Energy Update in Japan

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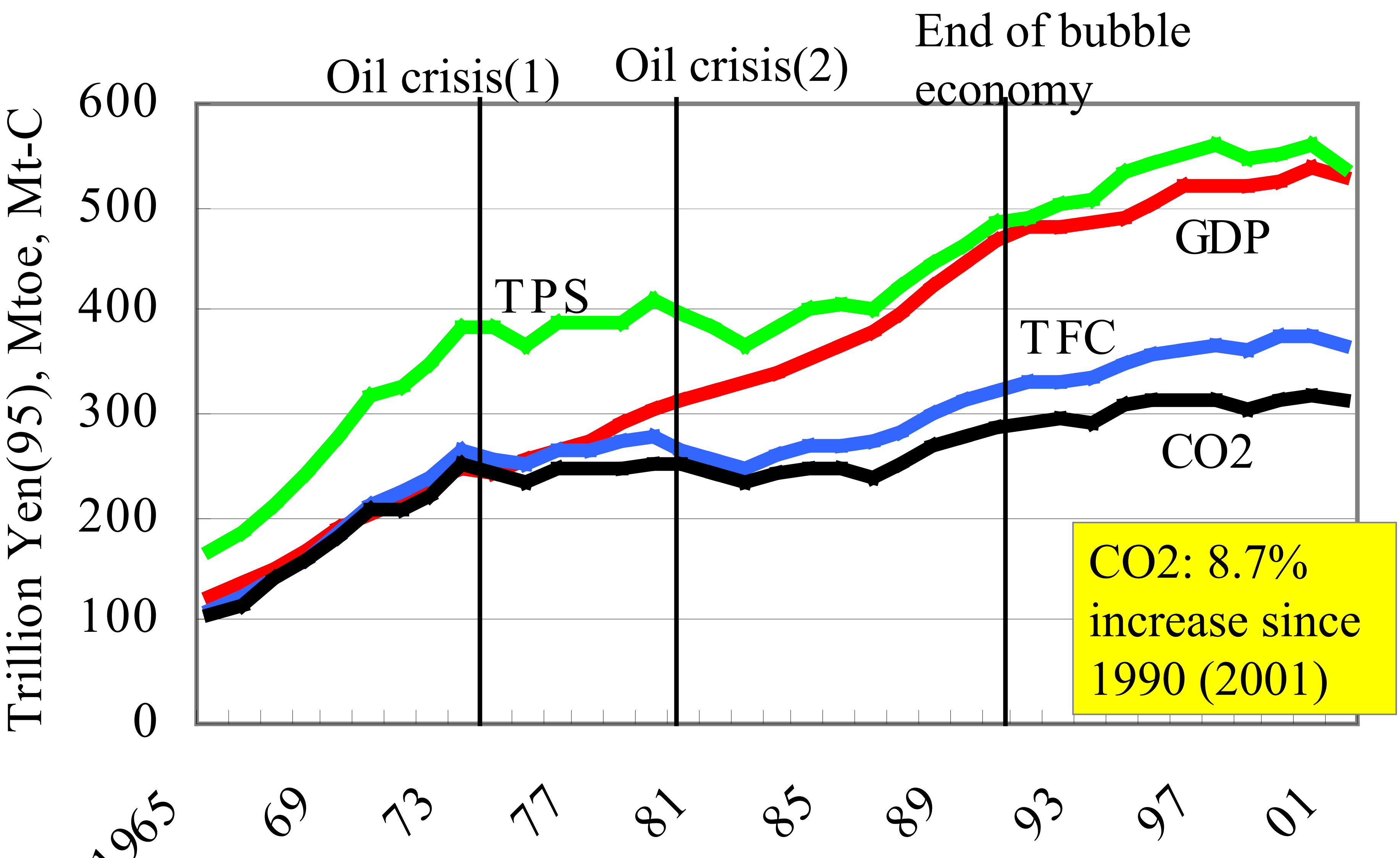
GDP, Energy, and CO2



Source: The Energy Data and Modelling Center,2001.

