



# Energy Policy of Taiwan

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# Three Parts of Energy Policy

- ❖ **Nuclear power**

- ↪ Directed by the Atomic Energy Council, **AEC**

- ❖ **Energy technology development**

- ↪ More dominated by the National Science Council, **NSC**

- ❖ **All others energy related issues**

- ↪ Directed by the Ministry of Economic Affairs, **MOEA**

- ↪ MOEA controls almost all energy related issues except the technology parts by AEC and NSC

# Subordinate units of MOEA

- ❖ **Bureau of Energy**

  - ☞ energy policy determination

- ❖ **State-owned Enterprise Commission**

  - ☞ 2 national companies

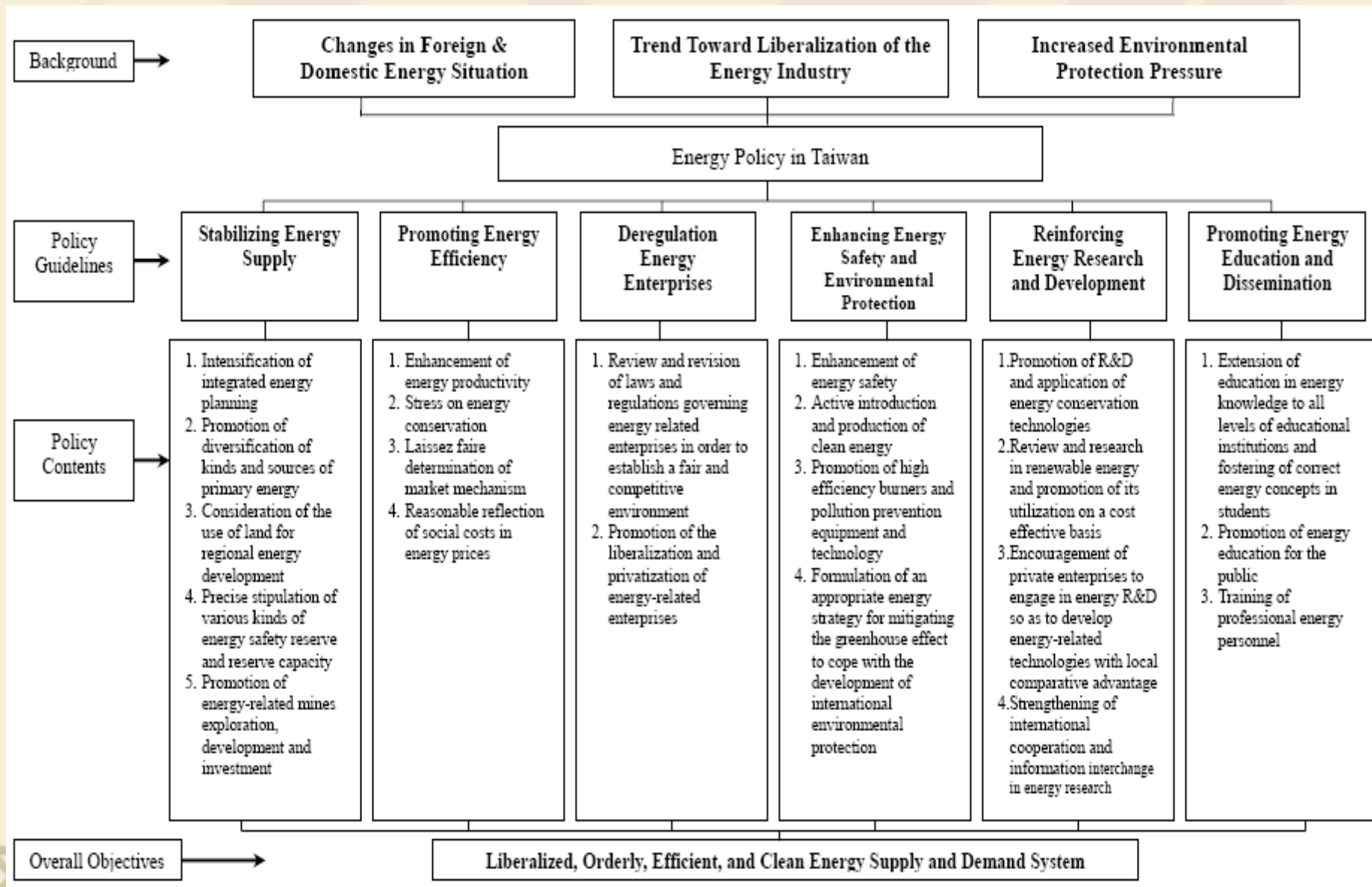
    - ❖ Chinese Petroleum Corporation, **CPC**

