China’s Iron and Steel Industry

Ankara

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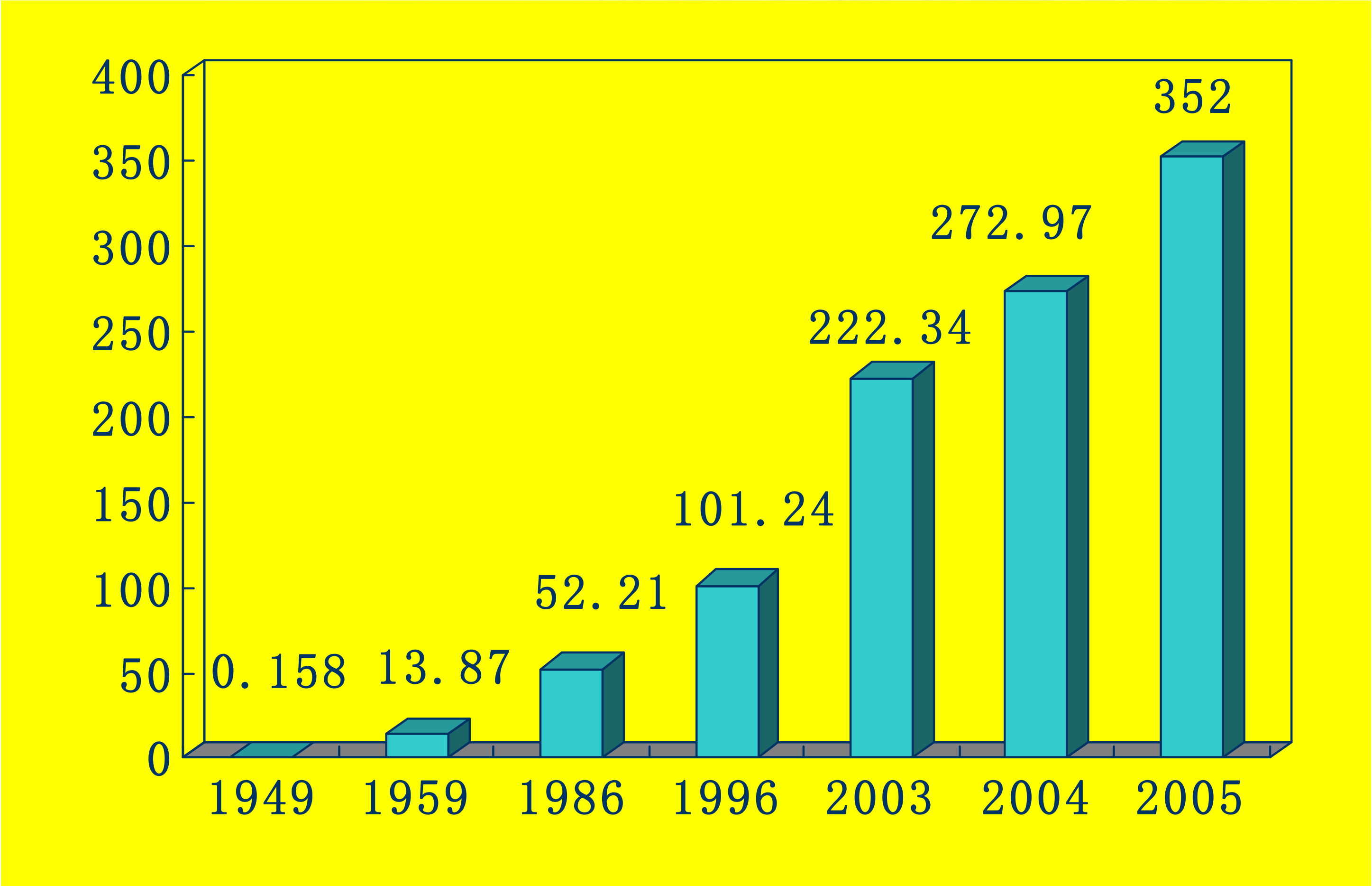
Outlines

I Developments
II Changes in the last five years
III problems
IV Opportunities and challenges
V Actions to be taken

I.1. overview



400
350
300
250
200
150
100
50
0
0.158
13.87
52.21
101.24
222.34
272.97
352
1949
1959
1986
1996
2003
2004
2005