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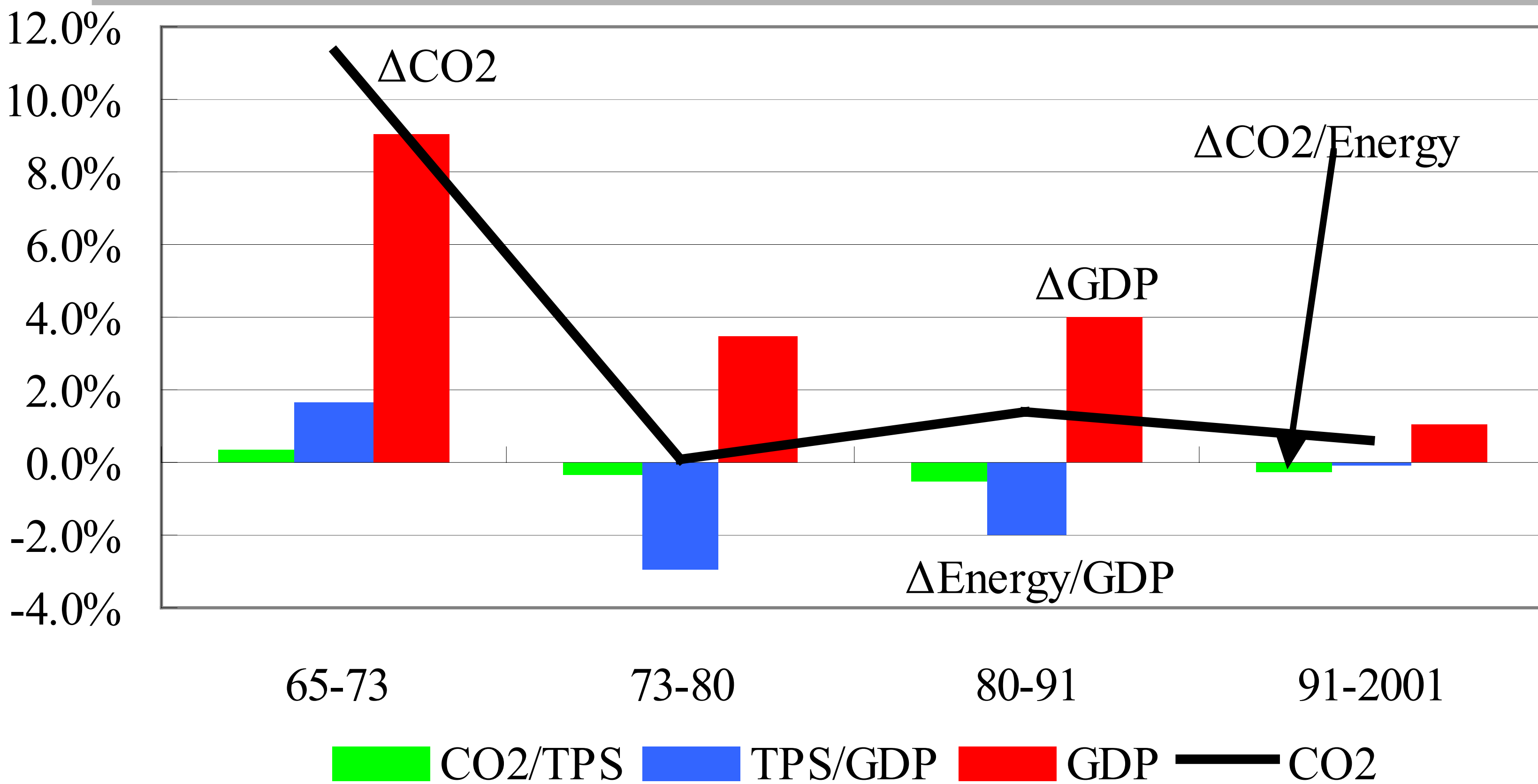
Energy Update

Factor Analysis

$CO2 = CO2/Energy \times Energy/GDP \times GDP$

$\Delta CO2 = \Delta CO2/Energy + \Delta Energy/GDP + \Delta GDP$



CO2 growth is low because of low GDP grwoth. Energy intensity of GDP is not decreasing.

Source: The Energy Data and Modelling Center,2001.

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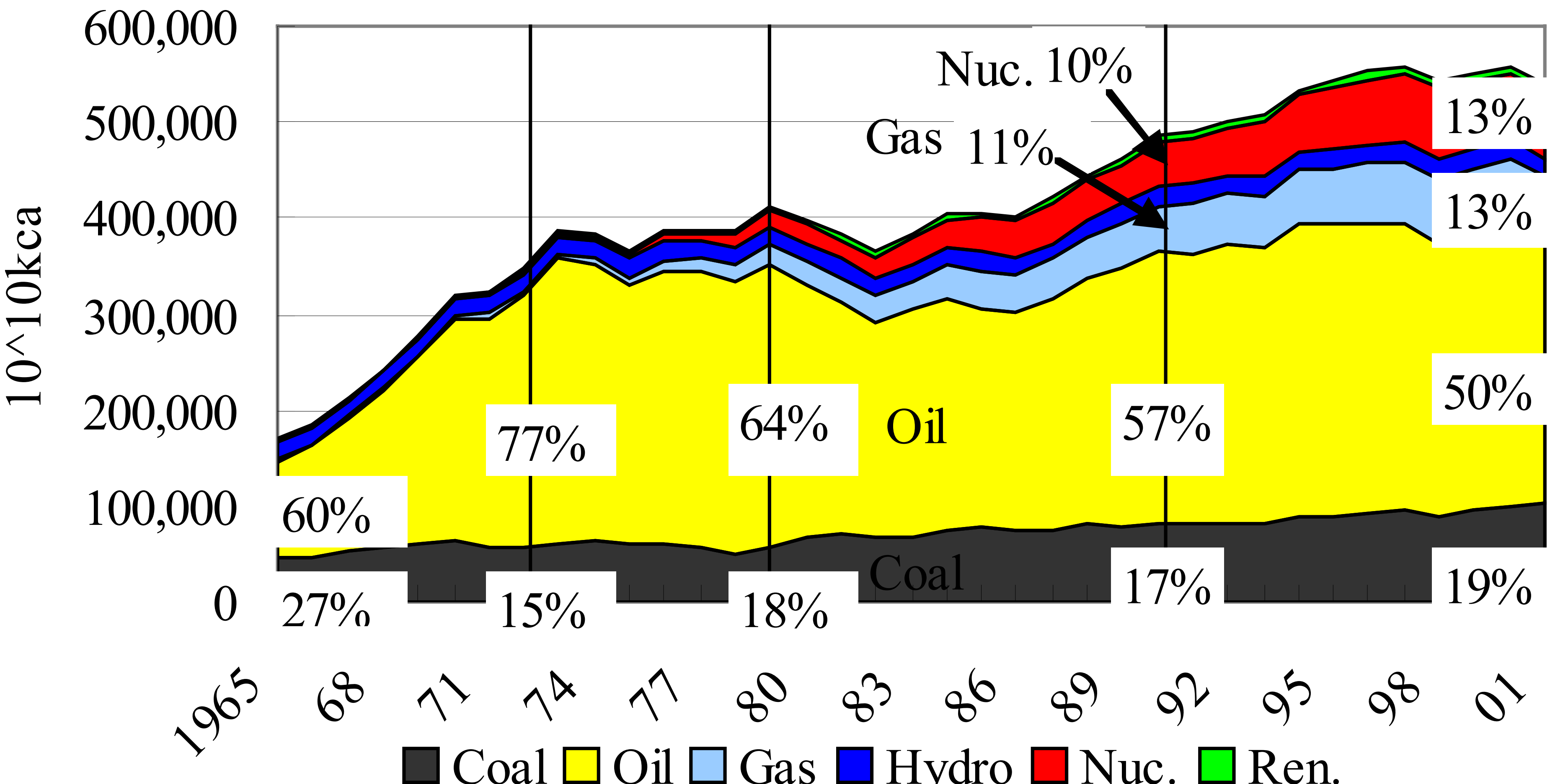
Primary Energy Supply in Japan

