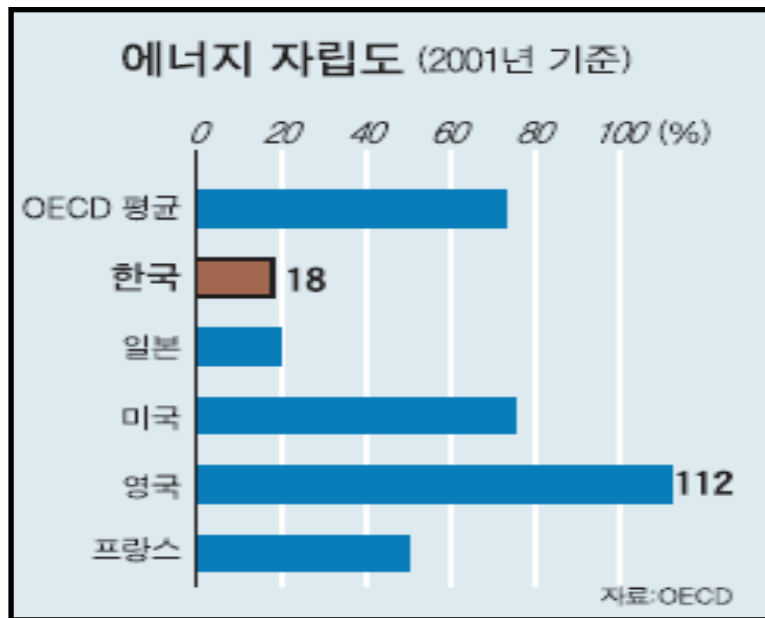
구분	'89년	'99년	'00년	'01년	'02년	'03년	'04년(잠정치)
총에너지수요(천toe)	81,659	181,365	192,888	198,410	209,112	215,067	219,957
신·재생에너지(천toe)	214.5	1,900.6	2,131.0	2,457.6	2,922	4,436	5,002
비중(%)	0.26	1.05	1.1	1.24	1.4	2.06	2.27

