ENERGY CHALLENGES

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SAP CONFERENCE 12 JAN 06

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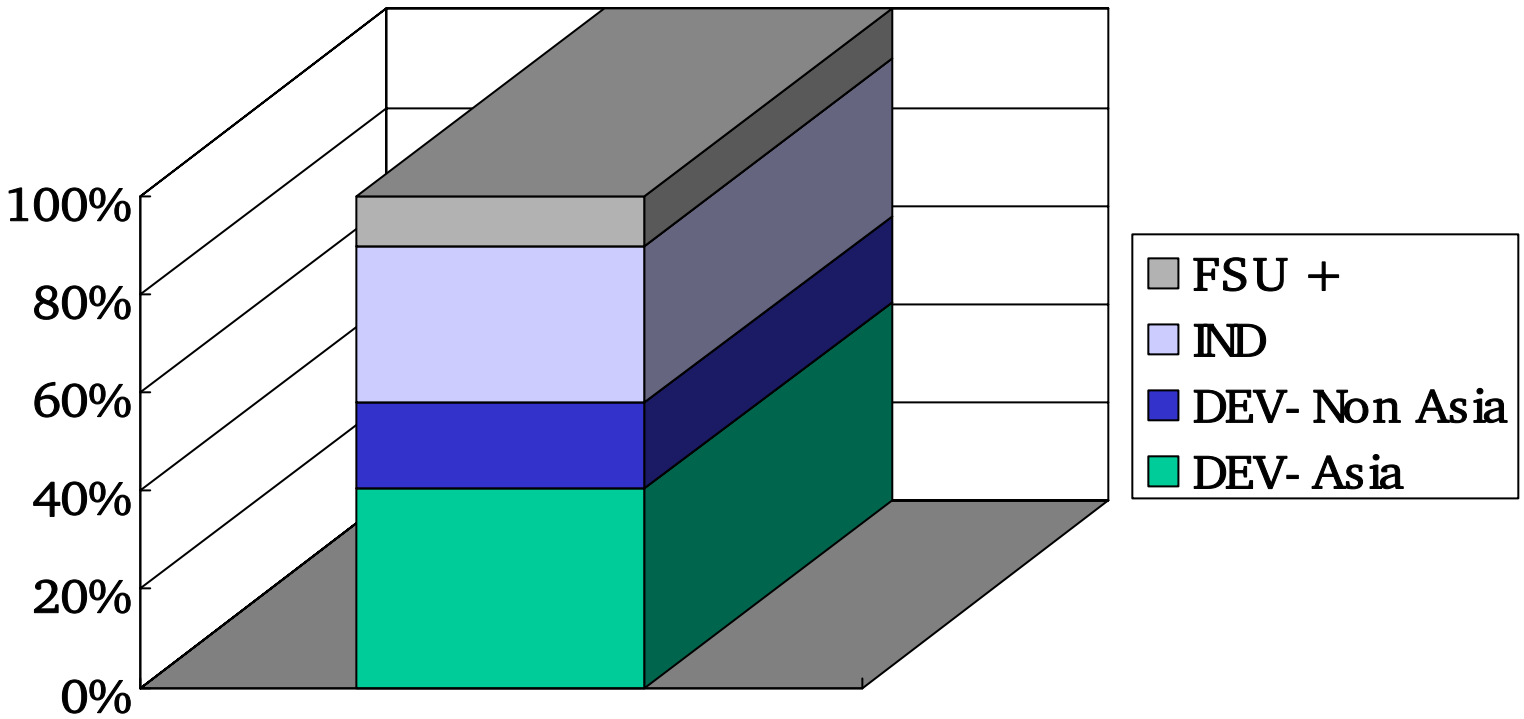
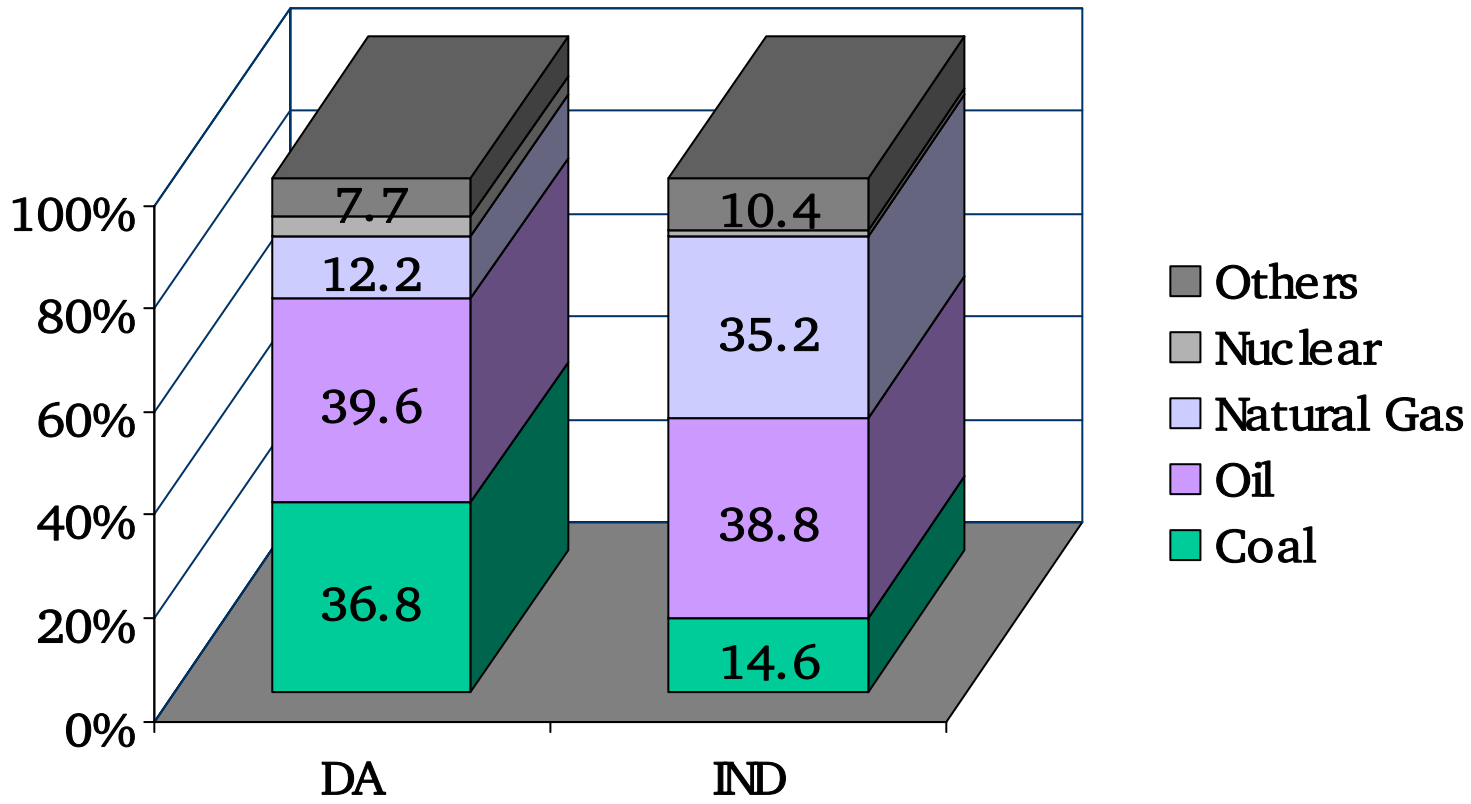
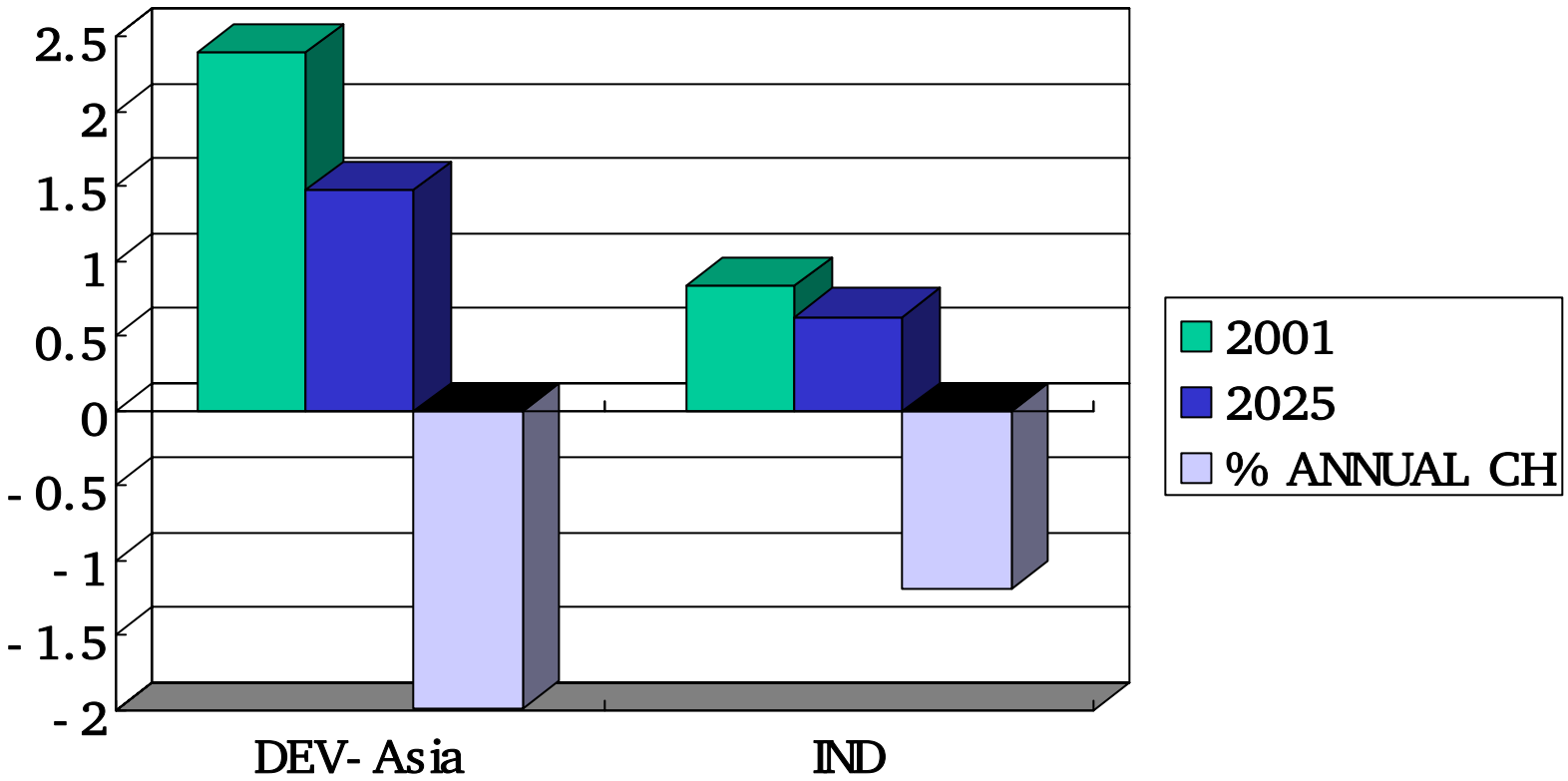
WORLD ENERGY MARKET 2001-2025