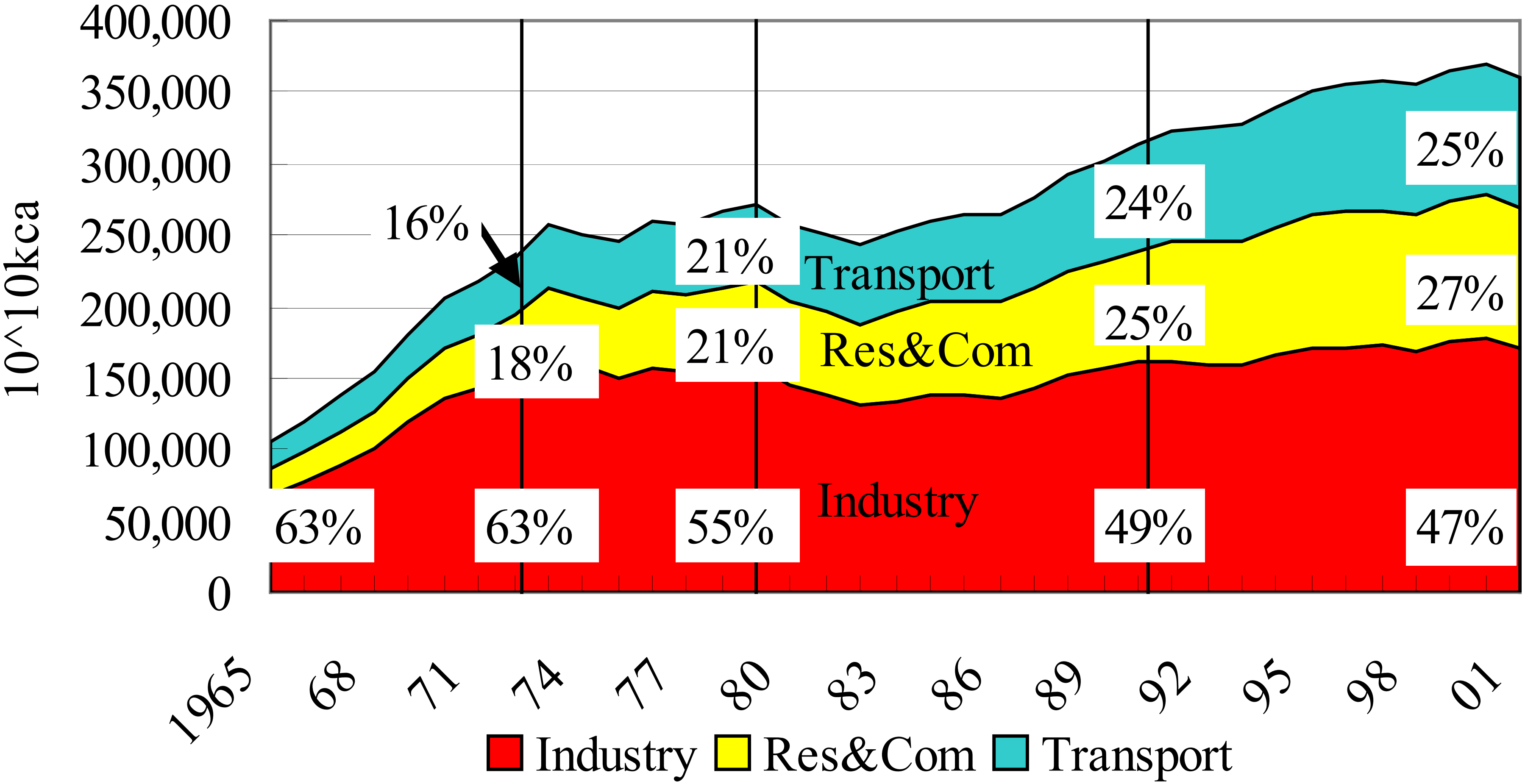


Oil share is decreasing, nuclear and gas share is increasing. Increase in coal share since 1998 because of METI's policy for more coal power 10 years before.

Source: The Energy Data and Modelling Center,2001.