### 국가별 전력 중 신재생에너지 비중

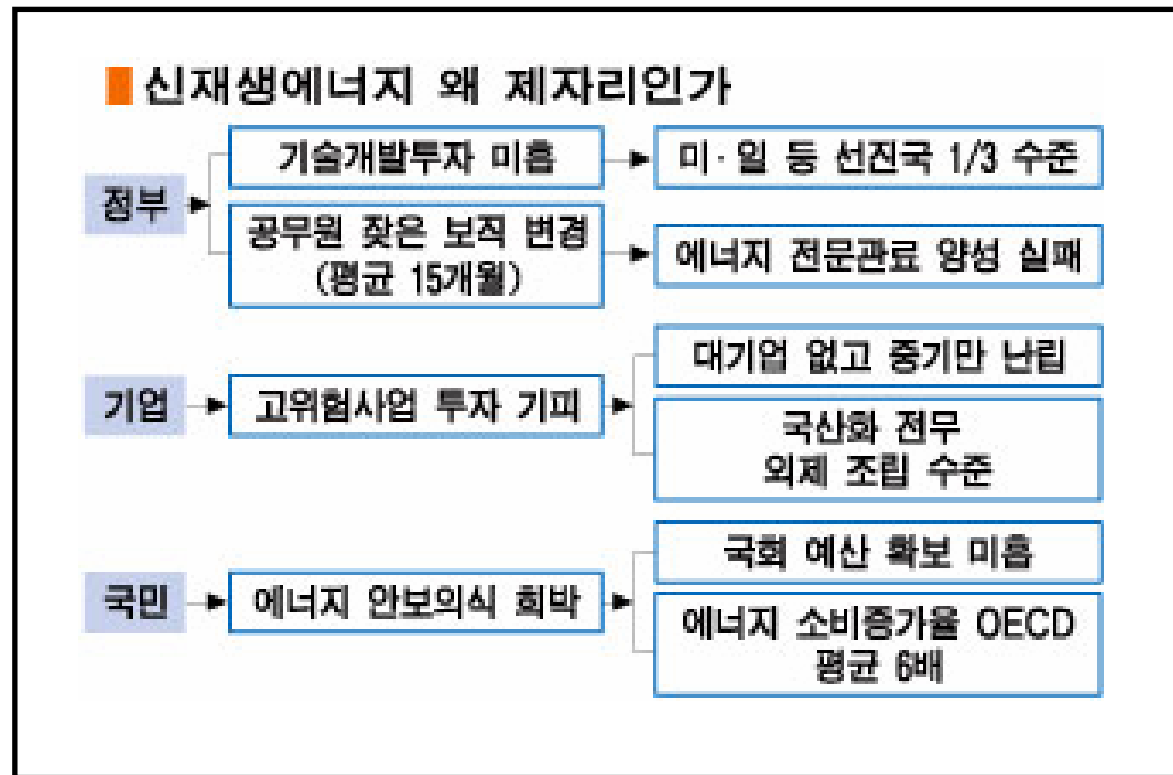


(자료:국제에너지기구, 2003년)