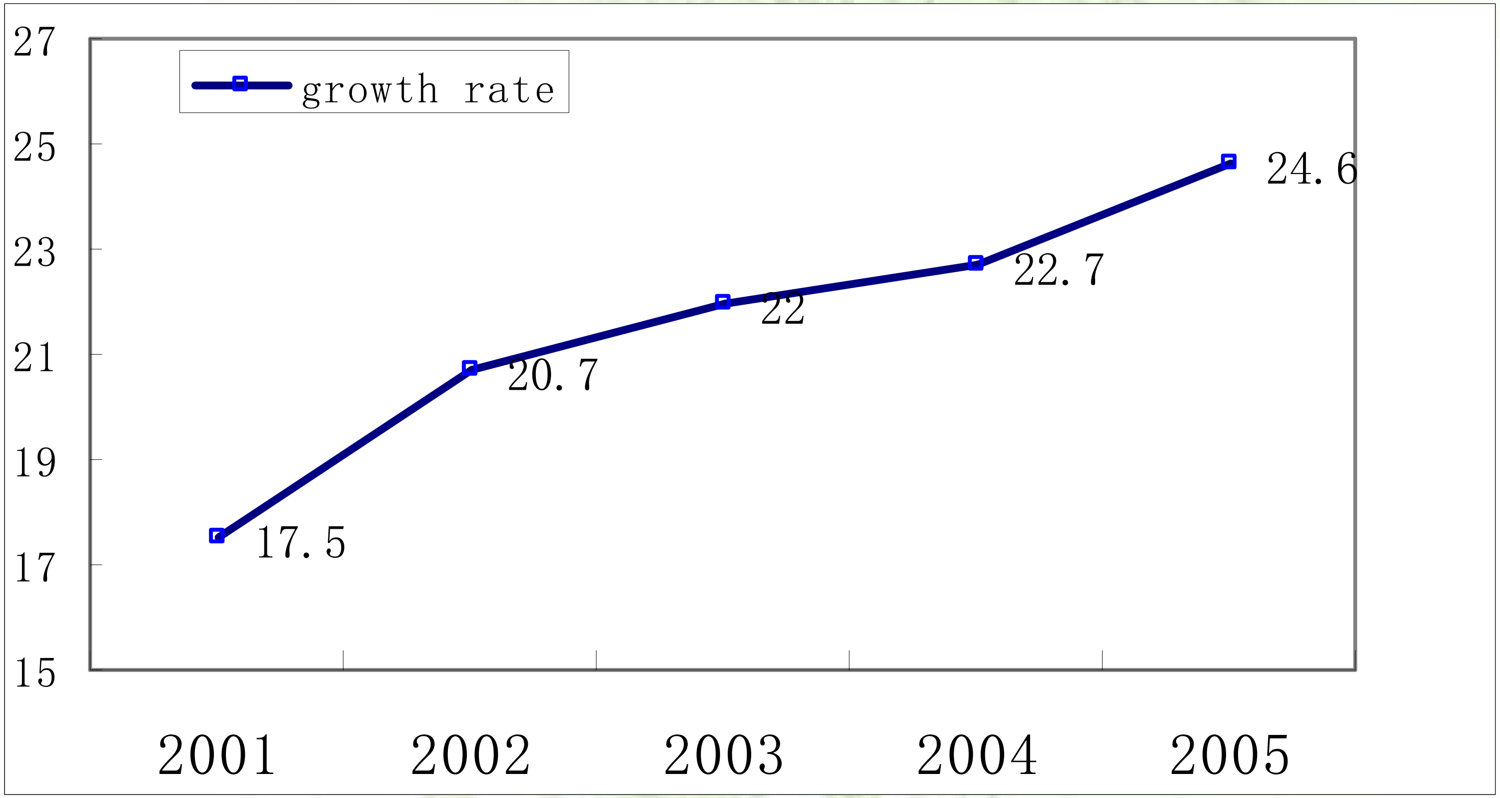
2001-2005 （The Tenth National Plan Period)

- 2001: 128.5   2005: 352 ml
  increased by over 200 ml tons within 5 years
  annual growth rate of over 20%

- 1.16 billion tons of steel was produced in last 5 years, accounting for 37% of the 3.1 bl tons of steel produced since new China was founded in 1949

