Presentation on China's Energy Policy

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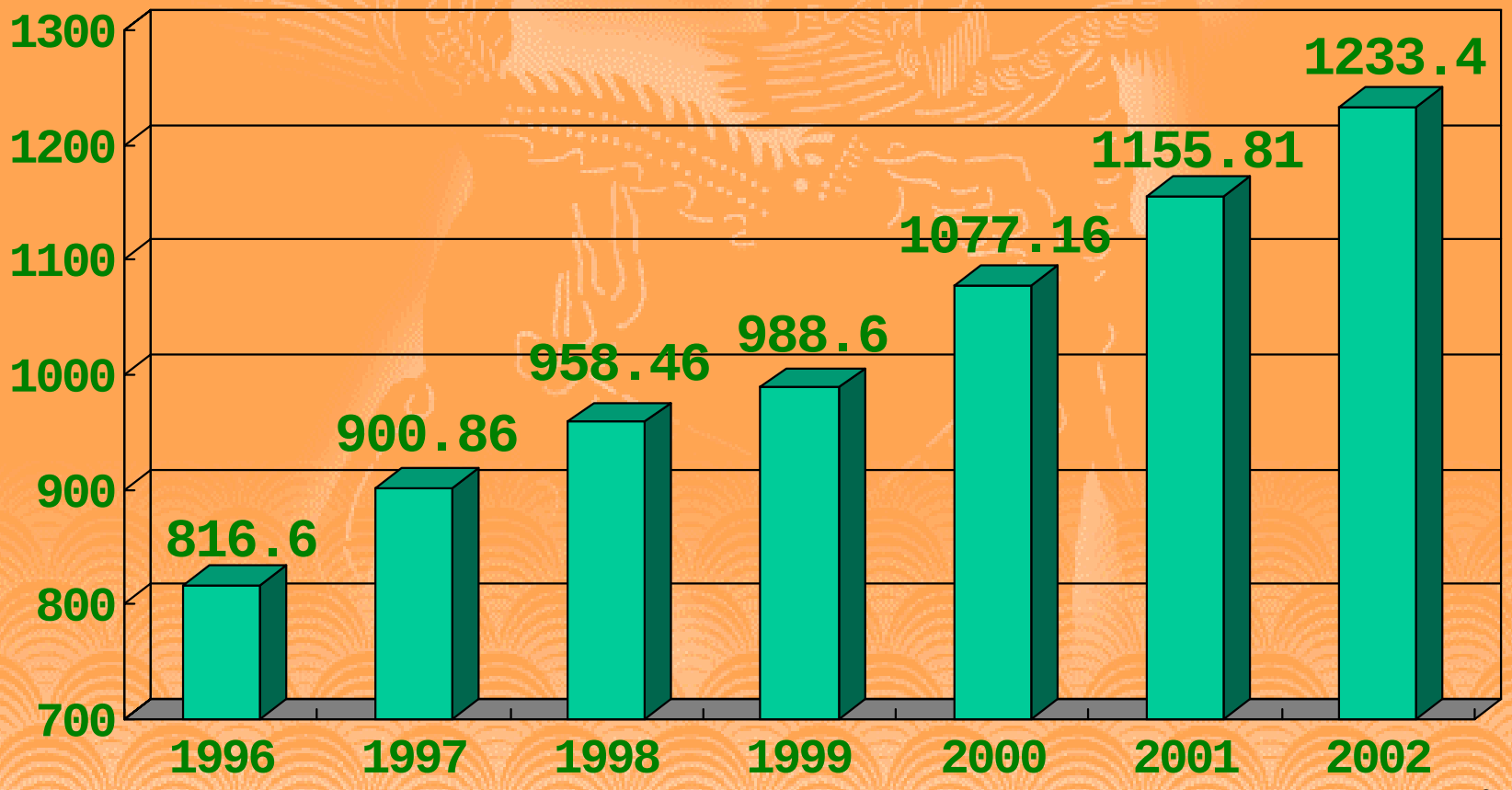
- Situations
- Problems
- Policy of Development
- Nuclear Energy