## Today's renewable energy in Korea



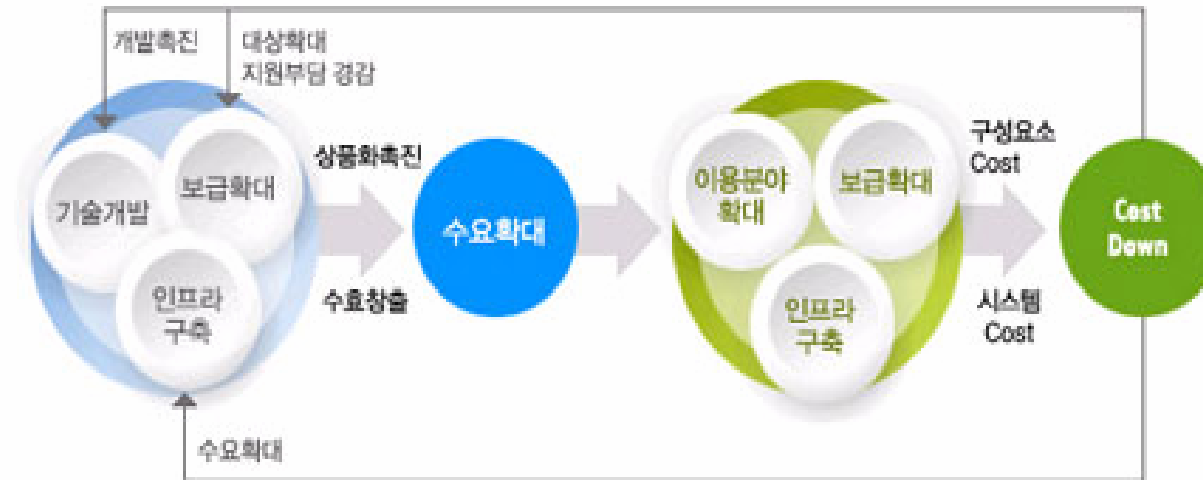
## ➤ Today's renewable energy in Korea



## Development plan of renewable energy

### 단계별 기술개발 및 보급 추진 전략 시나리오

- 기술개발, 보급확대, 인프라 구축 등으로 Cost-Down에 기여하여 신재생에너지 이용·보급을 위한 수요창출



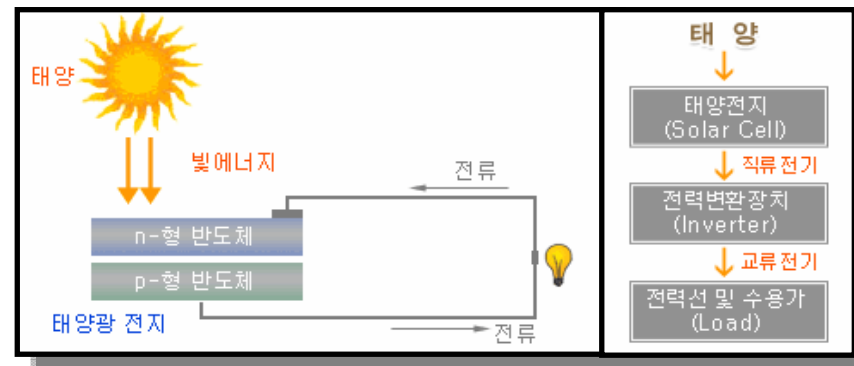
- 중장기 보급목표 : 2020년 기준 총에너지의 10%를 신재생에너지로 공급

구분	1단계 (2001~2010)	2단계 (2011~2020)	3단계 (2021~2030)
신·재생에너지 보급목표치(%)	3	10	15

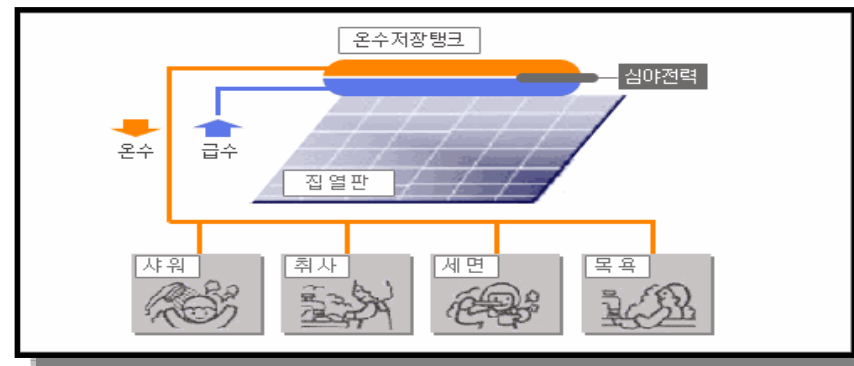
# ✦ Characteristic of Each Renewable Energy