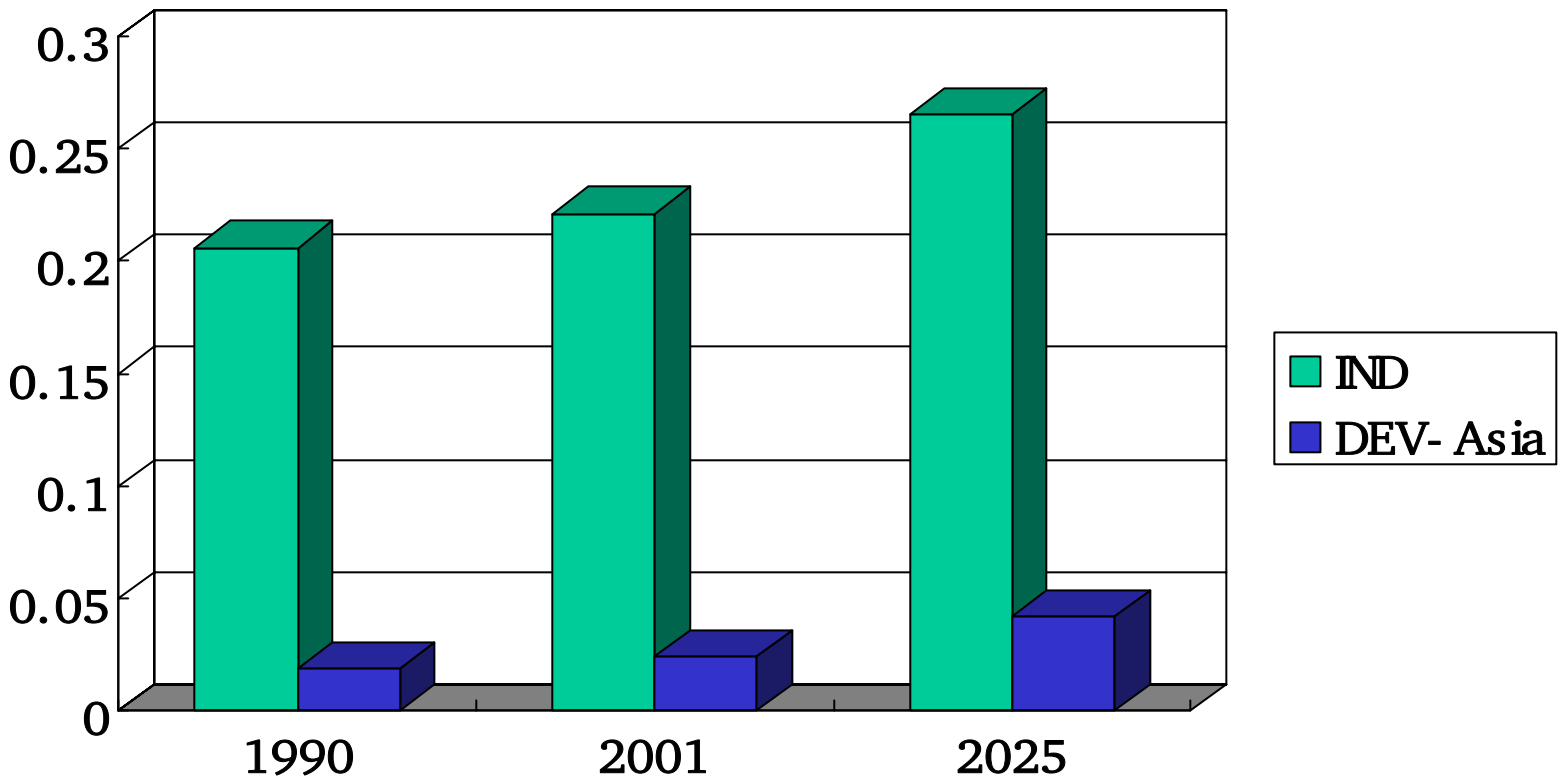
PRIMARY ENERGY MIX 2001-2025



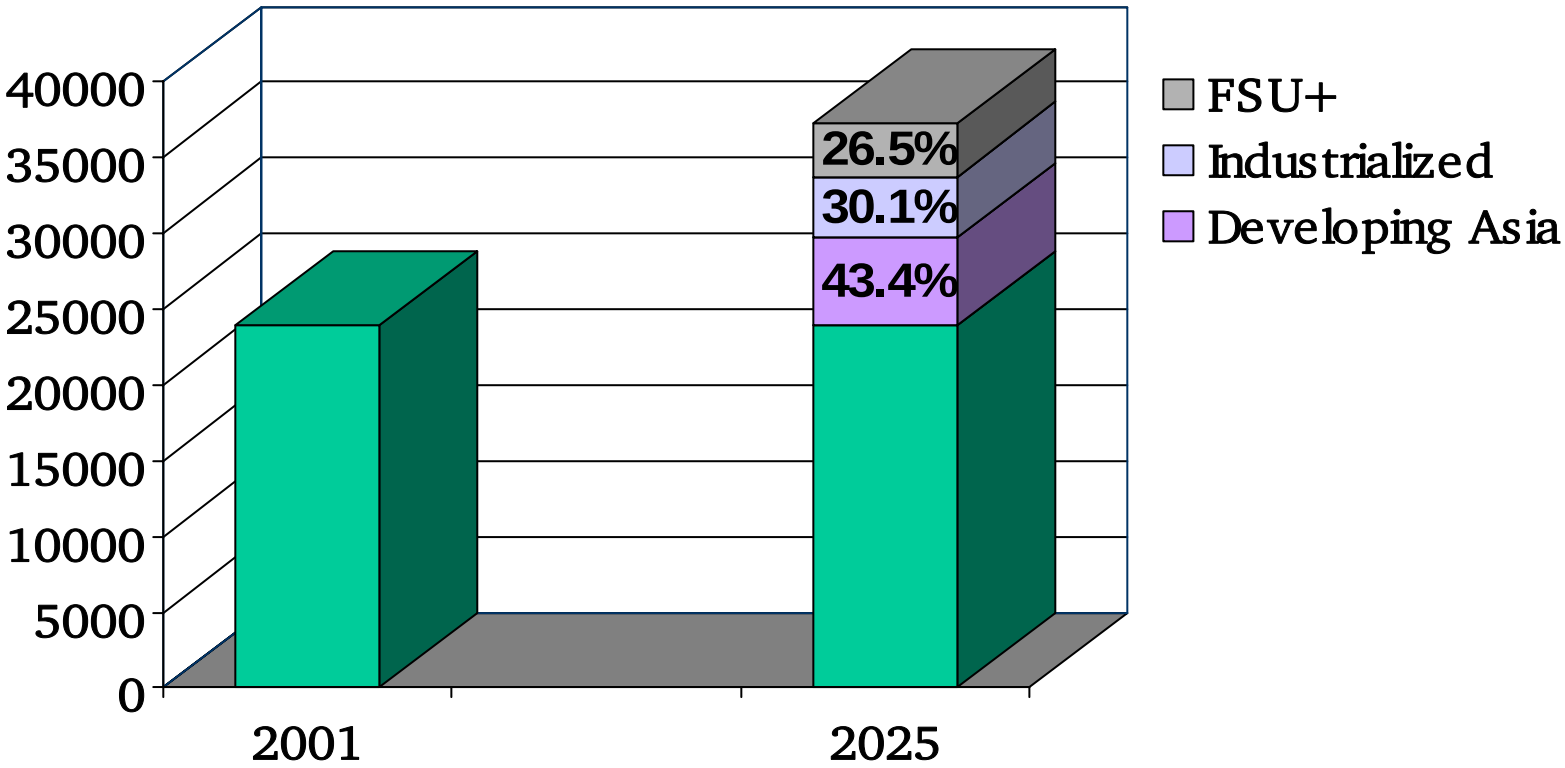
ENERGY/GDP RATIO