New and Renewable Energy

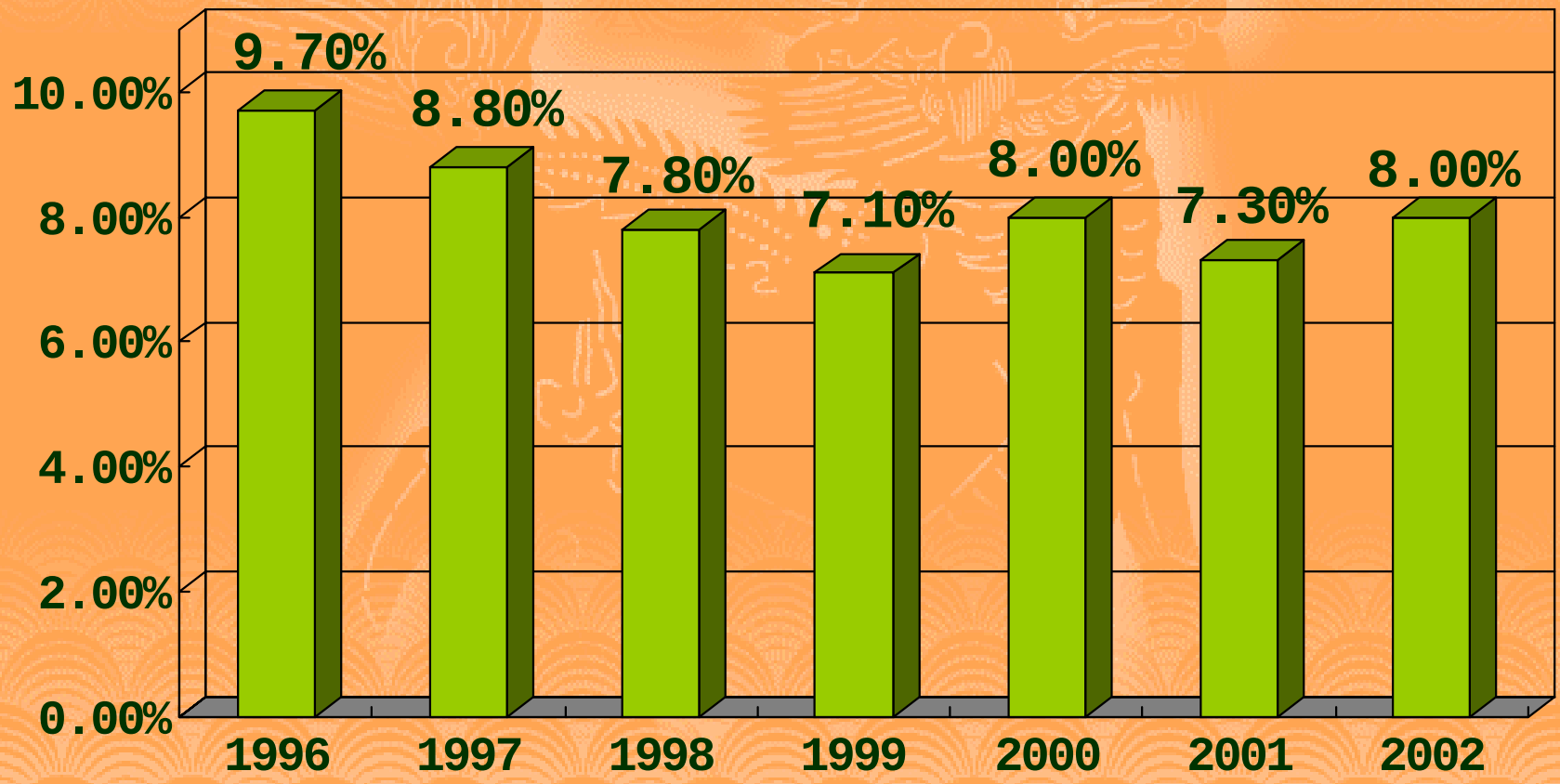
V.Priorities of R&D

Chinese Economy

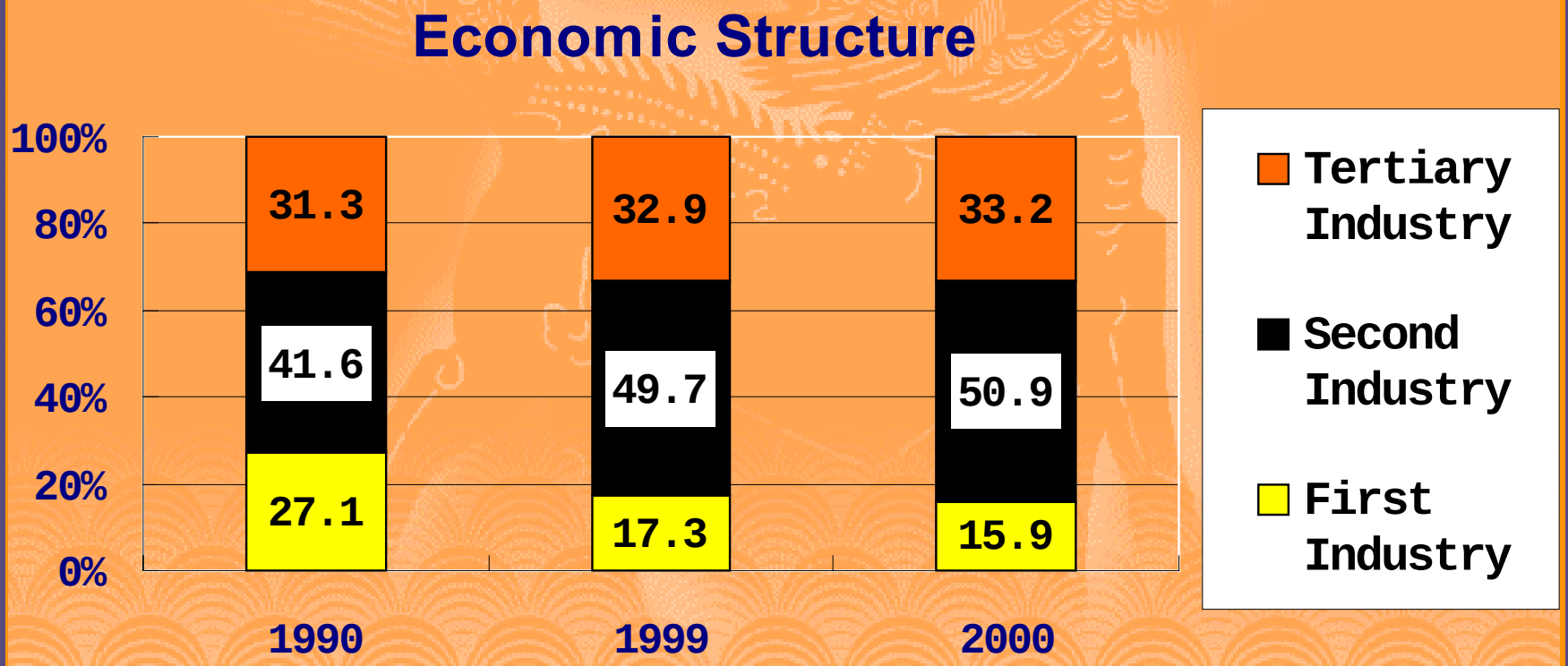
BNP (billion US$)



Growth Rate


9.70%
8.80%
7.80%
7.10%
8.00%
7.30%
8.00%
10.00%
8.00%
6.00%
4.00%
2.00%
0.00%
1996
1997
1998
1999
2000
2001
2002

Continuously adjust economic structure



Energy consumption

	Total Energy Consumption (10000 tons of SCE)	As Percentage of Total Energy Consumption				
		Coal	Oil	NG	Hydro power	Nuclear power
1990	98703	76.2	16.6	2.1	5.1	0
1995	131176	74.60	17.50	1.80	5.71	0.39
1998	132214	69.60	21.50	2.20	6.25	0.45
1999	130119	68.00	23.20	2.20	6.08	0.52
2000	128000	67.0	23.6	2.5	6.9	