## ✦ Solar energy

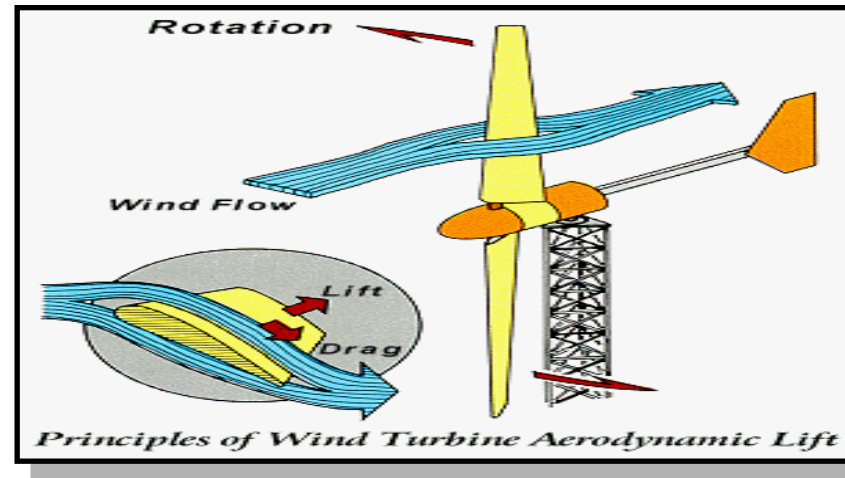
- Photovoltaic energy



- Solar heat energy



## ✦ Wind energy



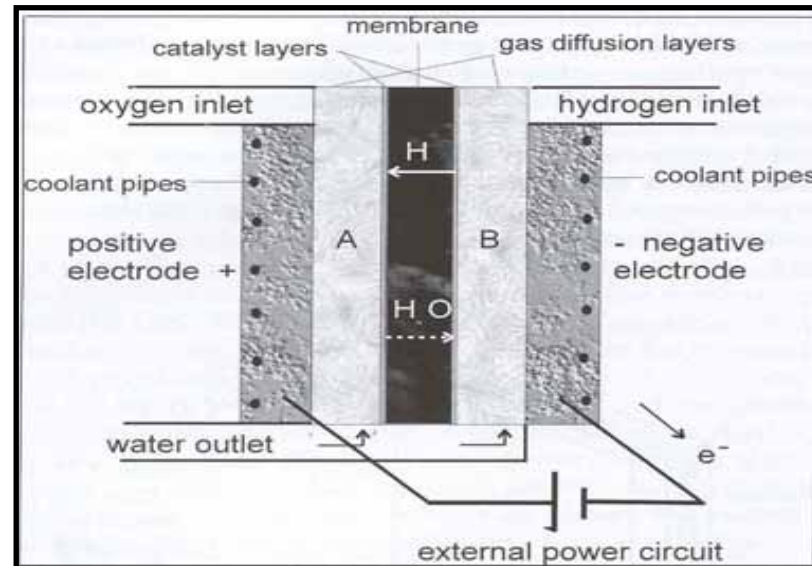
## ✦ Geothermal energy

- Use in U.S.A, New Zealand, the Philippines, Japan etc.
- Average system utility : 95%

## ✦ Hydrogen energy

- Energy of high level
- First used in 1970s in NASA to drive space shuttle & rocket