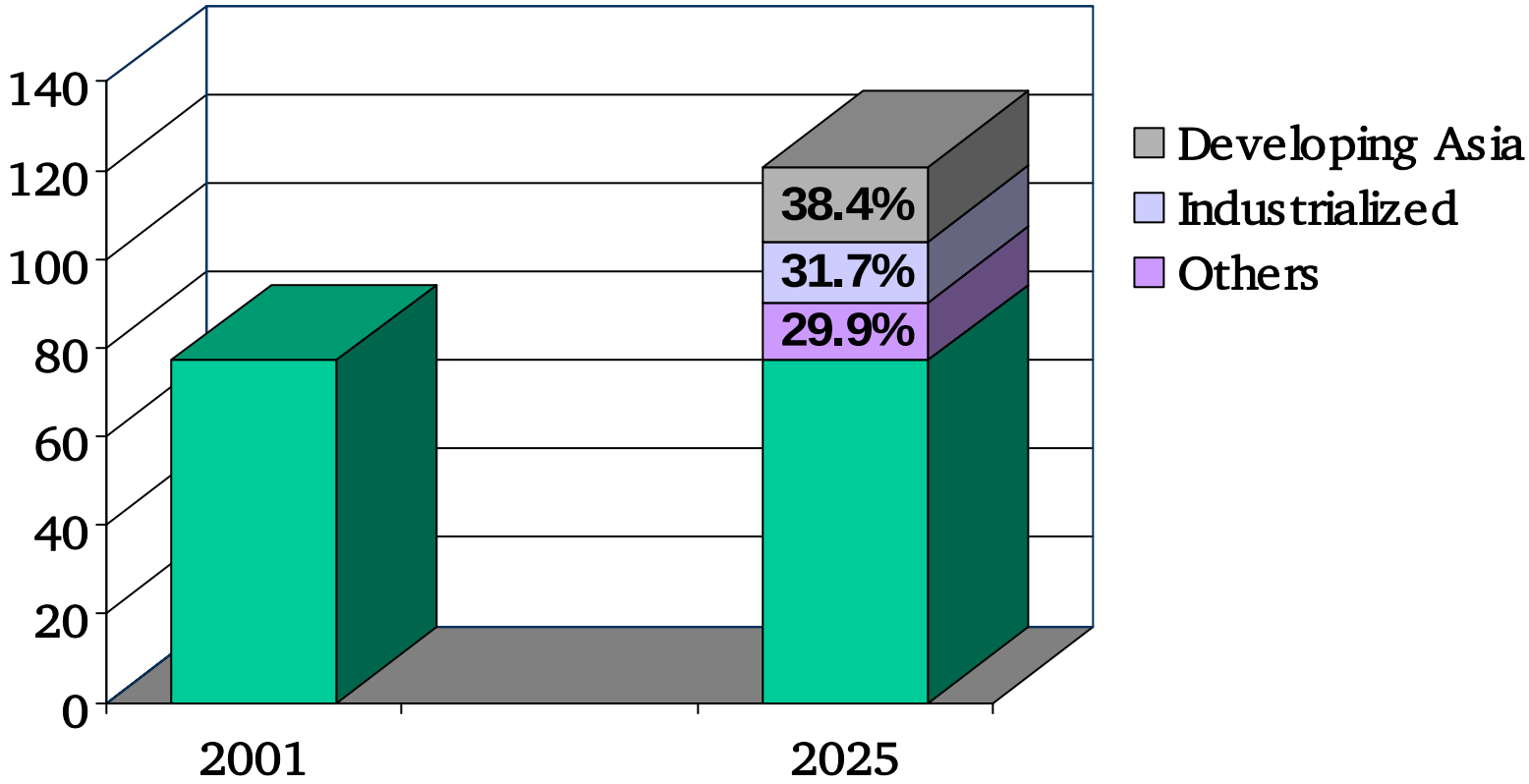
ENERGY PER CAPITA BBTU



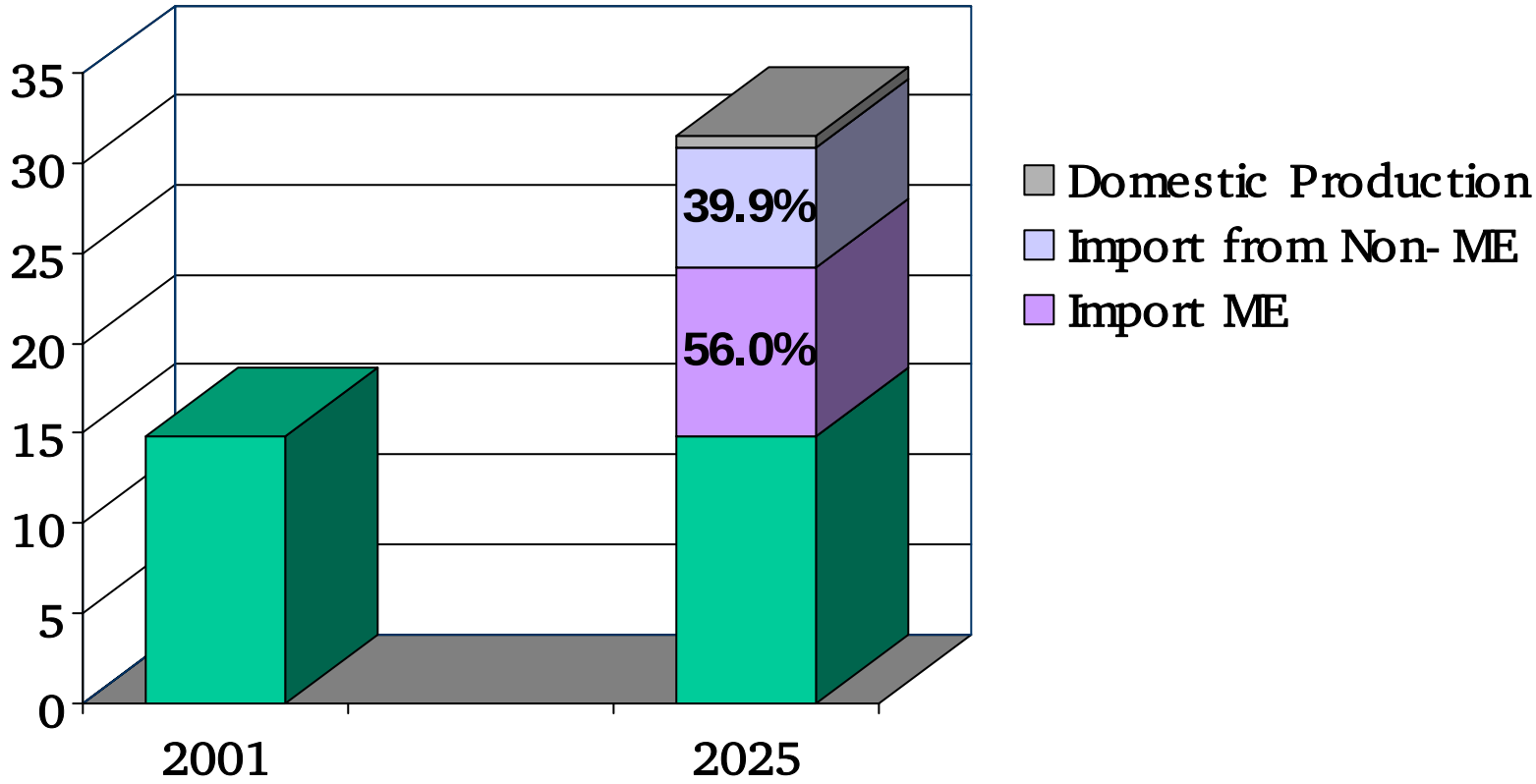
CO_2 EMISSIONS MT