    - ❖ Taiwan Power Company, **Taipower**

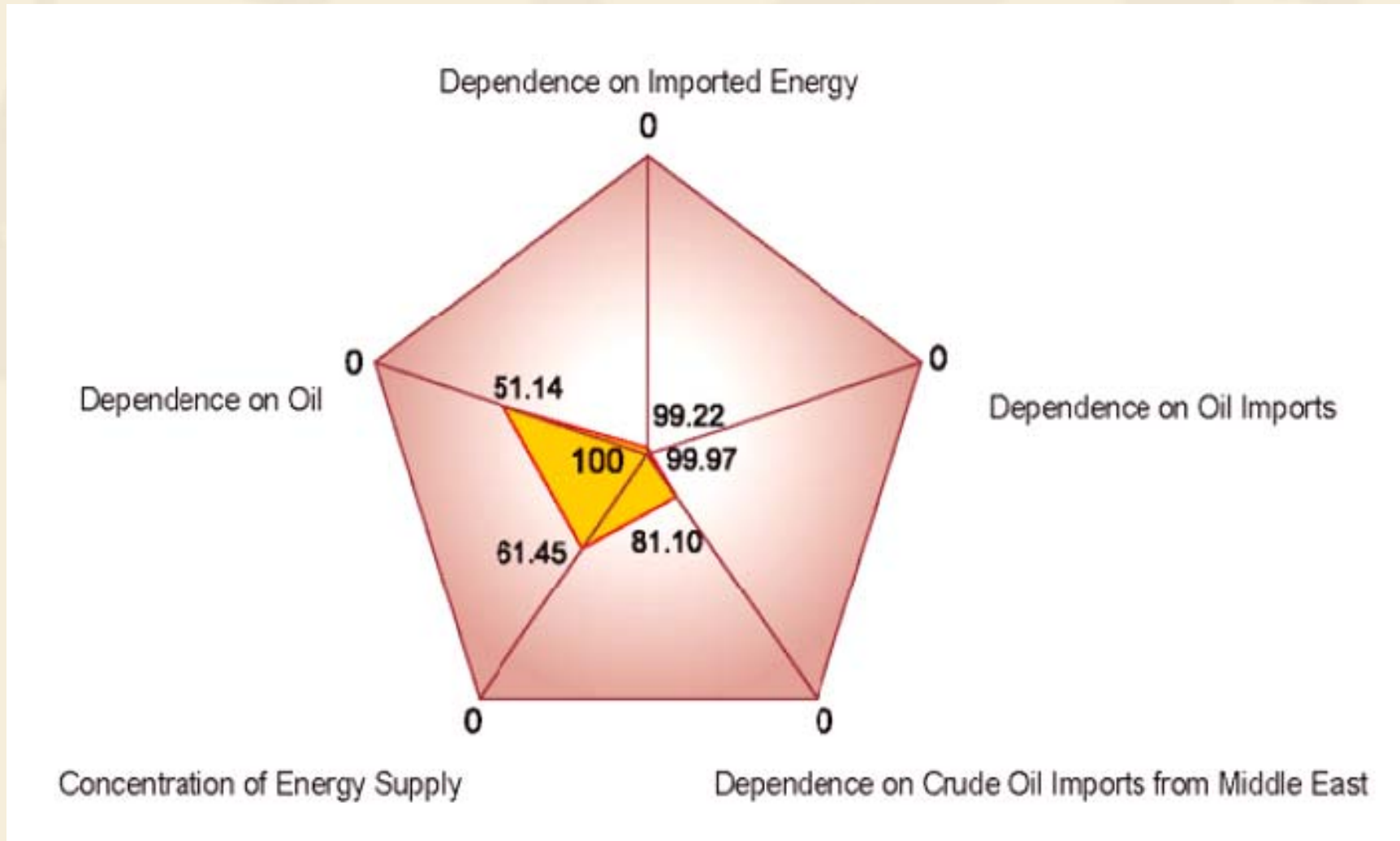
    - ❖ refined by government

    - ❖ must **obey the request of government** such as the **price freezing strategies** in past few years

# Energy Policy Framework



# Energy Security Indicators (2007)



# Stabilized Energy Supply

- ❖ Government tries very hard to stabilize energy supply
  - ❧ by implementing the regional energy development
  - ❧ **less achievement**
    - ❖ since most private firms tend to **import cheaper energy sources from foreign country**
- ❖ Taiwan is getting more and more dependent on imported energy in recent years