Energy Update

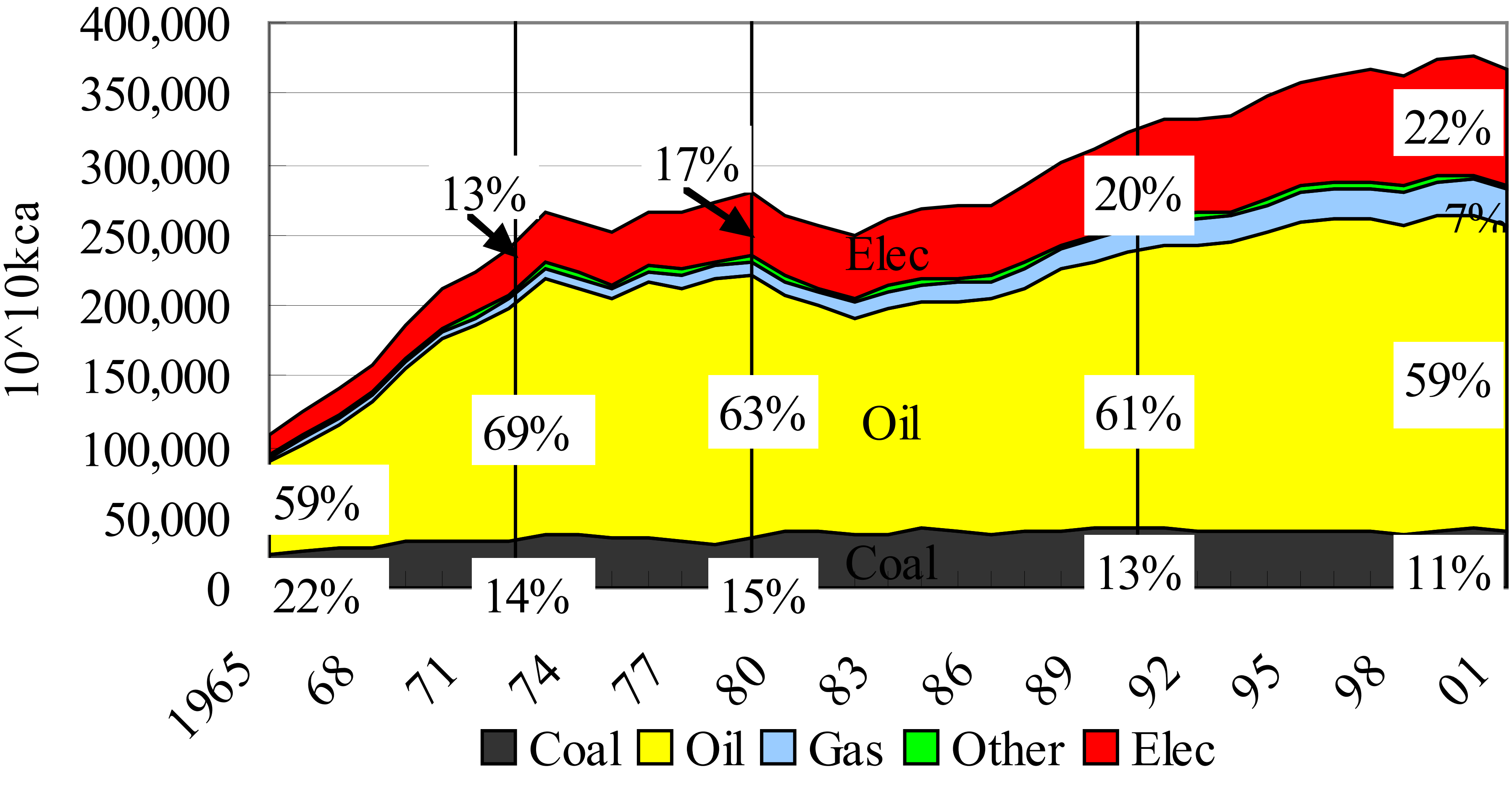
Final Energy Demand in Japan (by sector)



Industry share is shrinking, but transportation and res&com sector share is growing.

Source: The Energy Data and Modelling Center,2001.

Final Energy Demand in Japan (by energy)