Energy Production

	Total Energy Production (10000 tons of SCE)	As Percentage of Total Energy Production				
		Coal	Oil	NG	Hydro power	Nuclear power
1990	98703	76.2	16.6	2.1	5.1	0
1995	129034	75.30	16.60	1.90	5.85	0.39
1998	124250	71.86	18.51	2.49	6.66	0.45
1999	109126	68.40	20.95	3.07	7.06	0.52
2000	109000	67.2	21.4	3.4		8.0

Energy Real Production

	1998	1999	2000
Coal (Billion Tons)	1.25	1.05	1.00
Oil (Million Tons)	161	160	163
N. G. (Billion m^3)	23.3	25.2	27.8
Electricity (Billion kwh)	1167	1239	1356
Hydro-Electricity (Billion kwh)	199	197	221

Problems

- Weak Diversification Index
- Weak Energy Efficiency
- Pollution
- Shortage of Energy

Definition of DI

$$DI = \left(\sum_{i=1}^{n} (Ei / E)^2\right)^{-1}$$

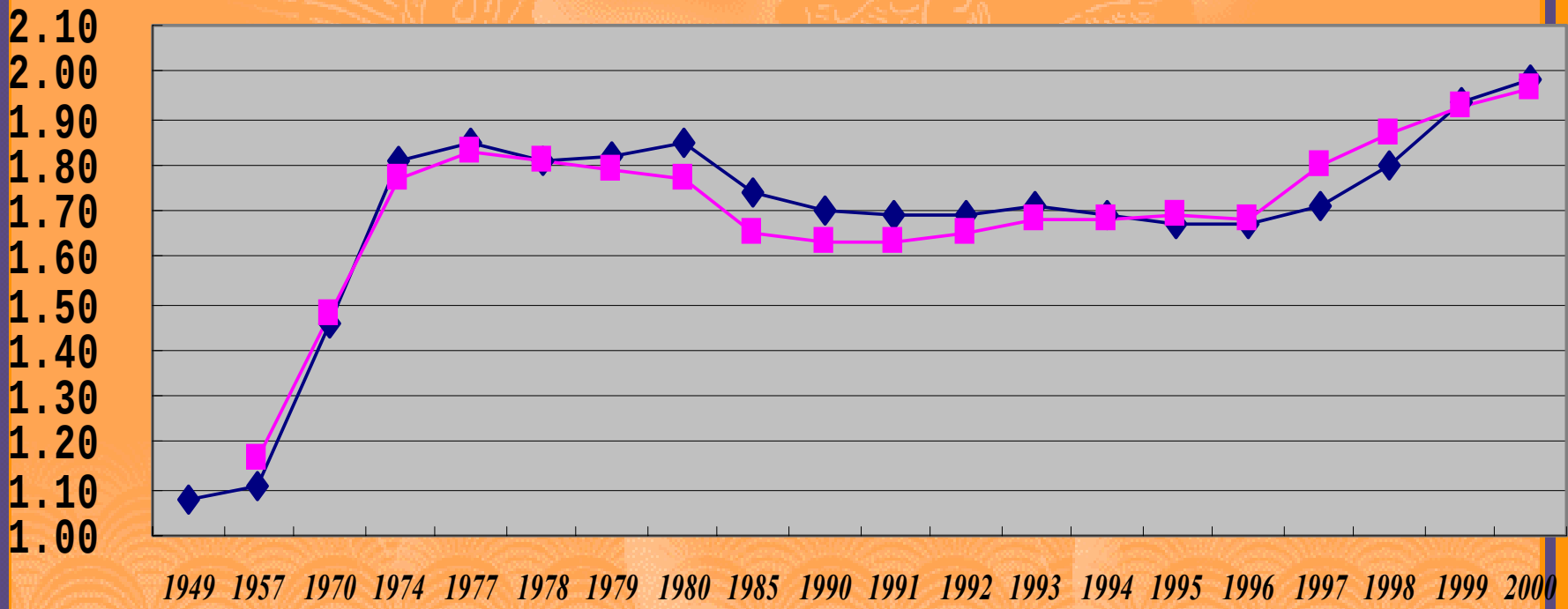
DI - Diversification Index

Ei - i^{th} type of energy

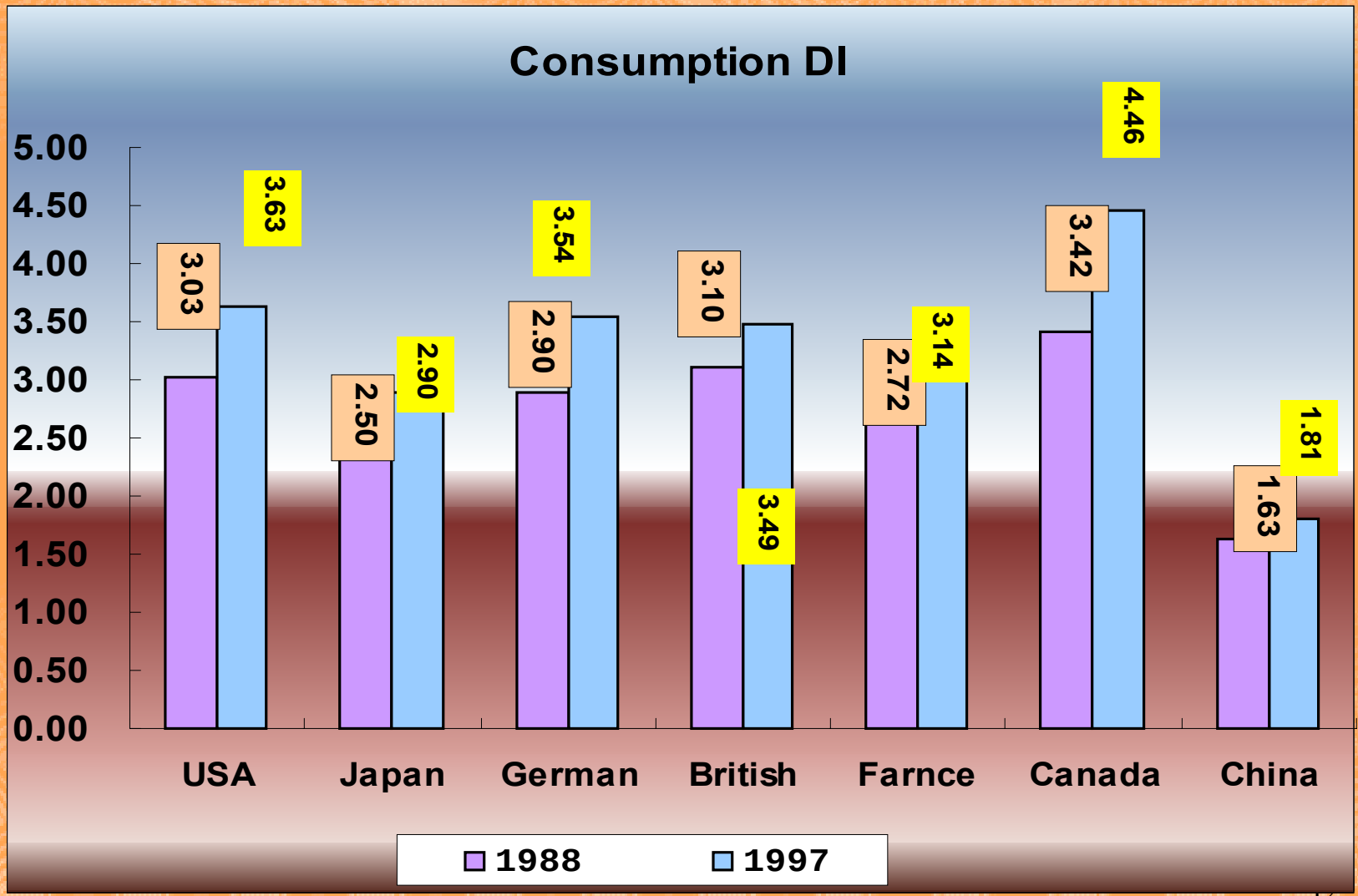
E - total energy

DI in China

Supply and Consumption DI



DI Comparison



Energy Efficiency

	1980	1989	1997	2005