- 2001   account for 15% of the world production
  2005   account for 30.93%

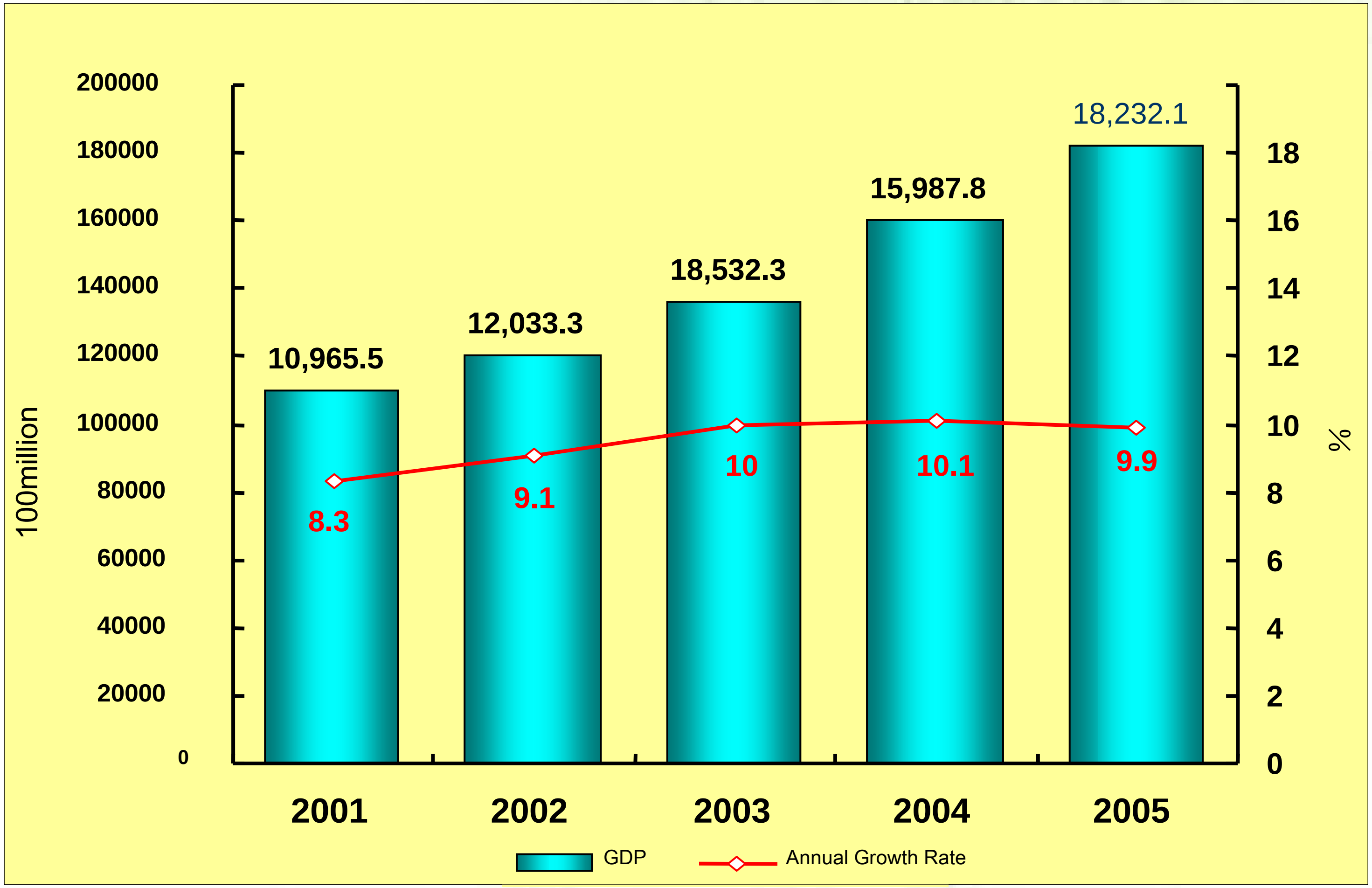
Crude Steel growth rate in the last five years