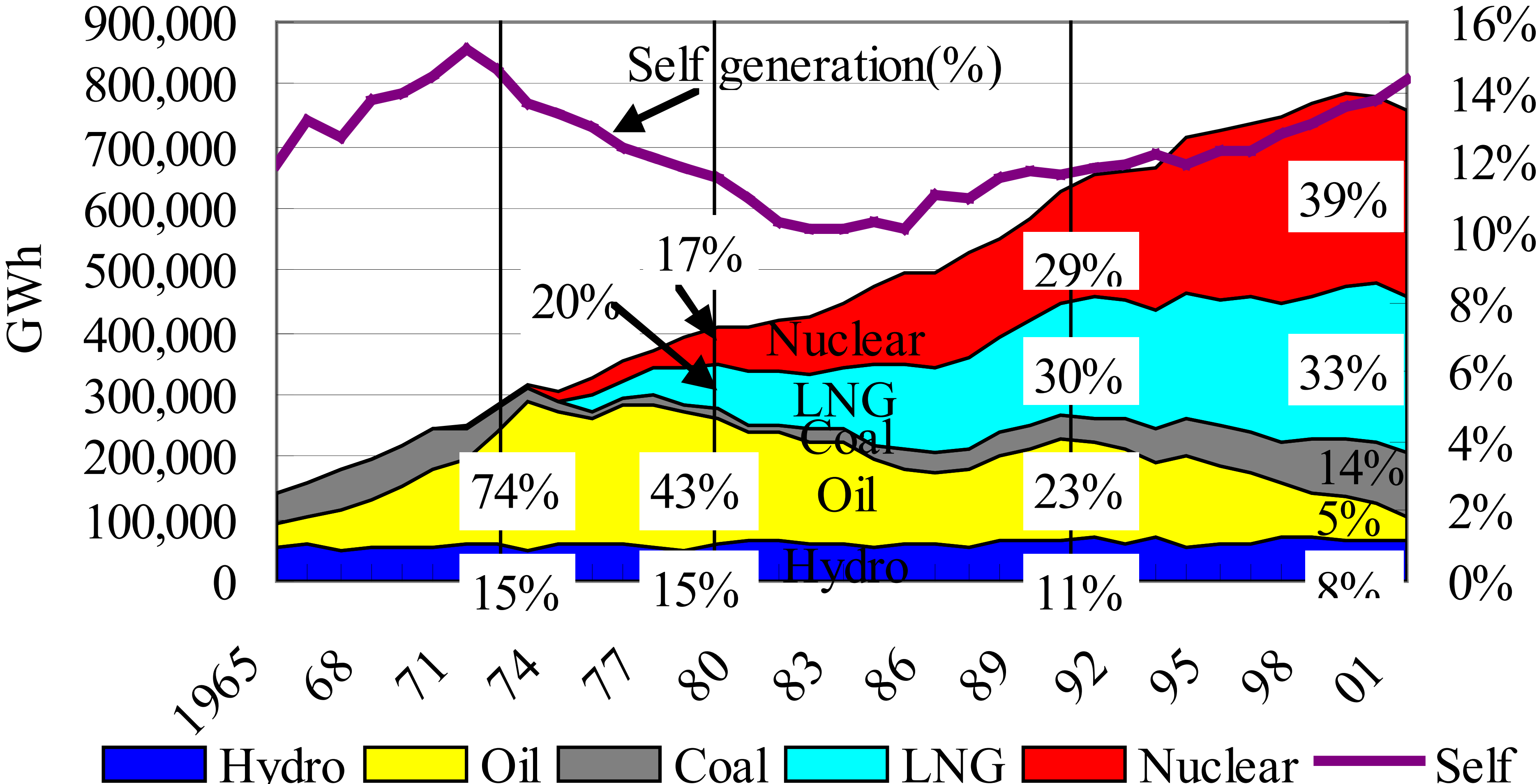


Electricity share is increasing.

Source: The Energy Data and Modelling Center,2001.

Energy Update

Electricity Generation by Source



Note: Generation by utility.

Oil share is decreasing, but nuclear, LNG, and coal share is increasing.

Self generation share is growing recently.

Major Policy Issues

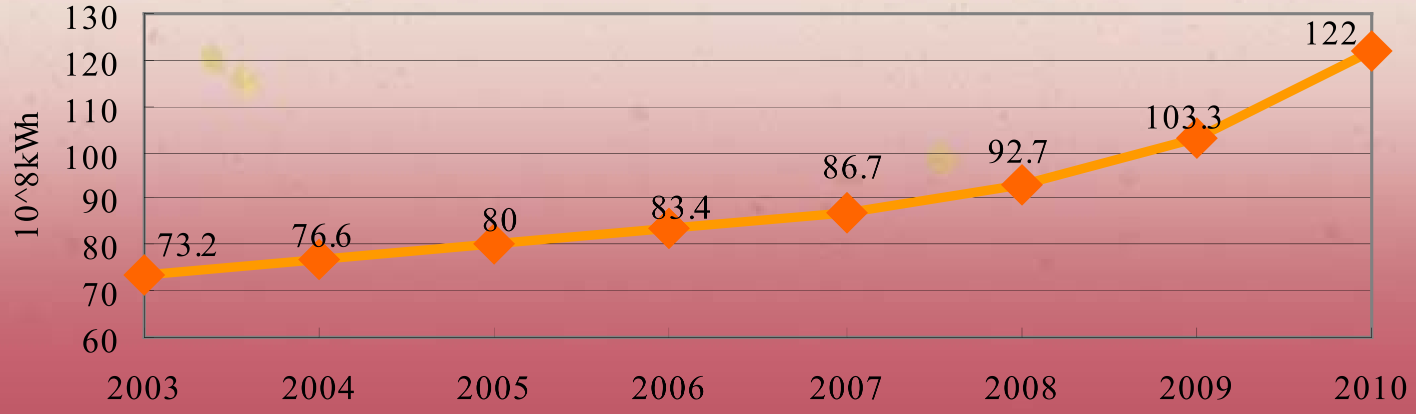
- Energy Policy Basic Law, Energy Policy Basic Plan
- RPS law
- Nuclear
  - Concealment of cracks in nuclear plants by TEPCO
  - Nuclear Fuel Cycle
- Deregulation
- International Pipeline
- Climate Change

Energy Policy Basic Law

- **Energy Policy Basic Law**(2002.6.7 approved)
  - "Promote non-fossil fuel energy use for environment"
- **Energy Policy Basic Plan** (2003.10.17 approved by Cabinet, reported to the Diet)
  - **"Stable supply"**: Steady promotion of <u>nuclear</u> and renewable
  - **"Environment"**: Improve the use of non-fossil fuel, such as <u>nuclear</u>, photovoltaic, wind, and biomass, ***improve the use of gas***
  - **"Use of market mechanism"** : But <u>government should be responsible</u> for "stable supply" and "environment."
- New **"long term outlook"** is under construction.
  - Advisory Committee of Energy will start by the end of 2003.
  - Final outlook will be determined by March (or June) in 2004.