The percentages of imported energy					
Year	1986	1991	1996	2001	2006
Rate (%)	93.63	97.19	98.26	98.29	99.32

# Promote Energy Efficiency

- ❖ **No significant improvement** is observed for the efficiency policy
  - ∞ due to the **cheaper energy price**
- ❖ Very **few** manufacturers are willing to enhance their energy efficiency
  - ∞ due to the **limited electricity costs savings**
- ❖ Many private firms indicates that the reason of no energy efficiency equipment installation plan
  - ∞ due to the more than 17 returns pay-back years



## Changes in Electricity Prices

Year	Light	Industrial Power	Average
1987	2.880	2.094	2.300
1988	2.410	1.972	2.094
1989	2.433	2.041	2.155
1990	2.429	2.049	2.164
1991	2.466	2.026	2.163
1992	2.469	2.051	2.185
1993	2.516	2.032	2.194
1994	2.518	2.015	2.185
1995	2.536	2.001	2.186
1996	2.548	1.997	2.191
1997	2.542	1.961	2.158
1998	2.583	1.931	2.161
1999	2.534	1.887	2.107
2000	2.554	1.892	2.113
2001	2.570	1.892	2.122
2002	2.580	1.849	2.095
2003	2.544	1.829	2.068
2004	2.532	1.823	2.052
2005	2.528	1.821	2.053
2006	2.593	1.875	2.105
2007	2.629	1.928	2.148

Unit: N.T.\$/KWh.

Electricity price is much lower in recent years than 1987.

# Promote Energy Efficiency

- ❖ The **environment protection** need is another baffle for poor energy efficiency
- ❖ Taiwan Environmental Protection Union
  - ❧ Insist that ***a new coal-fired power plant can only be built after an old coal-fired power plant is shut down***
- ❖ In case of limited power capacity, Taipower must keep old power plant for stabilizing electricity supply
- ❖ This environmental protection conflicts hinder the establishment of new and high efficient power plant

## Heat Rate of Thermal Power Plants of Taipower

Year	Steam Turbine			Diesel Engine	Gas Turbine	Double Cycle
	Oil-Fired	Coal-Fired	LNG-Fired			
1987	33.93	35.11	34.85	35.15	22.71	25.76
1988	35.00	35.09	35.05	34.98	22.99	26.47
1989	35.64	35.45	35.53	34.99	27.72	32.97
1990	35.10	35.54	35.00	34.46	35.02	36.23
1991	35.00	35.89	33.37	34.02	24.79	32.83
1992	34.94	35.89	33.54	34.34	24.356	35.54
1993	35.56	35.91	33.71	34.74	25.07	28.64
1994	36.21	35.94	34.69	34.44	24.02	36.19
1995	36.14	35.92	35.04	34.84	24.71	36.09
1996	35.76	35.91	34.06	34.75	24.59	37.60
1997	35.62	35.95	33.86	34.25	20.91	37.64
1998	36.64	35.80	33.40	36.02	24.18	38.86
1999	35.37	35.54	33.00	34.63	24.73	40.12
2000	35.16	35.56	32.11	34.72	25.80	40.12
2001	34.78	35.53	32.53	35.52	26.41	41.12
2002	34.68	35.44	30.80	36.53	27.23	42.64
2003	33.40	35.37	31.09	36.51	27.65	41.58
2004	33.96	35.52	30.08	37.35	28.58	42.19
2005	34.74	35.47	30.36	37.76	22.77	42.35
2006	34.42	35.37	31.13	38.20	28.30	42.52
2007	34.35	35.42	30.63	38.06	27.27	43.27

Source: Taiwan Power Company (2007).

Unit: %.