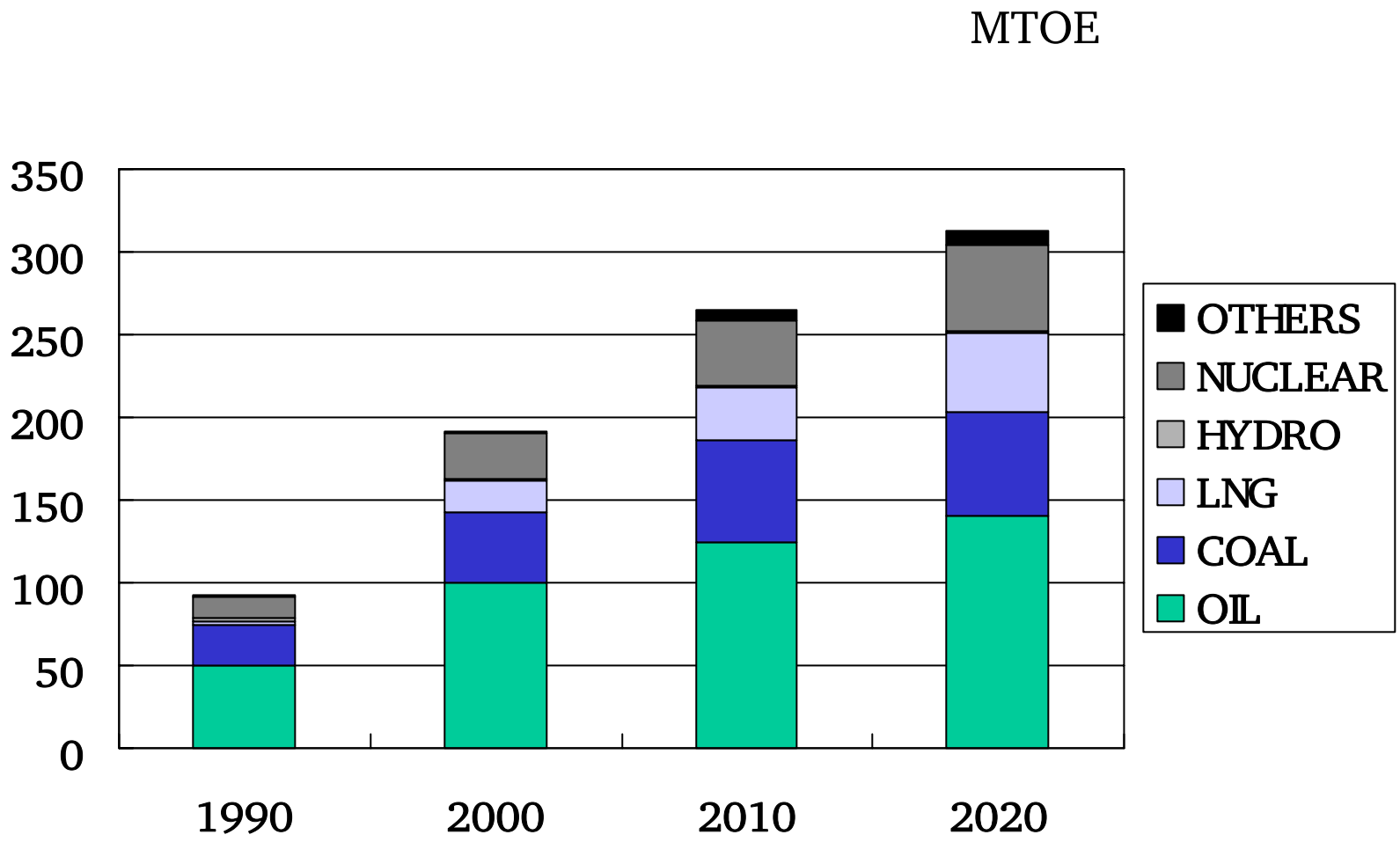
OIL CONSUMPTION MBD



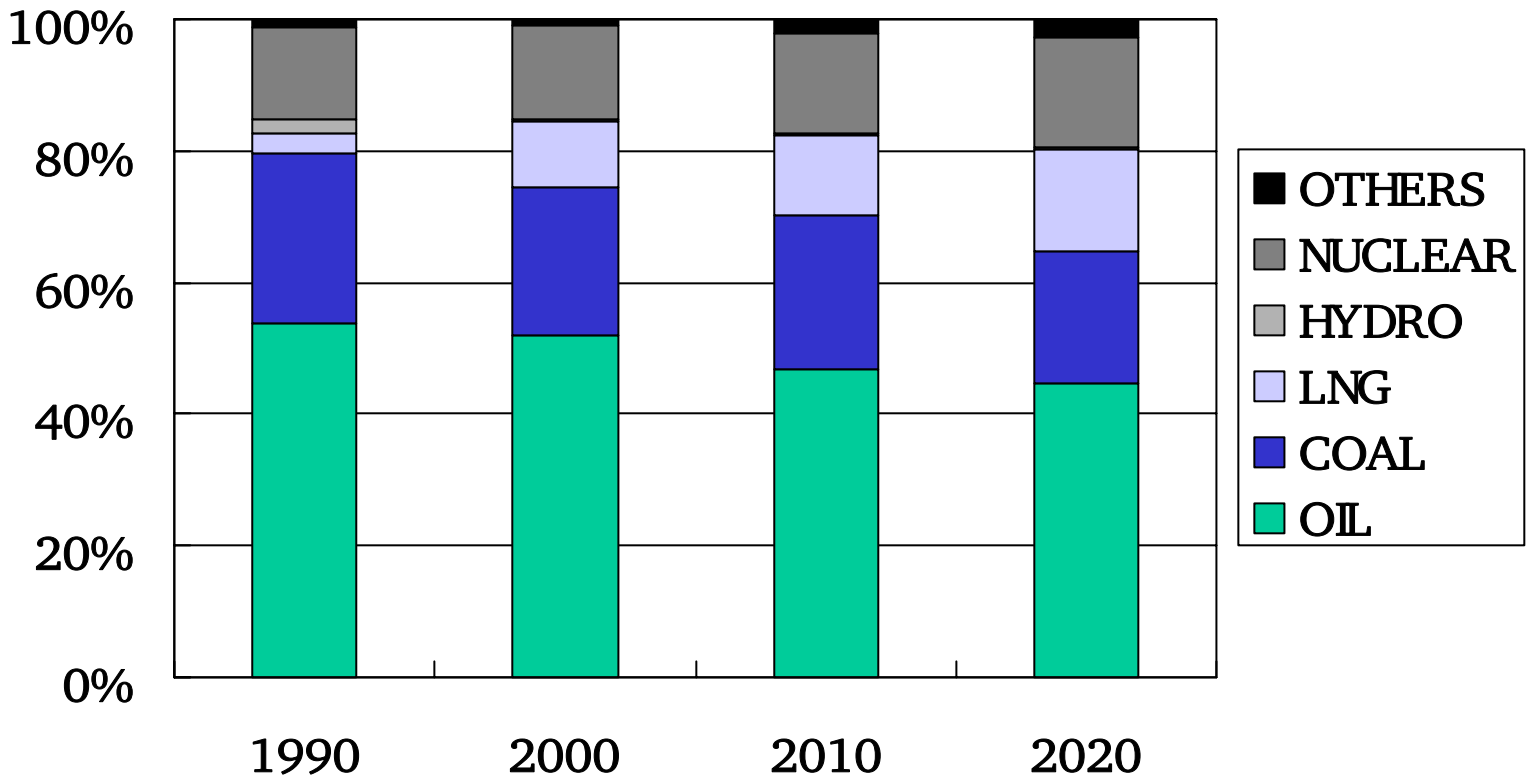
OIL CONSUMPTION:
Developing Asia (MBD)