RPS Law

- RPS law (2002.6 approved, 2003.4 enforced)
  - Electric power supplier obliged to supply certain percentage of “new energy”
  - Suppliers can supply new energy with their own capacity, or buy electricity from IPPs, or buy value of “CO2-free”
  - “New energy” includes waste power (dominant energy in Japanese RPS)



Concealment of cracks by TEPCO

- 2000.9: former employee of GE reported to METI the alteration of the internal inspection record
- 2002.8: “Nuclear and industrial safety agency” and TEPCO announced, “13 plant, 29 data alteration”
- (more alternation revealed)
- 2002.9: TEPCO was ordered to stop Fukushima No.1 plant.
- 2003.4: TEPCO stopped all 17 plants (now 7 working, rest would be restarted by 2004.3)
  - ❖2003.4-10 operation rate: 53.8% (30 point less than last year)
  - ❖No blackout in the summertime

Nuclear Fuel Cycle

- No more need for NFC
  - No future for FBR/pluthermal, no more scarcity of uranium
- Project cost → *electricity price*
  - Once started: **$90-130 billion** (1US$=110 yen) → *1 cents/kWh (nuclear)*
  - Stop before active test: **$40 billion**
    - 2004.1- Uranium test (contamination starts)
    - 2005.2- Active test
    - 2006.7- Commercial operation

  (Source: Japan Initiative,2003.11)
  - Whole cycle (2003.11.3 The Federation of Electric Power Companies of Japan(?), 72 years until decommission, mainichi news): **$200 billion** →*2 cents/kWh(nuclear)*
- Problem with used fuel storage for power companies
- If the project continues, 5 ton of plutonium per year will be produced in Rokkasho

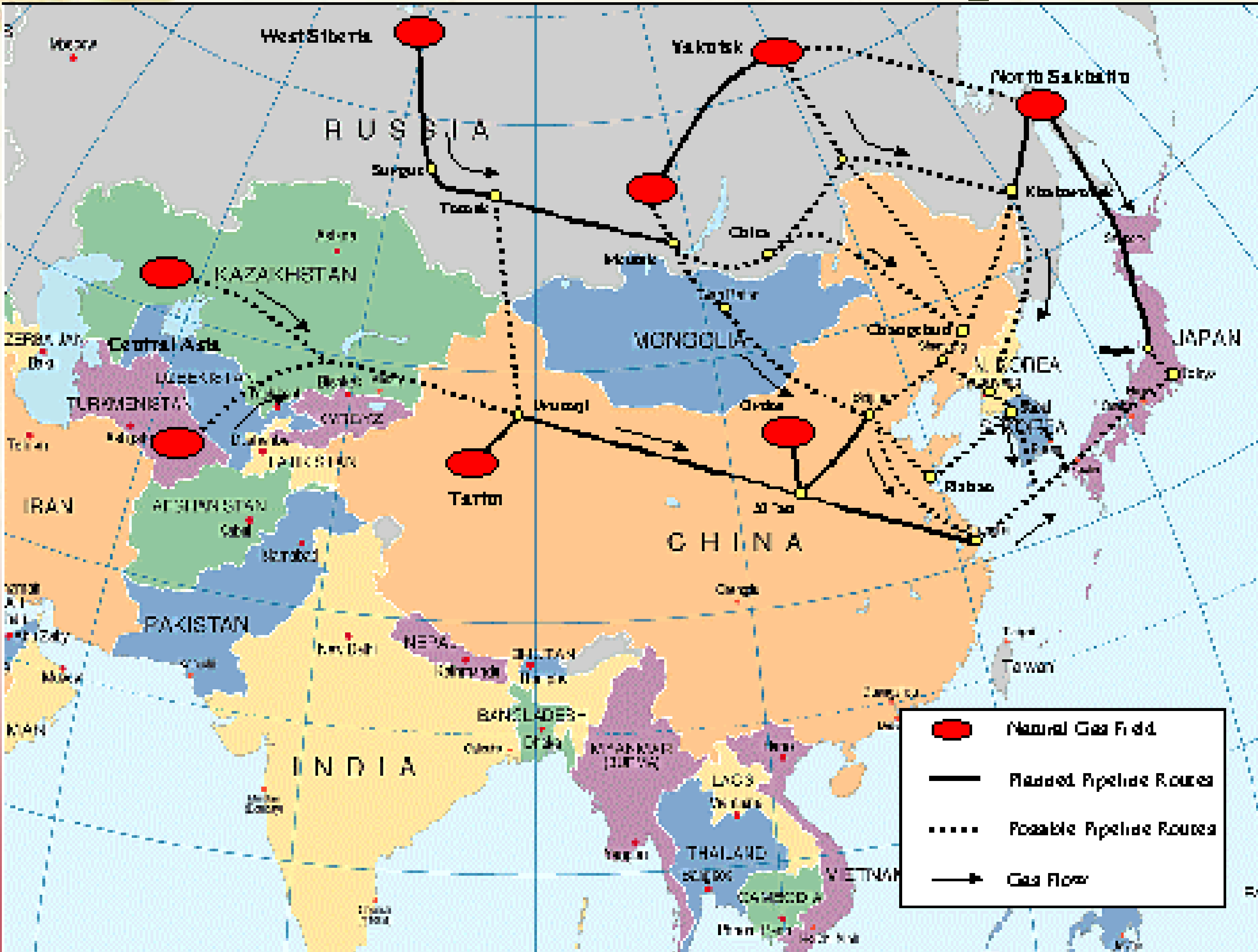
Deregulation

- Retail liberalization
  - 2001.3- :large-scale factories and department store (30% of demand)
  - 2004- :+middle-scale factories, office building
  - 2005- :+small-scale factories, supermarket (60% of demand)
- Turn back of market reforms (midterm report for further reform, 2003.9)
  - Responsible companies for generation-transmission-distribution is vital for stable supply, and nuclear development