**Taipower didn't enhance their efficiency significantly**

# Deregulate Energy Enterprises

- ❖ Petroleum market

- ⌘ full opened to **all petroleum product imports** at 2001

- ❖ Electricity market

- ⌘ foreign investors could be permitted to own up to **100%** of an Independent Power Producer (IPP)

- ❖ The electricity liberalization schedule is much behind than most countries in the world

- ⌘ **electricity price is decided by Taipower mainly**

# Other Energy Policy Guidelines

- ❖ Enhancement energy safety and environment protection
  - ❧ Promoting **Solar Water Heater** Systems (2000)
  - ❧ Subsidizing **Solar Photovoltaic** Systems (2000)
  - ❧ Subsidizing the Resource Exploration of **Geothermal Power Demonstration** Systems (2005)
  - ❧ Subsidizing **Energy Crop Green Bus** Projects (2006)
- ❖ Reinforce Energy R&D
- ❖ Promote Education and Dissemination

# Near-term and Long-term Solutions for Energy Issues in Taiwan

- ❖ Current issues confronted by Taiwan's energy policy
  - ❧ **Price devaluation**
  - ❧ **Significant greenhouse gas emission**
  - ❧ **Behind schedule for liberalization**
  - ❧ **Poor energy efficiency enhancement**

# Price devaluation

- ❖ Most fuel prices in Taiwan are much lower than in the international market
- ❖ Almost 100% crude import brings extremely tough burden for Taiwan's economy recently
- ❖ The old government applied the **freezing price policy** for fuel cost
  - ❧ **alleviate the higher living cost due to the increasing fuel cost**
  - ❧ suppressed a lot of complaints from public
  - ❧ incurred **huge deficit of CPC and Taipower**

# Significant Greenhouse Gas Emissions

- ❖ In 2005, Taiwan emits 284.40 million tons of CO<sub>2</sub> emissions
  - ❧ ranking the **24th** in the world
  - ❧ around **1%** of the world's total emissions
- ❖ Figure 3: the per capita CO<sub>2</sub> emission in Taiwan
  - ❧ **higher than the main industrial Asian countries**
- ❖ Figure 4: the increasing greenhouse gas emissions in all sectors
  - ❧ the **industrial sector** is the major emission producers