ENERGY OUTLOOK: KOREA



ENERGY MARKET SHARE



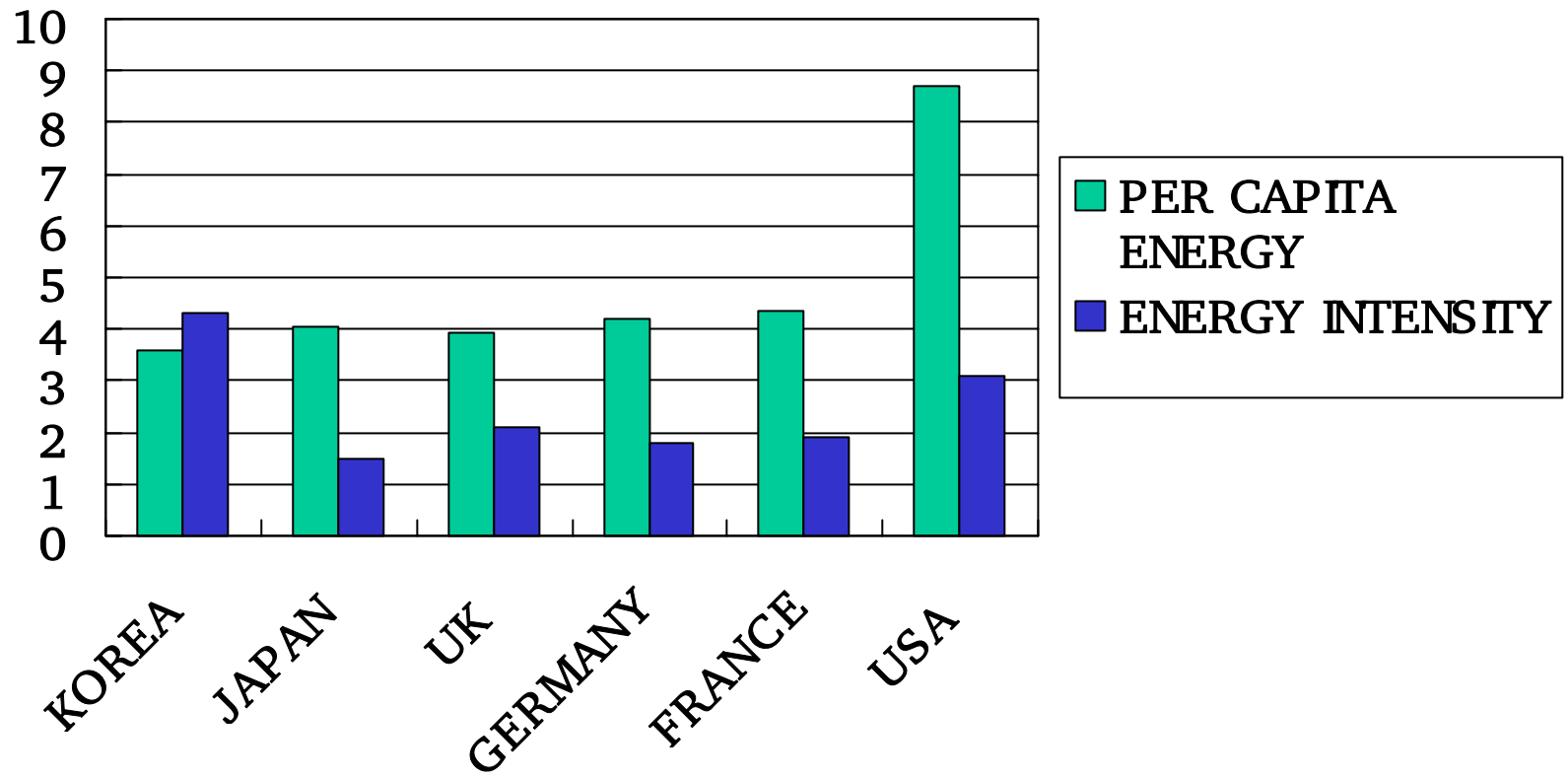
Major Energy Statistics

	1996	1997	1998	1999	2000	2001	2002	2003
Primary Energy Consumption Growth (%)	9.8	9.3	-8.1	9.3	6.4	2.9	5.2	3.1
Energy / GDP Elasticity	1.45	1.87	1.22	0.85	0.73	0.97	0.81	1.00
Overseas Dependency (%)	97.3	97.6	97.1	97.2	97.2	97.3	97.3	96.9

ENERGY KOREA IN THE WORLD

- ENERGY CONSUMPTION: 10TH
- OIL CONSUMPTION: 6th
- CRUDE OIL IMPORT: 3RD
- LNG IMPORT: 2ND
- COAL IMPORT: 2ND

ENERGY CONSUMPTION PATTERN



ENERGY SECTER CHALLENGES

- **ENERGY SECURITY:** 97% Import dependence
- **ENERGY INTENSIVE STRUCTURE:** Petrochemical, steel and cement use 80% of industrial energy
- **MONPOLISTIC STATE CORPORATION**
- **SUSTAINABLE ENERGY DEVELOPMENT:** Energy efficiency and NRE development

How to Identify Energy Saving Products

Classification	Items	Tips for Identifying
Energy Efficiency Standards & Labeling Program (13 Items)	- Refrigerators/Refrigerator-freezers - Air-conditioners - Clothes Washers - Incandescent Bulbs - Fluorescent Lamps - Ballasts for Fluorescent Lamps - Compact Fluorescent Lamps - Domestic Gas Boilers - Automobiles - Refrigerators for Kimchi - Dish Washers - Hot and Cold Water Dispensers - Rice Cookers	Energy Efficiency Grade Label 