International Cooperation

- Asian-pacific oil pipeline
  - China: succeeded in lobbying for oil pipeline with 30Mt capacity from Angarsk to Daqing
  - Japan: 2003.1, larger oil pipeline project from Angarsk to Nakhodka (50Mt) received support from Koizumi. (Japan-Russia Action Plan)
  - USA: 2002.5, "new energy dialogue"
- Northeast Asian natural gas pipeline
  - Supplier: Russia
  - Market: China, Korea, Japan
  - NAGPF (Northeast Asian Gas Pipeline Forum)
    - 1997- , NPOs from 5 countries (China, Korea, Russia, Mongolia, Japan), 2 private companies

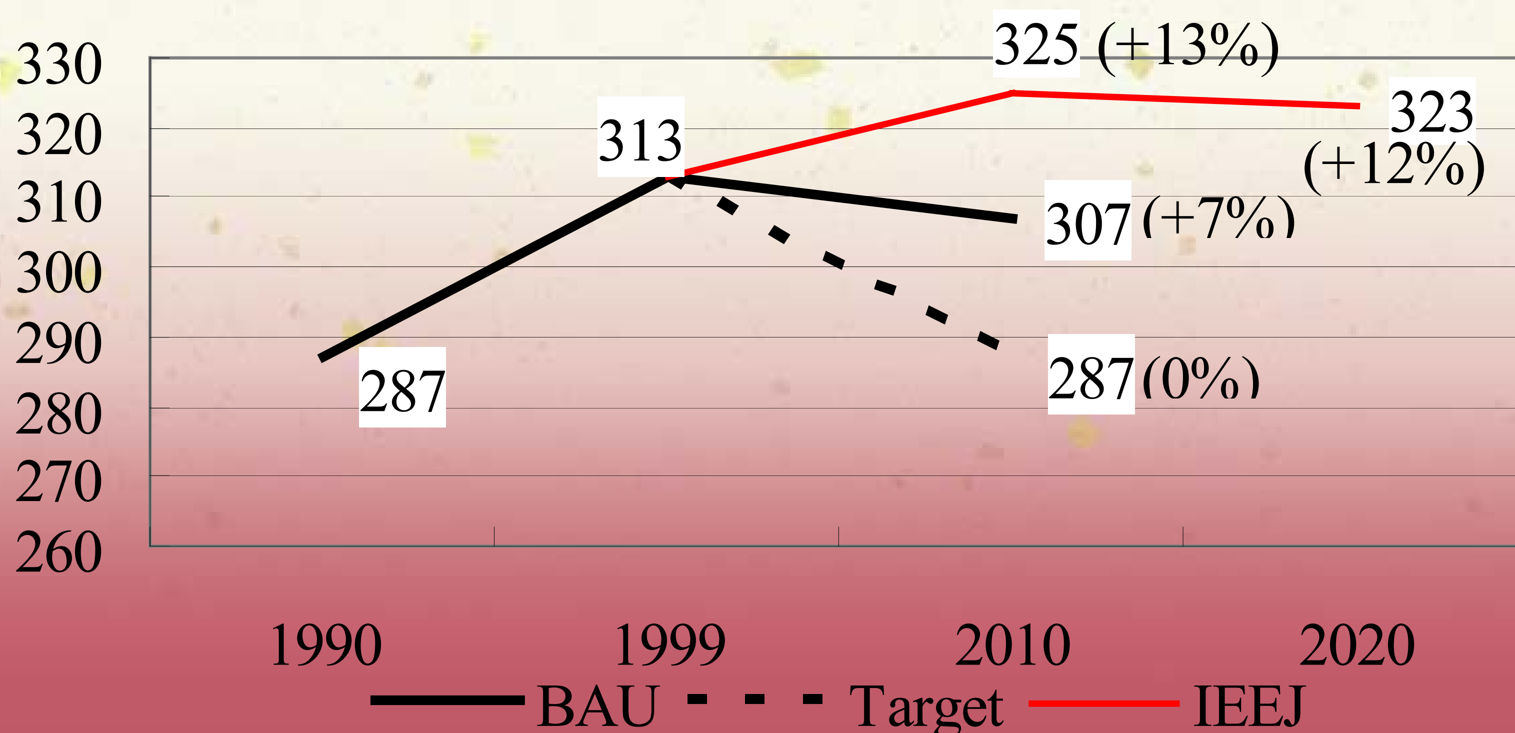
Northeast Asian NG Pipeline



Source: ACE, "Long-term energy outlook" (2001.7)
IEEJ, "Long-tem energy outlook (2002.12)

Climate Change

- EPA started discussion toward implementation of environmental tax from 2005. (1st period -2004, 2nd period 2005-)
- CO2 emission is still 9% over than 1990 level (2001)
  - Latest IEEJ forecast shows 13% increase of 1990 level in 2010.