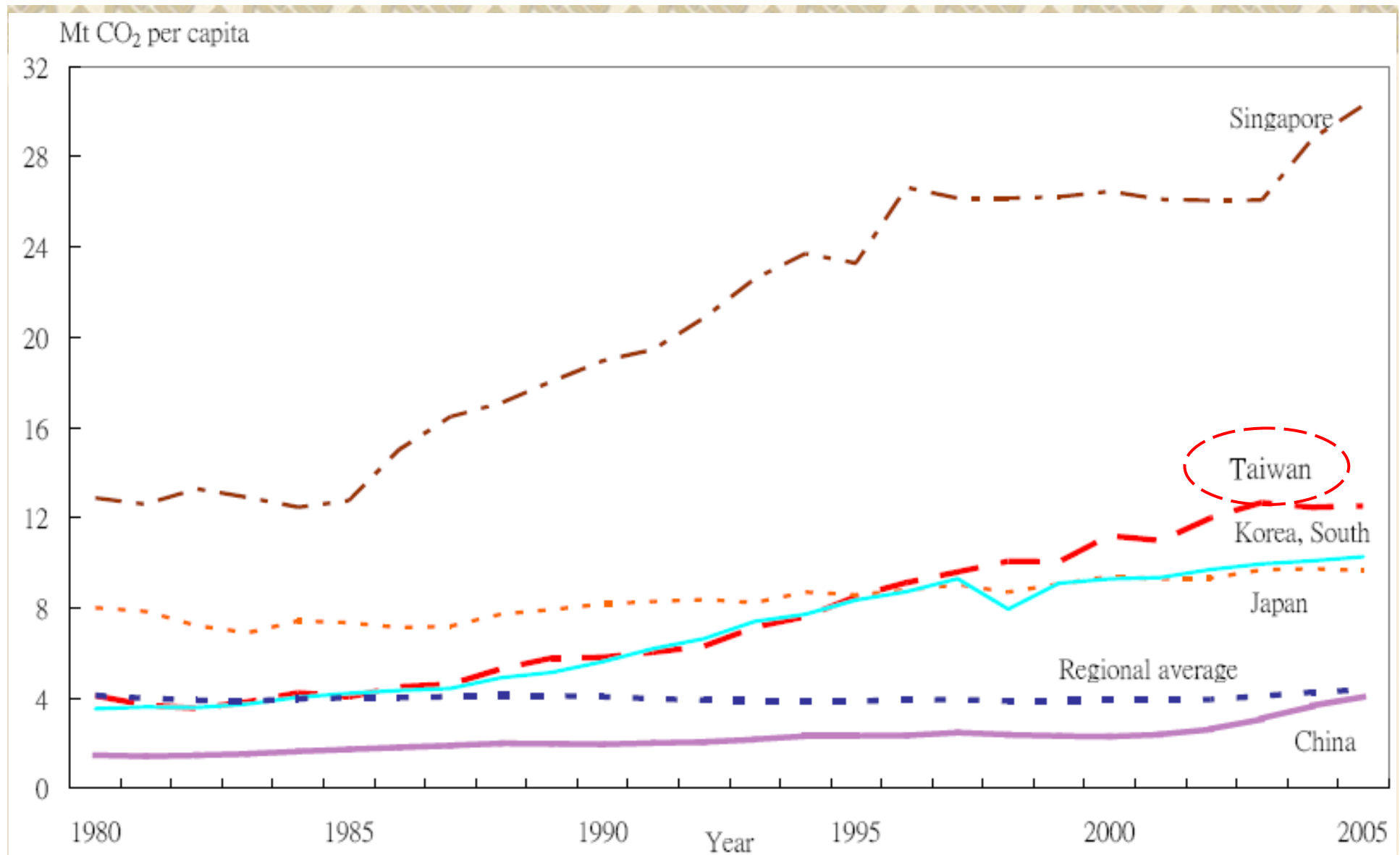


Figure 3: Per Capita Carbon Dioxide Emission in Select Asian Countries

Sources: EIA International Energy Annual.