Energy-saving Office Equipment & Home Electronics Program (15 Items)

- Computers
- Monitors
- Printers
- Fax Machines
- Copiers
- Scanners
- Multi-function Devices
- Energy Saving & Controlling Devices
- Televisions
- Video Cassette Recorders
- Home Audio Products
- DVD Players
- Microwave Ovens
- Battery Chargers
- Set-top Boxes

Energy Saving Label

에너지절약

Certification of High Efficiency Energy-using Appliances Program (28 Items)

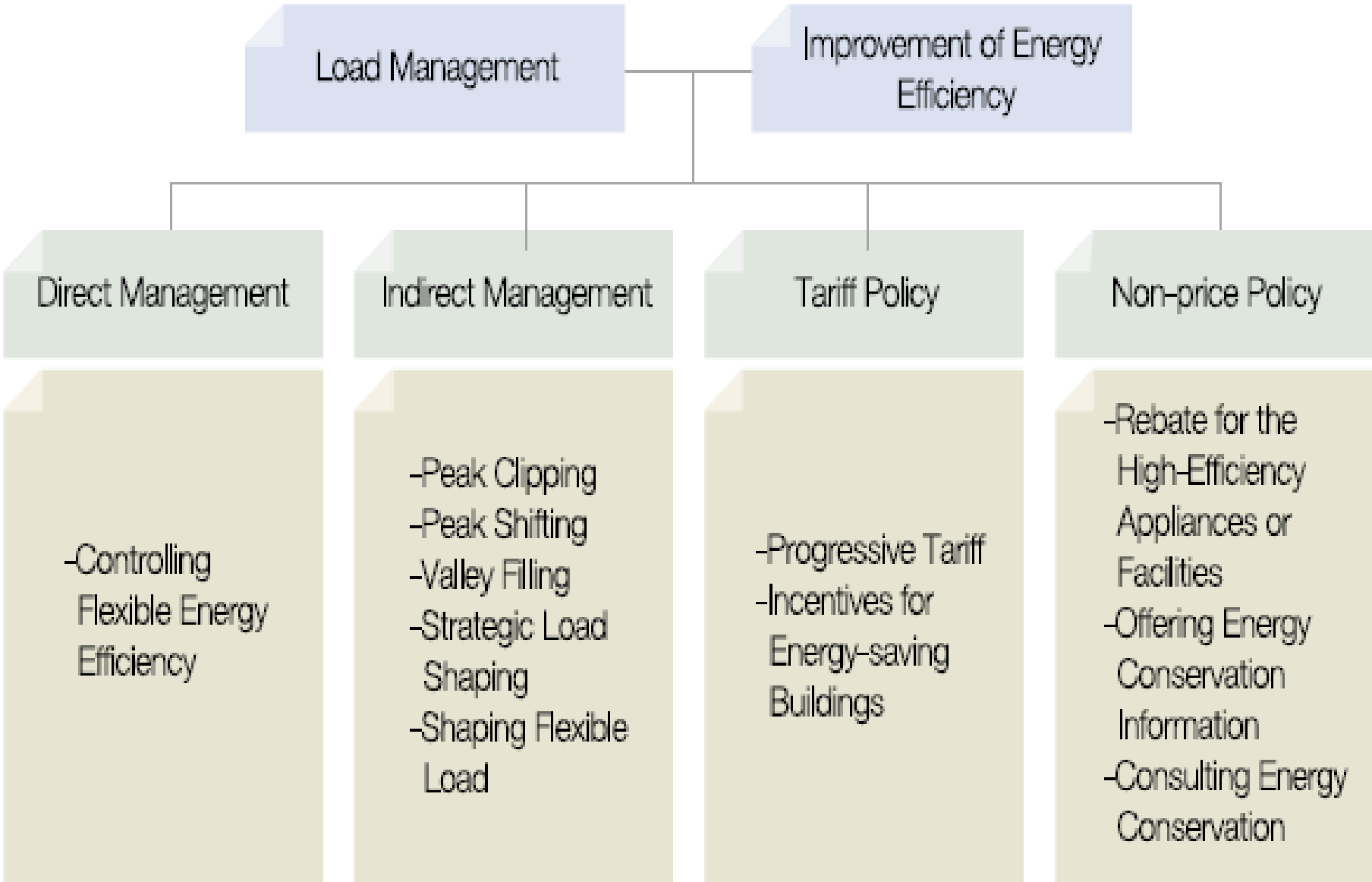
- 1-phase Induction Motors
- 3-phase Induction Motors
- 26㎜32W Fluorescent Lamps
- Ballasts for 26㎜32W Fluorescent Lamps
- Compact Fluorescent Lamps
- Reflectors for Fluorescent Lamps
- Sensor Lighting Equipment
- Heat Recovery Ventilators
- Windows
- Industrial Gas Boilers
- Domestic Gas Boilers
- Pumps
- Centrifugal Water Chillers
- Energy Saving Devices for Monitors
- Uninterruptible Power Supply System
- Vending Machines
- Transformers
- 16mm Fluorescent Lamps
- Ballasts for 16mm Fluorescent Lamps
- Electronic Ballasts for Metal Halite Lamps
- Electronic Ballasts for Natrium Lamps
- Inverters
- Auto Thermostatic Valves for Heating
- LED Traffic Lights
- Multi Function Type Switchgear System
- Direct-fired Absorption Chiller-Heaters
- Ventilation Fans
- Centrifugal Blowers