I.2 Propelling factors for the development

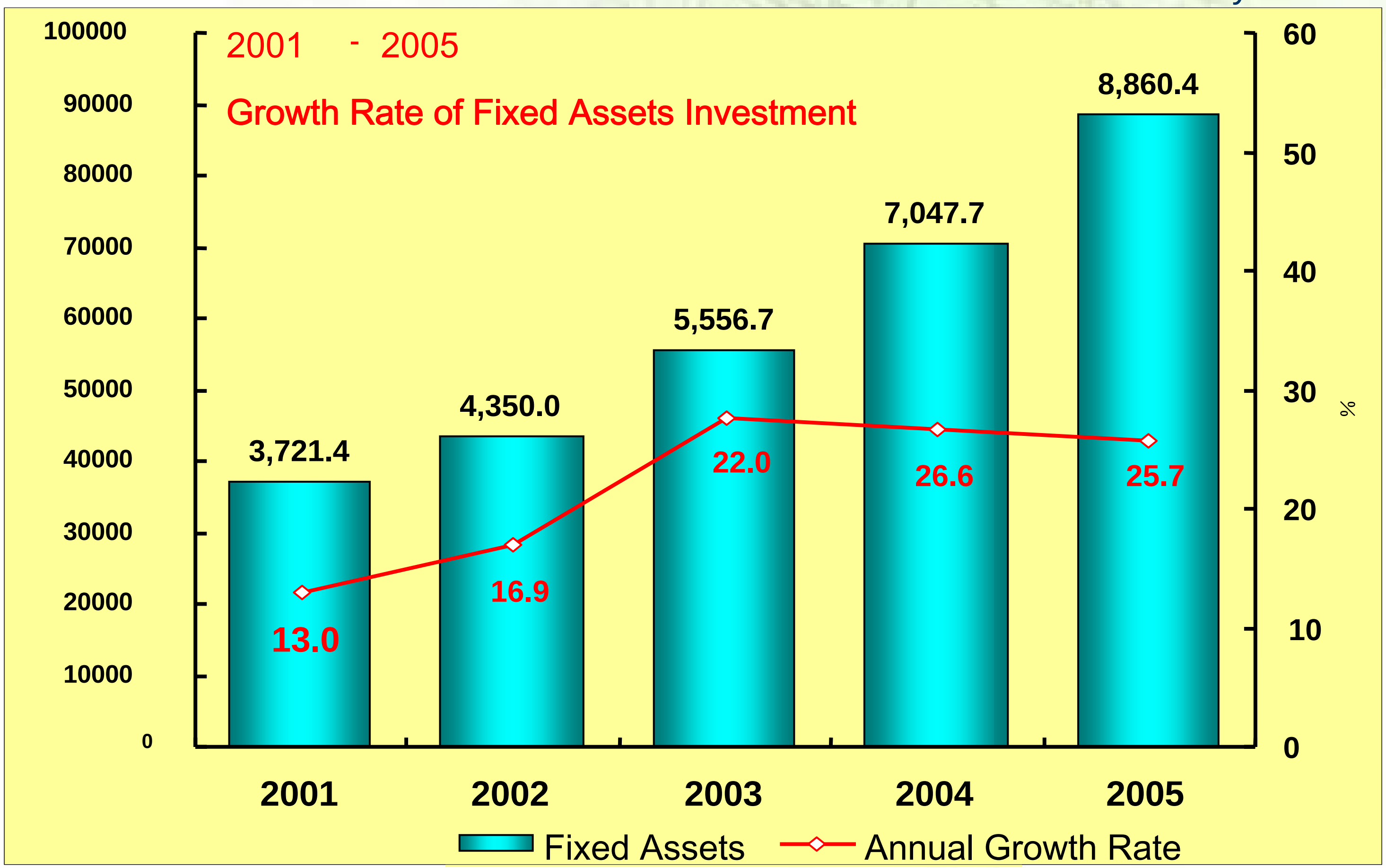
I.2.1 high GDP growth rate

Unit: billion yuan



I.2.2 Strong Fixed Asset investment in last five years

Unit: billion yuan



Investment

I.2.3 Fixed Asset investment in urban areas

		2001	2002	2003	2004	2005
volume of investment	B. Yuan	3000.12	3548.8	4581.17	5902.819	7509.65
Growth Rate in name	%		16.9	26.7	27.6	27.2
Price Index of FAI		100.4	100.2	102.2	105.6	101.6
Growth Rate in Reality	%		16.7	24	20.8	23.7

I.2.4 Newly added Capacity increased via FAI

	Unit	2001-2005
Power Generation	Mega W	176.55
Power transformers over 110.000VA	Mega VA	406.66
Railway	KM	7,063
Multi-Track Railway	KM	3,556
Electrical Railway in Operation	KM	5,494
Highway	KM	351,173
in which express Highway	KM	23,965
Handling Capacity of Ports over 10,000t	Million tons	452.32
Switch board	million lines	232.4
Optical fiber Cable Length	Million KM	214
Digital Mobile Phone Switch Board	Million Users	351.48

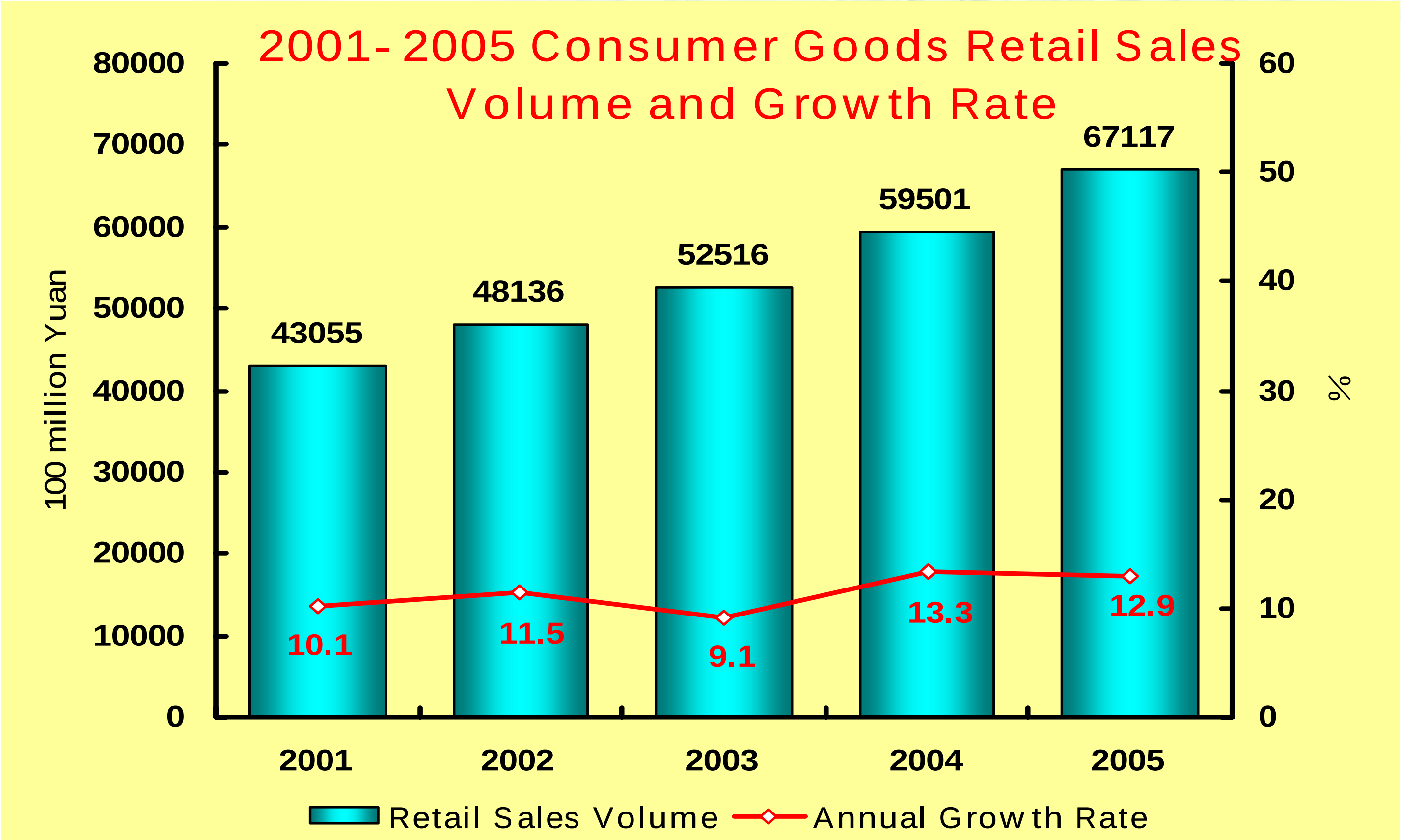
I.2.5 Growth of energy production volume