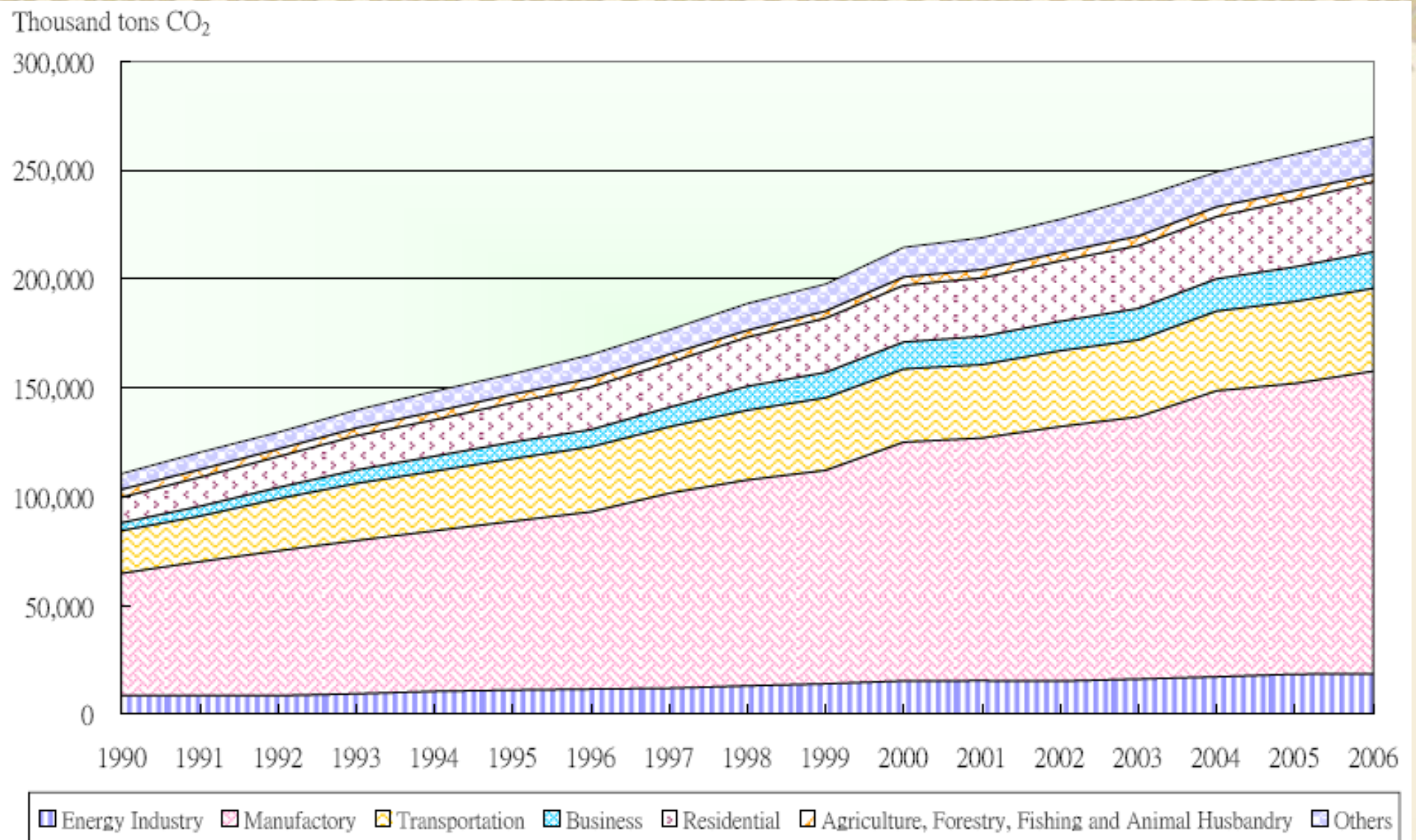


Figure 4: The Trend of Sectoral CO<sub>2</sub> Emissions from Fuel Combustion in Taiwan (Including the CO<sub>2</sub> Emissions transferred from power generation)

Sources: Bureau of Energy, MOEA, Taiwan.

# Behind Schedule for Liberalization

## ❖ Taipower

- ❧ decides the wholesale and resale electricity price alone

- ❧ bought all electricity from all power plants and sold to all electricity users

  - ❖ IPPs generated 15.49% of the power and cogeneration power plants generated 18.22% of the power in 2007

- ❖ This **monopoly behavior** is criticized by many experts and consumer representatives

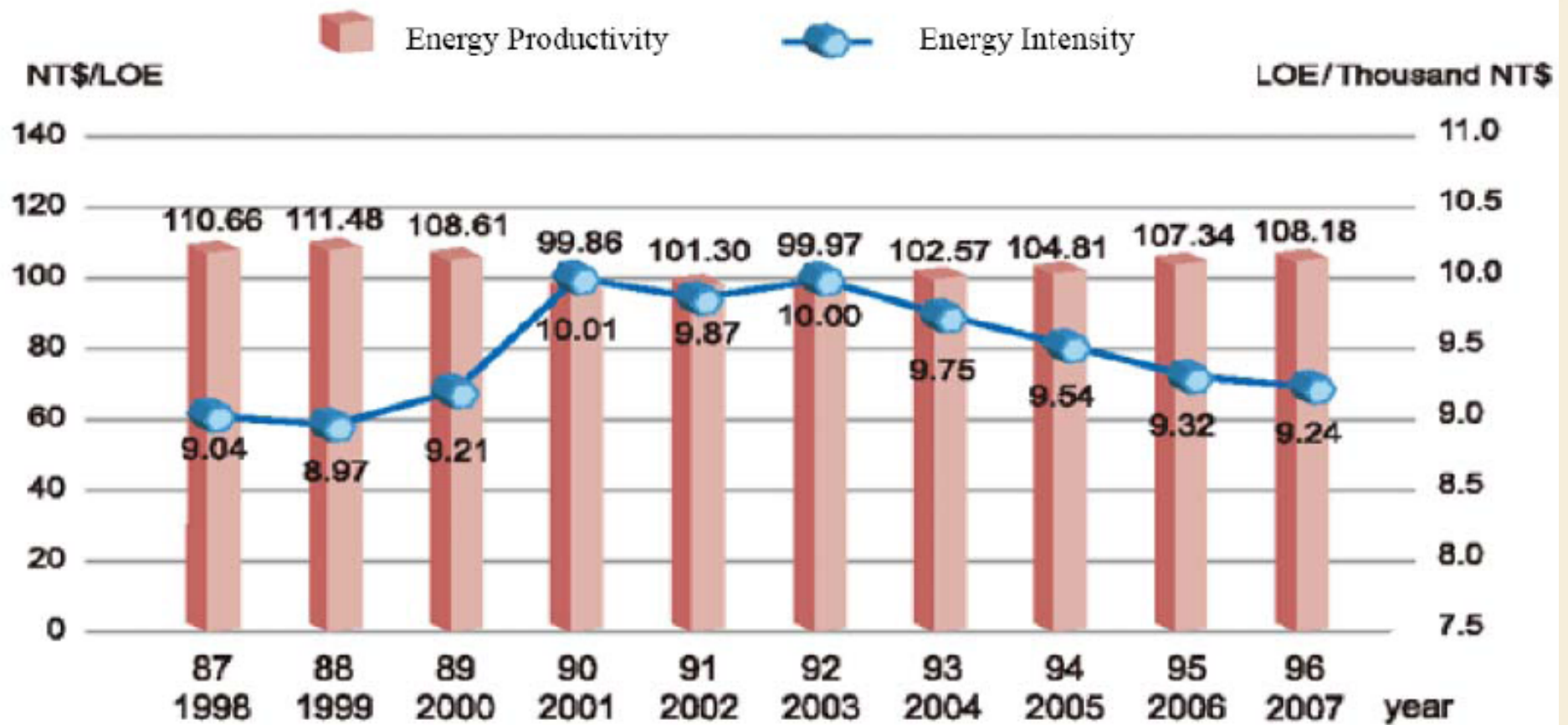


Figure 5: Energy Productivity and Energy Intensity in Taiwan

Sources: Energy Statistical Handbook 2007, Bureau of Energy, MOEA, Taiwan.