Efficiency (%)	25.9	28.0	31.2	35.0

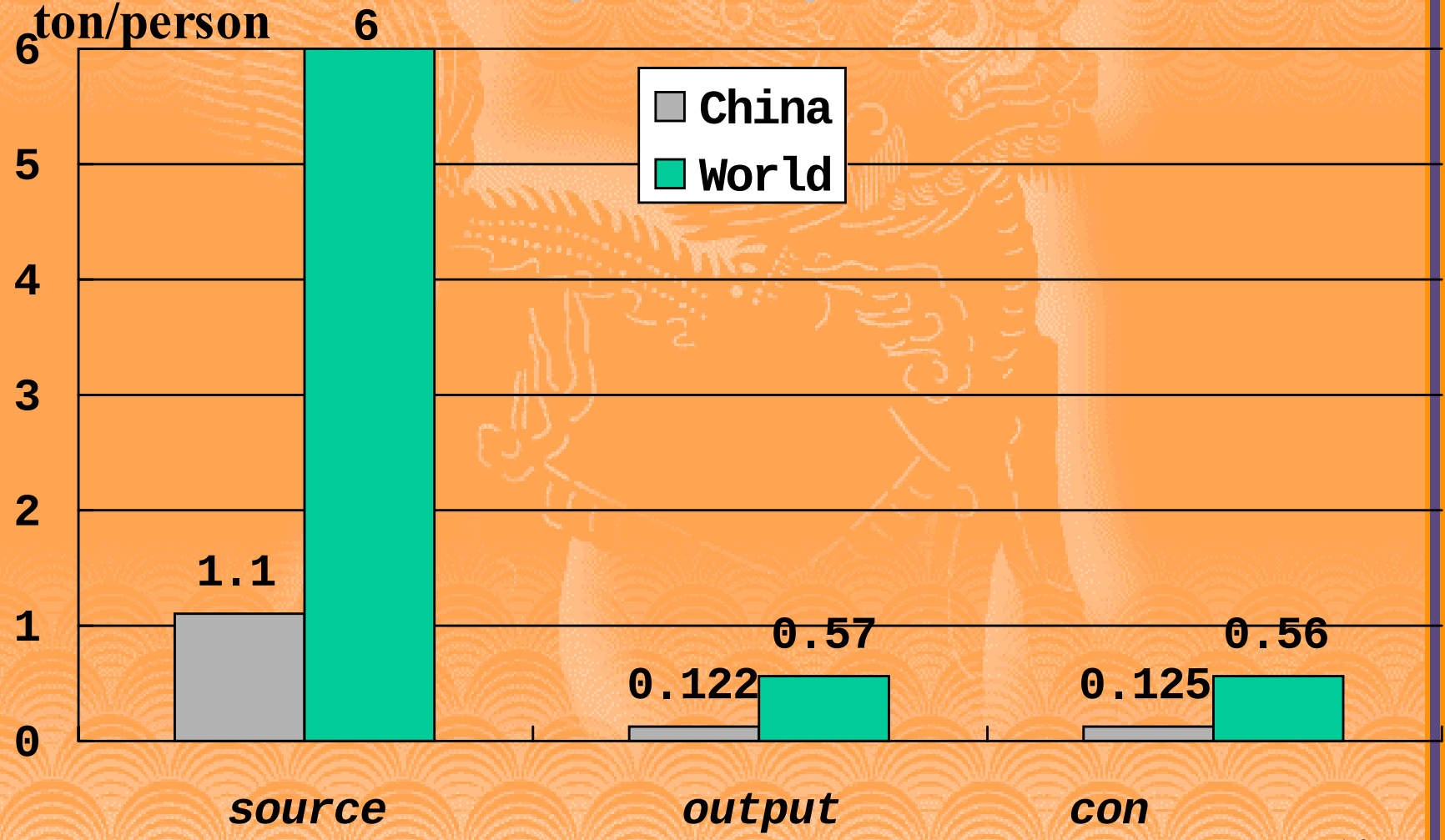
Comparison of Energy Consumption

	1980	1985	1990	1995	1997	1999
Thermal Power Plant(gce/kWh)						
China	448	431	427	412	408	399
Japan	340	339	332	330	325	322
Steel(kgce/t)						
China	1201	1062	997	983	976	833
Japan	705	640	629	652	656	680

Heavily rely on imported oil in oil consumption

Year	1990	1995	1999	2000	2020
Crude oil consumption (Mtce)	114.85	160.64	203.81	302.1	
Crude oil import (Mtce)	7.55	36.73	57.43	100	