Item	Unit	2000	2005	Increment	Gowth Rate %
Energy Production Value	Million ton Standard coal	981.38	1786.35	80.497	82.02
Raw coal	Million ton	869.41	2190.00	1320.59	151.89
Crude oil	Million ton	162.81	181.00	18.19	11.17
Natural gas	Billion M^3	27.21	50.00	22.789	83.75
Power	Billion Megawatt	1.320	2.4747	2.1538	87.34

I.2.6 Growth of Major Industrial Products

Item	Unit	2000	2005	Increment	Growth Rate%
10 Nonferrous Metals	m. t	7.84	16.35	8.51	108.5
cement	m.t	597.14	106.00	426.86	77.51
Vehicle	m	2.07	5.70	3.63	175.36
in which cars	m	0.60	2.77	2.17	361.66
Air conditioner	m	18.26	67.65	49.39	270.48
P computer	m	6.72	80.84	74.12	1102.97
Steel products	m.t	131.46	396.92	265.46	201.93

I.2.7 Retail Sales of Consumer Goods Increases



I.2.8 Real Estate Investment

Investment in real estate development in 2005 increased by 1077.5 billion Yuan or 216.2% comparing with that in 2000.

	Unit	2001	2002	2003	2004	2005
Real estate Investment	billion Y	624.6	779.1	1010.6	1315.8	1575.9
Annual Growth Rate	%	25.3	29.7	30.2	28.1	19.8
On Going Construction	B.m^2	1.787	2.156	2.593	2.919	
Completed Construction	B.m^2	0.837	1.102	1.228	1.281	

I.2.9 Export Value and the proportion of Mechanical and electric equipment

	Unit	2001	2002	2003	2004	2005
Export Value	billion USD	266.1	325.6	438.2	593.3	762
mechanical & electrical equipment ratio		44.6	48.2	51.9	54.5	55.99

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II. Changes of China’s Steel Industry in the last five years

II.1 Steel mill further expanded their production capacity

Steel Mill over ten million tons in 2000 and 2005

2000

Baosteel

2005

Baosteel

Anben Steel

Tanshan Steel

WISCO

Shougang

ShaSteel

Jinan Steel

Laiwu Steel

31% of the country’s total

111.919

Million tons

Steel mills over five million tons up to 10 million tons

2000

Anshan Steel

Shougang Corp.