The lower energy price around 1999 to 2003 should be the main reason of poor energy efficiency

# Near-term Solutions for Energy Issues in Taiwan

- ❖ **Oil and electricity price devaluation** is the most urgent problem
  - ∞ CPC and Taipower had lost huge money due to the price freezing policy
- ❖ ***Properly unfreezing the price cap*** should be the most important near-term solution
  - ∞ improve the policy effects of energy conservation and CO2 emission reduction

# Floating Oil Price Mechanism

- ❖ Fuel price is decided by CPC but monitored by the Oil and Electricity Price Commission for a long while
  - ∞ people always complain that CPC tends to overreact to the rising cost but less respond to the decreasing cost
- ❖ The **floating oil price mechanism**
  - ∞ to determine a fair price
  - ∞  $P = A + B * 0.8$ 
    - ❖ A represents the original fuel price
    - ❖ B is the percentage imported cost change in a certain period
    - ❖ 0.8 is the relative share of crude oil cost

# Floating Oil Price Mechanism

- ❖ The **rapid increasing crude oil price** in the international market in 2007 again incurs lots of complaints
- ❖ The old Taiwan government freezes the fuel price again
  - ∞ for calming down the complaints
  - ∞ for the considering of president campaign
- ❖ ***The floating price mechanism is then stopped in the end of 2007***

# Small Electricity Price Adjustment

- ❖ Taipower actually faces similar trouble as CPC and gets even worse fortunate
- ❖ The **increasing electricity price** will result in much stronger **economic negative impacts**
  - ∞ the old Taiwan government keeps **freezing the electricity price in all periods**
  - ∞ but allowing **small price adjustment** for reflecting the significant increasing fuel cost in the **summer peak-load period**



# Energy Conservation And Carbon Cut

- ❖ The **freezing electricity price** policy
  - ⌘ *less* incentive for *energy conservation* activities for most firms
- ❖ The *only* progress for carbon cut right now is the *voluntary carbon cut of some firms*
  - ⌘ this **poor performance** is mainly due to the special role in the international organization
  - ⌘ Taiwan does not have any carbon cut obligation and privilege

# Energy Conservation And Carbon Cut

- ❖ Taiwan government still works much harder to cut carbon emissions
  - ∞ the request of many domestic environmental protection groups
  - ∞ the consideration of **world trade**
- ❖ More countries ask higher **environmental protection standard** for their imported products
  - ∞ the carbon cut policy can actually ensure the products competition in the world market

# Long-term Solutions for Energy Issues in Taiwan

- ❖ **Develop new sources of traditional energy and renewable energy by Investing more funds**
- ❖ **Enhance the energy efficiency in all sectors by more technology development**
  - ∞ the first annual budget of the Petroleum Fund, MOEA includes 1 billion for oil exploration to discover and develop new oil fields in 2002

# Long-term Solutions for Energy Issues

- ❖ The **freezing electricity price** policy brings **negative impacts** for these long-term solutions
  - ∞ many private firms have no incentive to purchase the energy saving equipment
    - ❖ **energy use** still keeps **significant increase**
    - ❖ more and **more carbon emission**
  - ∞ the **significant loss of CPC and Taipower**
    - ❖ shrinks the long-term investment funds
    - ❖ the Standard & Poor's devalue Taipower's credit as A- and negative development (increase the interest expenditure)

# Revised Direction of Taiwan's Energy Policy

- ❖ The new Government beginning from May 20, 2008 implements different energy strategy
  - ❧ ***less intervention and more free market emphasis***
  - ❧ revised floating oil price formula
  - ❧ partial adjustment for electricity price
  - ❧ energy saving and carbon cut intensification
  - ❧ nuclear power reconsideration