High Energy Efficient Equipment

고효율기자재

Certification for High Energy Efficient Equipment

DSM Methods

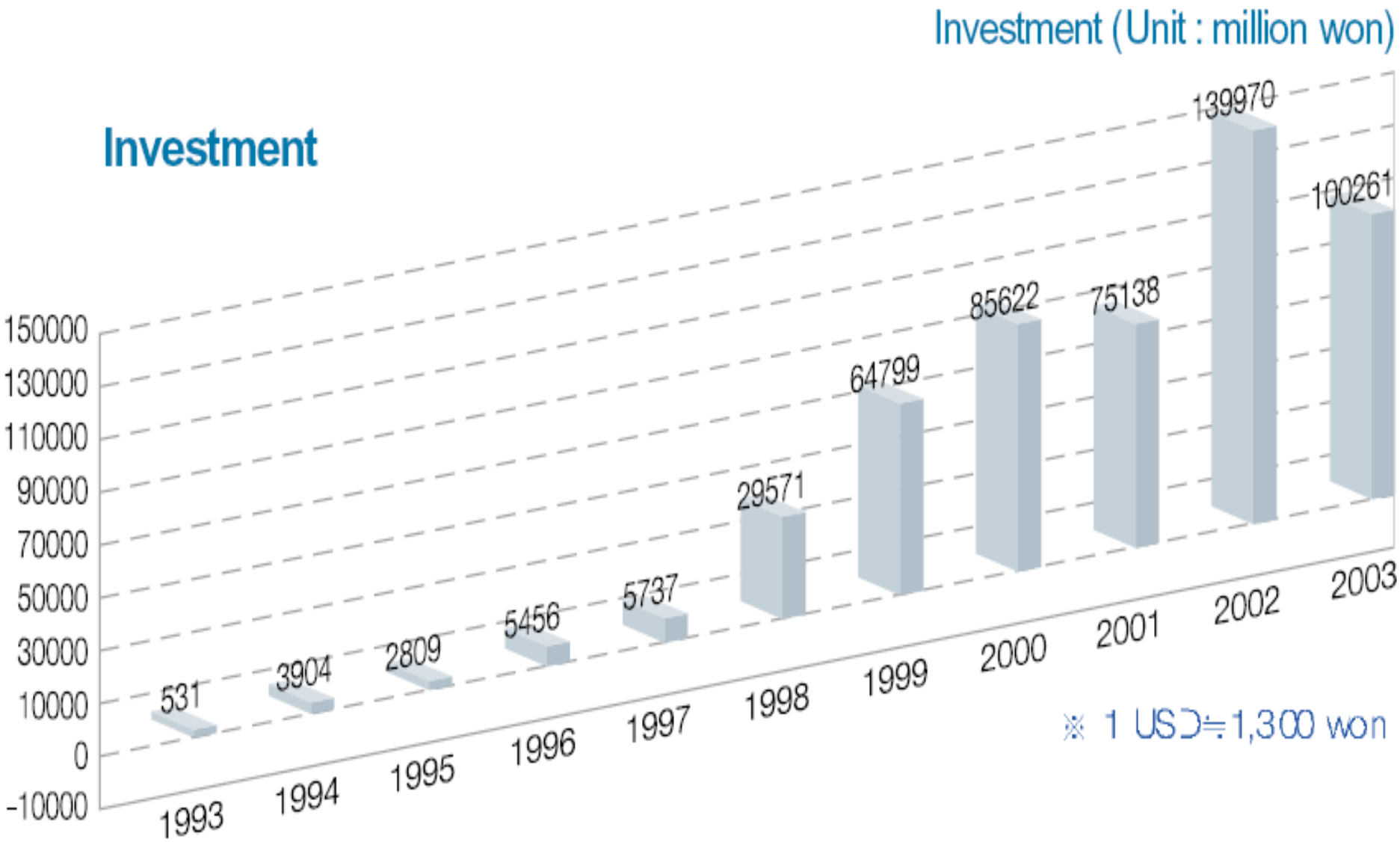

Load Management
Improvement of Energy Efficiency
Direct Management
Indirect Management
Tariff Policy
Non-price Policy
-Controlling Flexible Energy Efficiency
-Peak Clipping
-Peak Shifting
-Valley Filling
-Strategic Load Shaping
-Shaping Flexible Load
-Progressive Tariff
-Incentives for Energy-saving Buildings
-Rebate for the High-Efficiency Appliances or Facilities
-Offering Energy Conservation Information
-Consulting Energy Conservation

Loan Performance, 2003

(Unit: million won)

Category	Projects	Performance
Rational Use of Energy	Installation of Energy-saving Facilities	304,345
	Insulation Retrofit for Housing	256
	Subtotal	304,345
Integrated Energy Supply	District Heating	117,050
	Community Energy System	3,683
	Industrial Complex CHP	41,451
	Subtotal	425,078
Dissemination of Alternative Energy	Dissemination of Alternative Energy	47,775
	Subtotal	47,775
Total		525,054

Investment


Investment (Unit : million won)
150000
130000
110000
90000
70000
50000
30000
10000
0
-10000
531
3904
2809
5456
5737
29571
64799
85622
75138
139970
100261
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
※ 1 USD≒1,300 won

Energy Technology Development Investment, 2003

	No. of Projects	Investment (Unit: million won)		
		Government	Project Performer	Total
Energy Conservation Technology	115	21,320	9,515	30,835
NRE Technology	95	32,963	18,015	50,978
Cleaner Energy Use Technology	30	7,372	3,241	10,613
Natural Resources Technology	40	6,636	2,315	8,951
Total	280	68,291	33,086	101,377

New & Renewable Energy Consumption, by Year

(Unit: 1,000 TOE)

Type	1996	1997	1998	1999	2000	2001	2002	2003
Primary Energy Consumption	165,209	180,781	167,370	181,027	192,626	198,285	209,112	215,223
N&RE	1,161.9	1,421.3	1,715.7	1,900	2,131	2,457.6	2,922	3,257.7
Share (%)	0.70	0.80	1.03	1.05	1.11	1.24	1.4	1.51

POLICY FOR NRE DISSEMINATION

- Loans(4.25%;3yr grace-5ys repay)
- Tax (Income tax credit equal to 70% of NRE investment)
- Price subsidy to PV, Wind, SH power (Cost of production – Market price)
- Marketing subsidy (70% of installation costs)

R&D Strategies for Energy Conservation Technology

	Period	R&D Strategies
1st Stage	1992-1996	- Propulsion based on possible commercialized technology within a short period - Construction of an R&D base by the promotion of short-term projects
2st Stage	1997-2001	- Development of energy saving potential - Dissemination and demonstration of R&D results - Systems renovation (legal, financial, etc.)
3st Stage	2002-2006	- Development of large-scale technologies - Accomplishment of energy conservation goals

R&D Strategies for Cleaner Energy Use Technology

	Period	Goal
1st Stage	1994-1996	Establishment of research base
2st Stage	2000-2005	Establishment of utilization basis, Development of high-priority technologies
3st Stage	2005-2010	Commercialization of developed technologies

R&D Strategies for New & Renewable Energy Technology

	Period	Development Goals	Dissemination Goals (Ratio of N&RE in Total Energy)
1st Stage	1988-1991	Establishing research basis	Securing basic technology (0.5%)
2st Stage	1992-1996	Establishing basis for utilization	Creating demand, Initiating demonstrational dissemination (0.6%)
3st Stage	1996-2001	Developing high-priority technology	Creating market (1.3%)
4st Stage	2002-2006	Commercializing technology	Expanding dissemination (3.0%)

PROBLEMS

- POTENTIAL FOR NRE IS POLICY DRIVEN. CARBON PRICE WILL LIMIT NRE MARKET SHARE
- ENERGY EFFICIENCY IMPROVEMENT IS HIGHLY REPONSIVE TO POLICY
- ENERGY SECURITY: PROBLEMS REDEFINED