WISCO

2005

Magang

Valin Group

Baotou Steel

Handan Steel

Panzhihua Steel

Taiyuan Steel

Anyang Steel

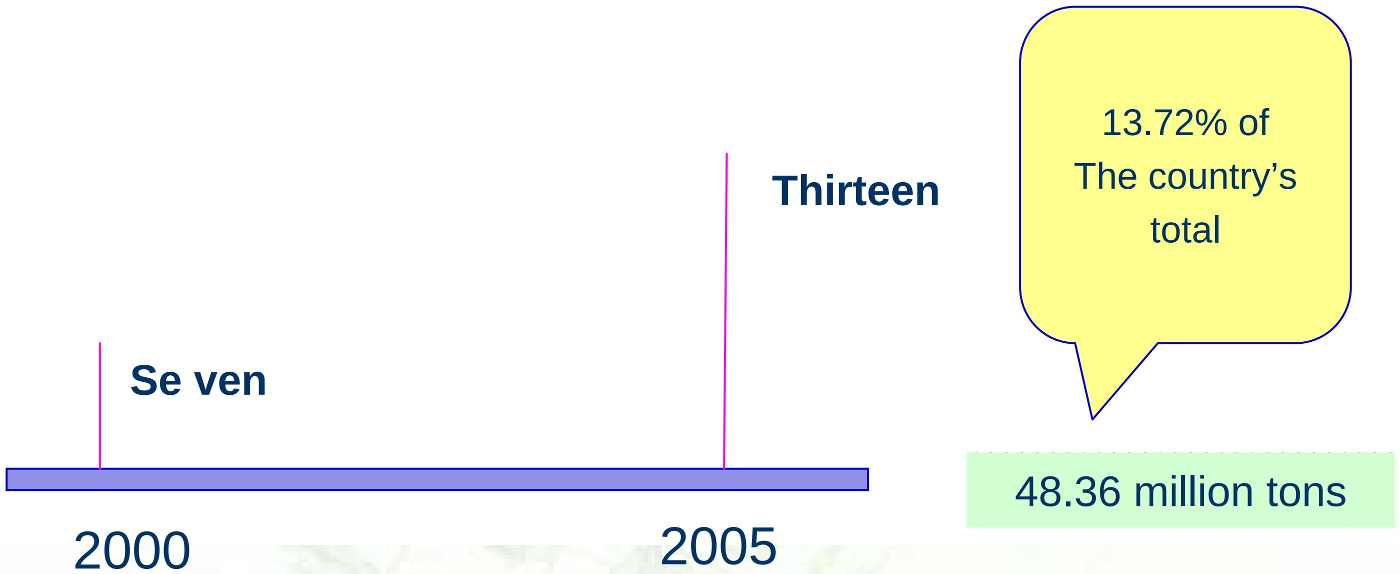
Jiuquan Steel

Jianlong Steel

17.17%%

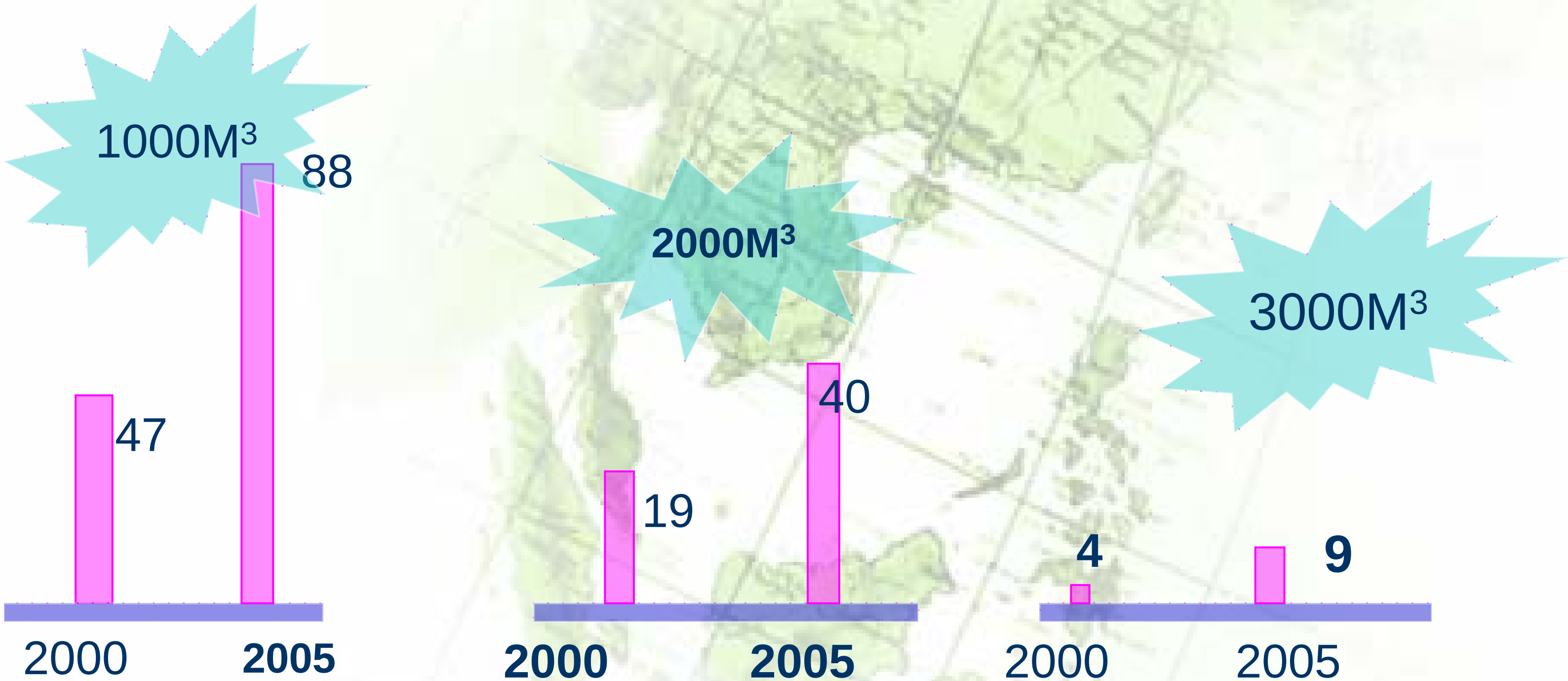
60.51 million tons

Steel mills from 3 to 5 million tons in 2000 and 2005