### The Contents of Taiwan's Floating Price Mechanism in Different Periods

Period	2006/9/26 ~ 2006/12/31	2007/1/1 ~ 2007/8/14	2007/9/1 ~ 2008/5/27	2008/5/28
Frequency	Weekly	Weekly	Monthly	Monthly
Benchmark Price	Platts WTI	NYMEX WTI	70% Platts Dubai 30% Brent	70% Platts Dubai 30% Brent
Percentage change before tax	$(WTI_t - WTI_{t-1}) * 100\% ^a$	$(WTI_t - WTI_{t-1}) * 80\% ^a$	$(P_t - P_{t-1}) * 80\% ^b$	$(P_t - P_{t-1}) * 80\% ^c$
Others	The Asia's lowest price before tax.		<ul style="list-style-type: none"> <li>◆ The Asia's lowest price before tax</li> <li>◆ Setting a mitigating mechanism for oil price increase.</li> </ul>	<ul style="list-style-type: none"> <li>◆ The Asia's lowest price before tax</li> <li>◆ Cancel out the mitigating mechanism for oil price increase.</li> <li>◆ Diversified cost absorbed six months by CPC and sales tax</li> </ul>

<sup>a</sup> WTI price on Monday.

<sup>b</sup> Monthly average benchmark price.

<sup>c</sup> Monthly average benchmark price and the exchange rate factor are included.

Source: Bureau of Energy, MOEA, Taiwan

# Revised Floating Oil Price Formula

- ❖ Although new Government try very hard to reflect a reasonable cost of the market
  - ∞ the **great pressure** from public media pushes the new Government to **apply some compensation policy**
  - ∞ CPC and new Government absorb almost **40%** of the increasing cost, the public is still unhappy
- ❖ Today, the new Government still faces **lots of criticism of floating oil price mechanism**

# Partial Adjustment For Electricity Price

- ❖ Due to the consideration of economic impacts, the electricity price upward adjustment in July only reflect **30%** of the increasing imported cost
- ❖ In order to create the *energy conservation incentive*
  - ⌘ the new Government institutes more **categories for users**
  - ⌘ *higher unit price will be charged to the larger users*
  - ⌘ every customer can **earn some discount** if he/she uses less electricity than the same period of last year



## Rate schedules in Taiwan

Classification			Summer	Non-Summer
Households	First 110 kWh per month	Per kWh	2.10	2.10
	Next 220 kWh per month		2.87	2.54
	Next 170 kWh per month		3.85	3.09
	Next 200 kWh per month		4.11	3.24
	Over 700 kWh per month		4.47	3.48

### Notes:

1. Summer refers to June 1 to September 30 and non-summer refers to all other days of the year.
2. MOEA offers electricity discount policies, households that hold their electricity consumption steady or cut by less than 5% from a year ago will receive a 5% discount, households save between 5% and 10% on electricity consumption will receive a 10% discount, and households save more than 10% from the same period ago will receive a 20% discount on their electricity bills.

Source: Taiwan Power Company website (<http://www.taipower.com.tw/>).

# Energy Saving and Carbon Cut Intensification

- ❖ The **unfreeze energy price policy** is the most effective way to conserve energy and cut carbon emissions
- ❖ The new Government insists on the ***expansion of renewable energy***
  - ⌘ resubmit “the Renewable Energy Development Bill”
- ❖ The new Government is also considered for ***more carbon emissions cut***
  - ⌘ submit “the Greenhouse Gas Reduction Act (draft)”

# Nuclear Power Reconsideration

- ❖ Taipower reflects costs to the electricity market price
  - ⌘ huge loss due to the stoppage of Nuclear Power Plant No. 4
  - ⌘ fuel costs increase recently
- ❖ The **cost reflection** claim let more and more people aware the important role played by **nuclear power**
- ❖ Recently, the new Government begins to claim that nuclear power should be one of the options for power generation

# Conclusion and Remarks

- ❖ Taiwan has developed a comprehensive energy policy for a long while
  - ❧ It ***gets problems*** in recent years
  - ❧ due to the ***world trend of energy price boom and carbon cut***
- ❖ The *old* Government concerns more about the alleviation of economic impacts
  - ❧ implements more compensation strategies
  - ❧ **freezes the oil prices and electricity prices**

# Conclusion and Remarks

- ❖ The *new* Government concerns more about the **free market mechanism**
  - ❧ implements the *price reflection policy*
  - ❧ *absorbs some cost from diversified sources*
- ❖ Statistical reports show that the ***oil and electricity use is slowly decreasing recently***
  - ❧ success of the energy conservation and carbon emissions cut policy
- ❖ Of course, there are more works for Taiwan Government in order to build up a good energy environment



**Thank You for Your Attention!**