Net crude oil import (Mtce)	-23.54	12.18	43.81	85.71	
Import share of crude oil consumption (%)	6.6	22.9	28.2	33.1	
Net import share of crude oil consumption (%)	-20.5	7.6	21.5	28.4	45

Oil Supply and Demand (1999)



China's Energy Strategy

- Energy Security
- Optimizing the Energy Structure
- Raising the Efficiency
- Protecting the Environment
- Opening to Outside
- Developing the Western Parts

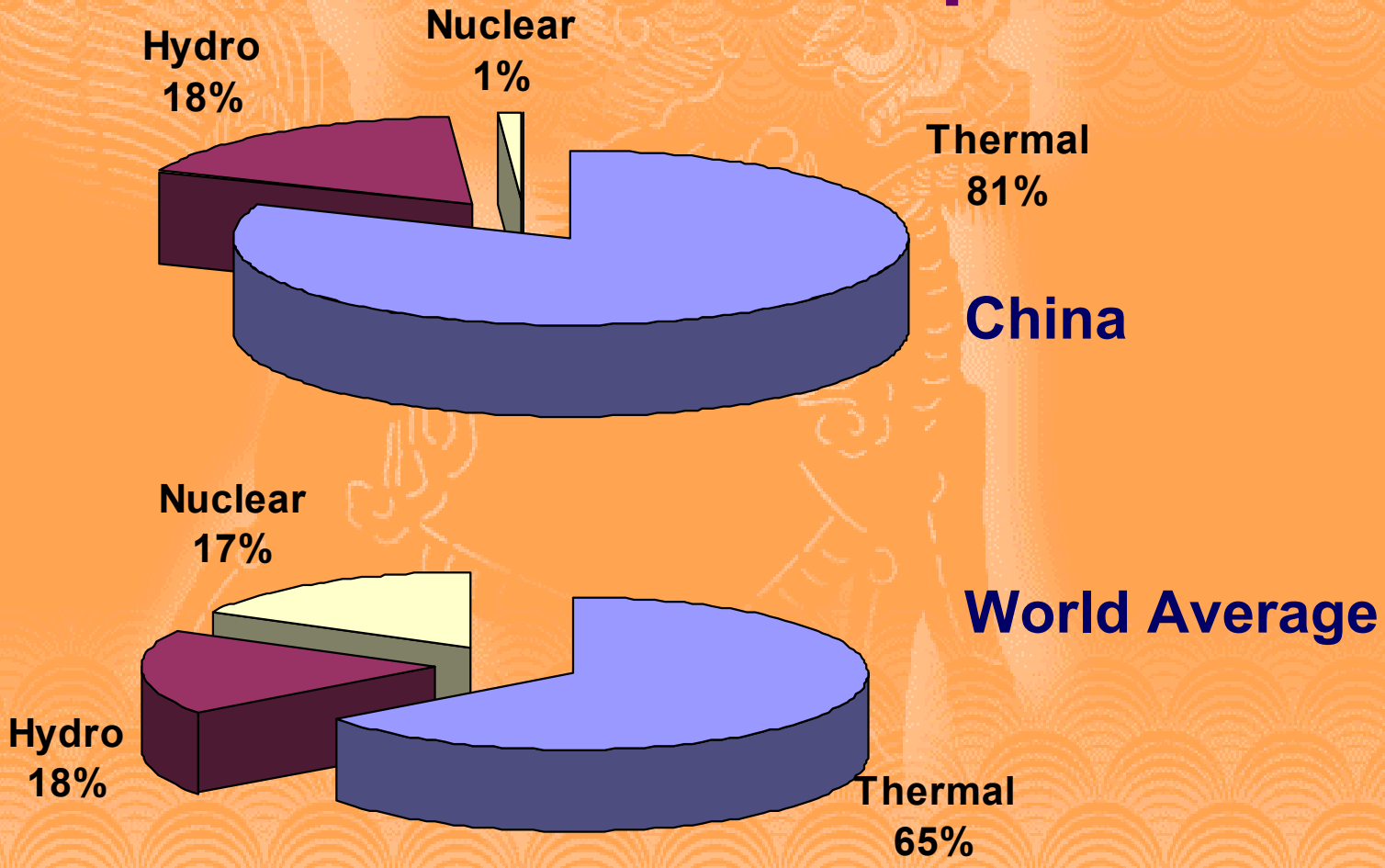
China's nuclear power plants in operation