II.2 Progress achieved in plant equipment modernization

II.2.1 No. of Blast furnaces changes



II.2.2 Converters changes

	Over 100t	Over 250
2000	30	7
2005	80	10

II.2.3 Some rolling facilities changes

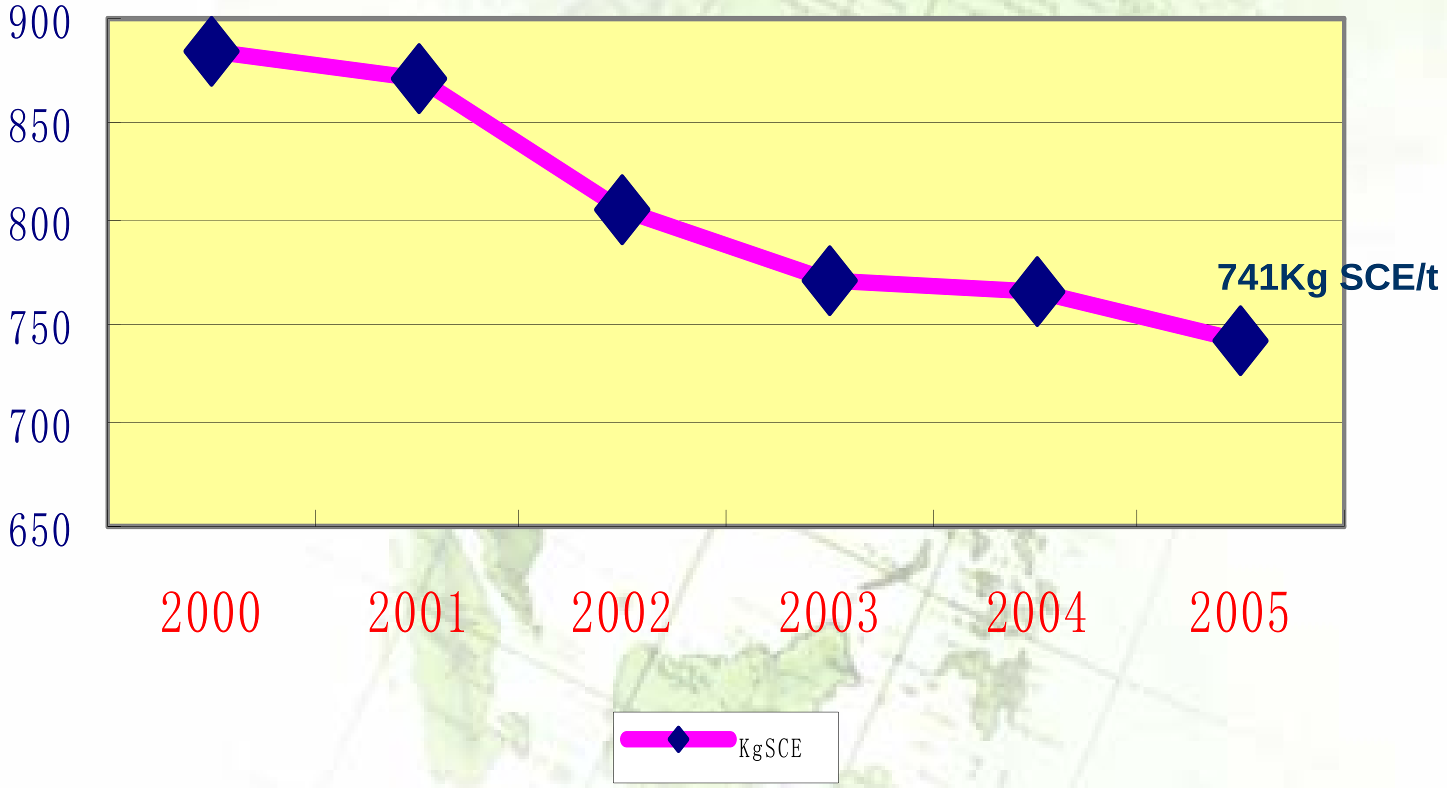
	High speed wire mills	Hot strip mills	Cold strip mills	Plate mills
2000	35	9	7	26
2005	63	24	31	35