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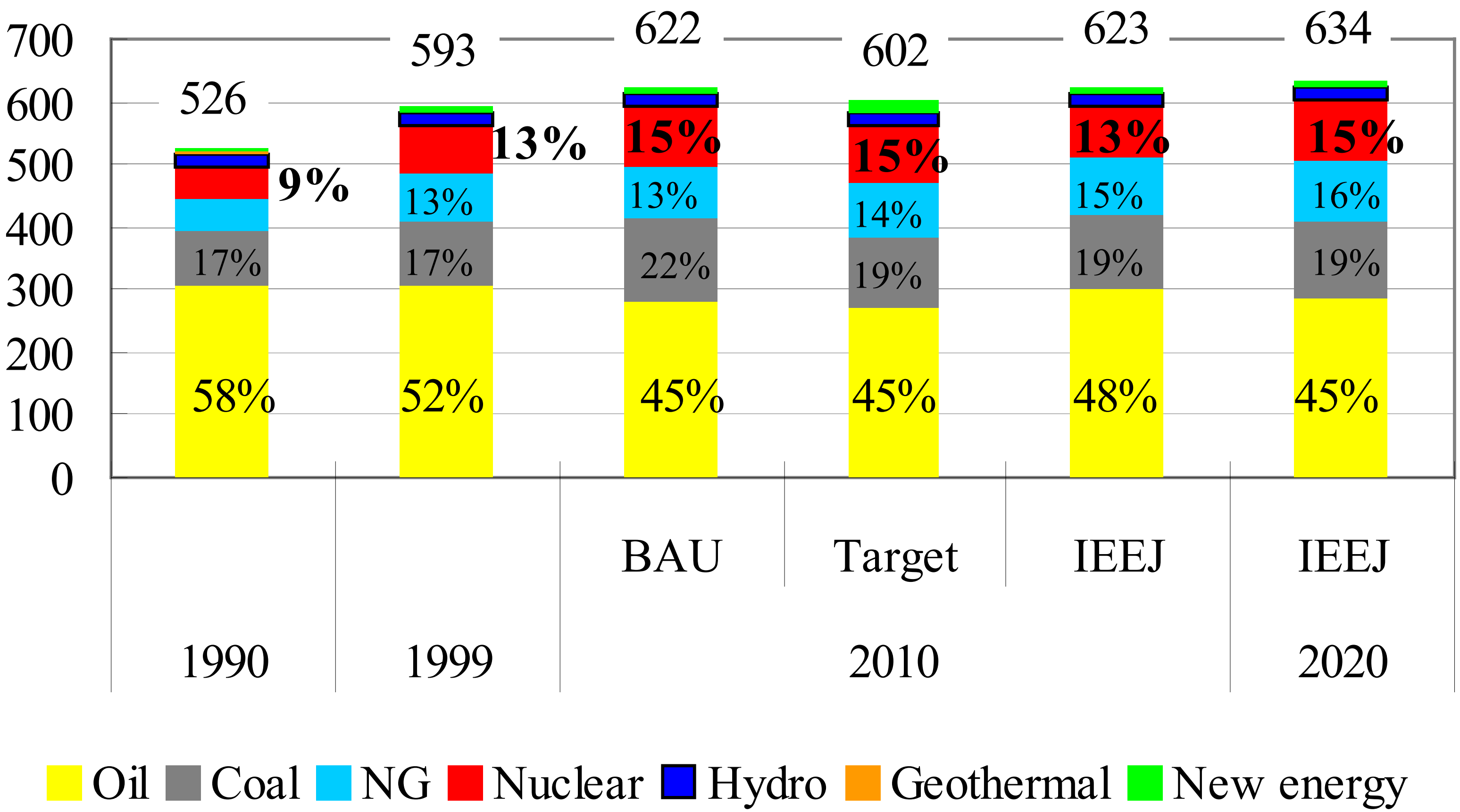
Primary Energy Supply



No big difference between government BAU and IEEJ (2010), but smaller share of nuclear. (gov. 58-62GW, IEEJ 52GW)

New Energy

	FY 1999		FY 2010			
	Actual		BAU		Target	
	crude oil	capacity	crude oil	capacity	crude oil	capacity
	10^4kl	10MW	10^4kl	10MW	10^4kl	10MW
Electricity						
PV	5.3	209	62	2,540	118	4,820
Wind power	3.5	83	32	780	134	3,000
Waste power	115	900	208	1,750	552	4,170
Biomass	5.4	80	13	160	34	330
Heat						
Solar heat	98	-	72	-	439	-
wasted heat	4.1	-	9.3	-	58	-
heat from waste	4.4	-	4.4	-	14	-
biomass heat	-	-	-	-	67	-
Black liquor, waste wood	457	-	479	-	494	-
Total (new energy)	693	-	878	-	1,910	-
% in TPS	1.2%	-	1.4%	-	3%	-

Summary

- Energy update
  - Slow increase (or decrease) in energy consumption and CO_2 emission, because of low (or minus) economic development
  - Steady increase for electricity. Steady increase for res.&com sector.
- Policy
  - "Energy policy basic law" is now leading Japan to more nuclear-friendly country.
  - Nuclear fuel cycle is at the crossroad (stop before active test?)
  - Turn back in deregulation.
  - Compliance of Kyoto Protocol (1st period) is difficult.
  - International cooperation in Northwest Asia is proceeding