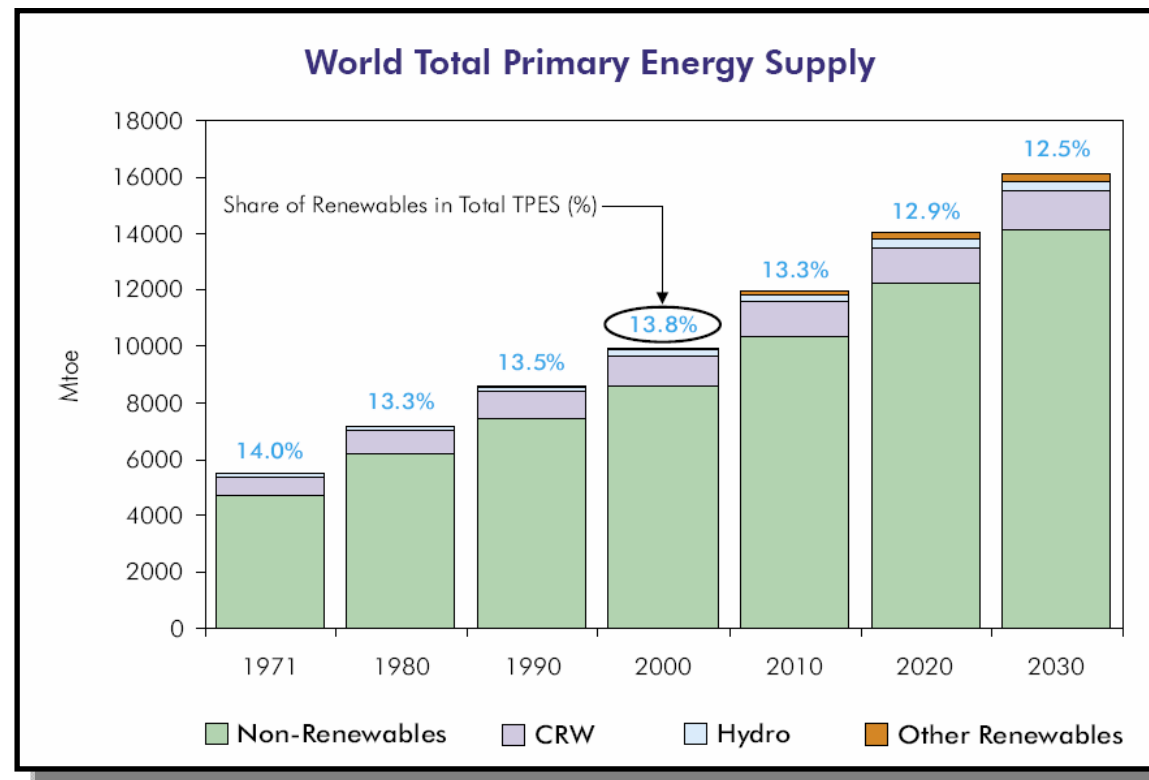
## ✦ Fuel cell





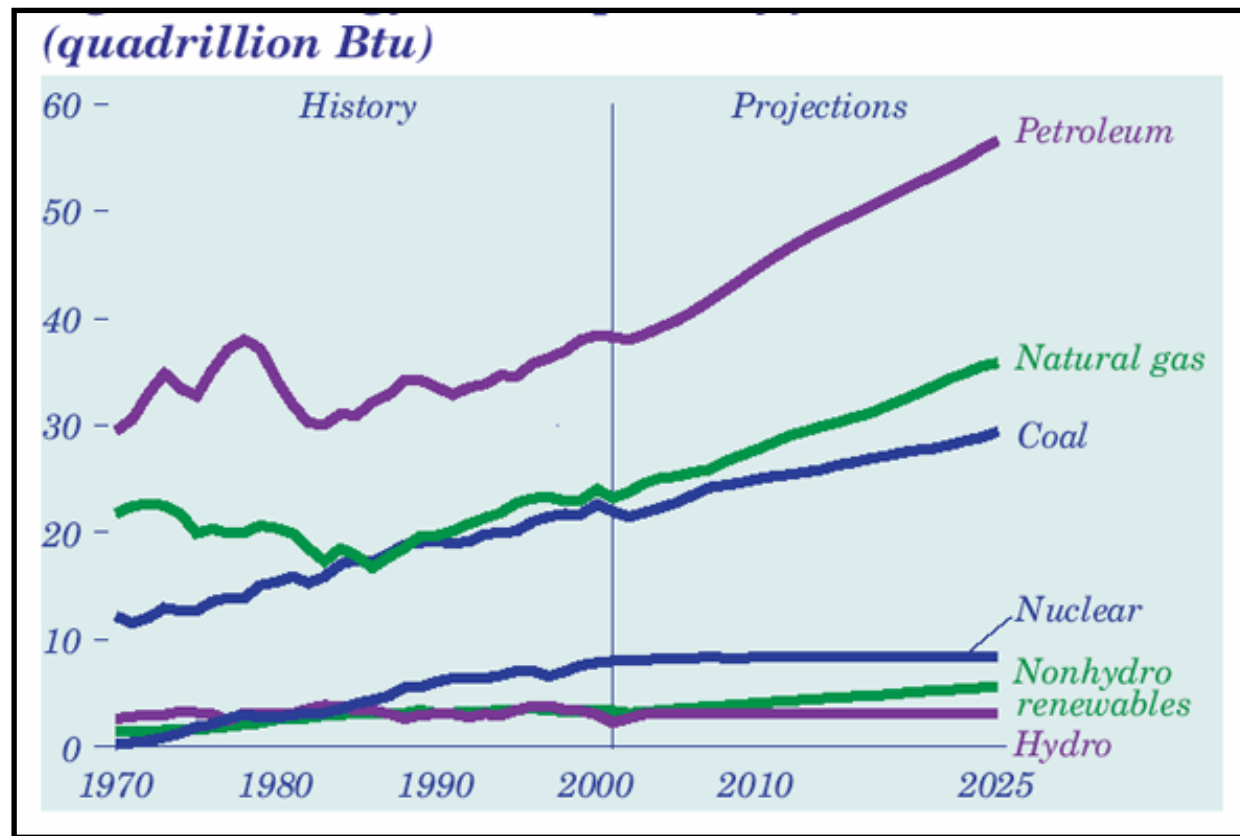
# ➤ Prospect of Renewable Energy

## ➤ Future of renewable energy



## ➤ Future of renewable energy

- Future of renewable energy consumption



## ✦ Limitation of renewable energy



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