	Capacity	Type of Reactor	Technology Supplier	Commercial Operation
Dayabay Nuclear Power Plant-1 Guangdong Province	984MW	PWR	France	1994-2
Dayabay Nuclear Power Plant-2 Guangdong Province	984MW	PWR	France	1994-3
Qinshan Nuclear Power Plant-1 Zhejiang Province	300MW	PWR	China	1994-4
Lingao Nuclear Power Plant-1 Guangdong Province	985MW	PWR	France	2002-7
Total	3,255MW			

China's nuclear power plants in construction

	Capacity	Type of Reactors	Technology Supplier	Construction Start	Estimated time of Commerce Operation
Lingao Nuclear Plant -2 Guangdong Province	985MW	PWR	France	1997-11	2003-3
Qinshan Nuclear Plant 2-1 Zhejiang Province	642MW	PWR	China	1996-6	2002-
Qinshan Nuclear Plant 2-2 Zhejiang Province	642MW	PWR	China	1997-4	2003-4
Qinshan Nuclear Plant of Zhejiang Province 3- 1	700MW	HWR	AECL, Canada	1998-6	2003-2
Qinshan Nuclear Plant 3-1 Zhejiang Province	700MW	HWR	AECL, Canada	1999-3	2003-11
Tian Bay Nuclear Plant -1 Lianyungang in Jiangsu Province	1,000MW	PWR	VVER, Russia	1999-10	2004-7
Tian Bay Nuclear Plant -2 Lianyungang in Jiangsu Province	1,000MW	PWR	VVER, Russia	2000-10	2005-7
Total	5,669MW				

The Comparison of Power Generation Fuel Composition



THE POLICIES OF NUCLEAR ENERGY DEVELOPMENT IN CHINA

- Priority will be given to hydropower development and great efforts should be made to develop thermal power, and nuclear will be developed to an adequate degree
- The development of nuclear power will implement a principle of seeking Sino-foreign cooperation and " taking China's self- reliance as the dominant factor – design, manufacturing, construction and operation
- The PWR type nuclear power plant is considered as the prevailing technology option in the near future

New and Renewable Energy

		2000	2005
Solar	Production of Solar heater (Million m^2)	6.1	11
	Production of Photocell (MW)	5	15
Wind	Capacity (MW)	340	1,200
Biomass	Capacity (Million m^3)	600	
Geothermal	Heated Surface (Million m^2)	10	20

Priorities of R&D

- **Clean coal technologies**

  IGCC CFBC

  Gasification of coal

  Liquefaction of coal

- **New and Renewable Energy**

  Solar Wind Biomass

Priorities of R&D

- **Hydrogen Energy**

  Fuel cell
- **Nuclear Energy**

  New-type Reactors
- **Fusion (ITER Program)**
- **Energy Economy**

THANK YOU