- 5 meter super wide and heavy plate mill
- 2250 hot strip mill, 2130 cold strip mill
- stainless steel cold strip mill
- 340 large diameter seamless pipe line
- heavy rail universal rolling mill
- 900mm large H-beam mill
- BHW welded pipe mill
- UOE large diameter welded pipe mill
- special alloy steel metallurgy equipment
- and high precision continuous rolling bar mills

II.3 Great efforts were made in Improving Product Mix

- **Flats: increased from 34% to 38%**
- **Import of high value-added products reduced such as pipes, galvanized sheet, color coated sheet**
- **The ratio of other products such silicon steel ,stainless steel, alloy steel , automobile steel have all increased by big margin**

II.4 New progress was made in energy and resource saving and environmental protection



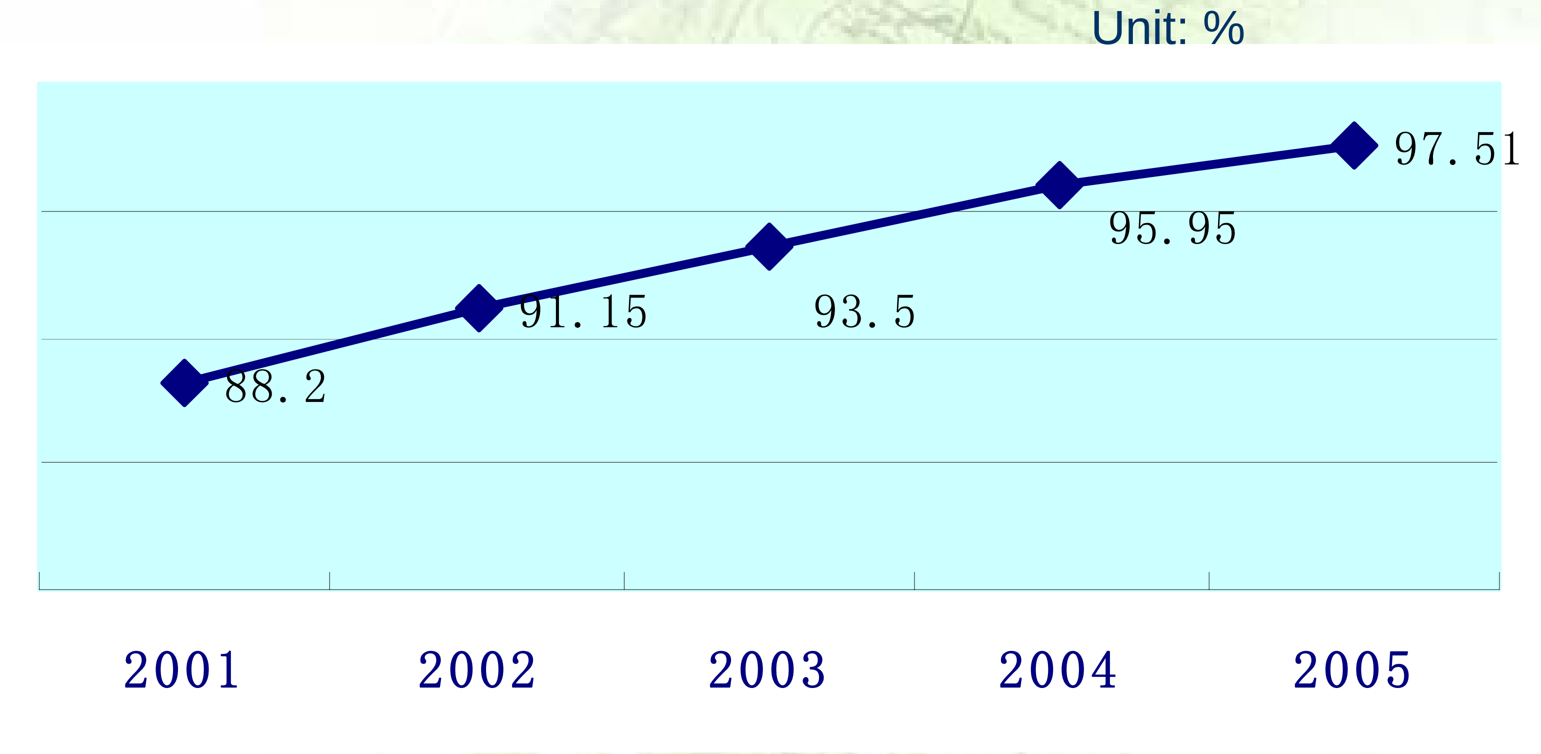
Comparison between 2000 and 2004

- Water consumption reduced: 24t/t to 8t/t, down by 68%
- Used water recycling rate: 87% tp 92%
- Treated water rate” 98% to 99%

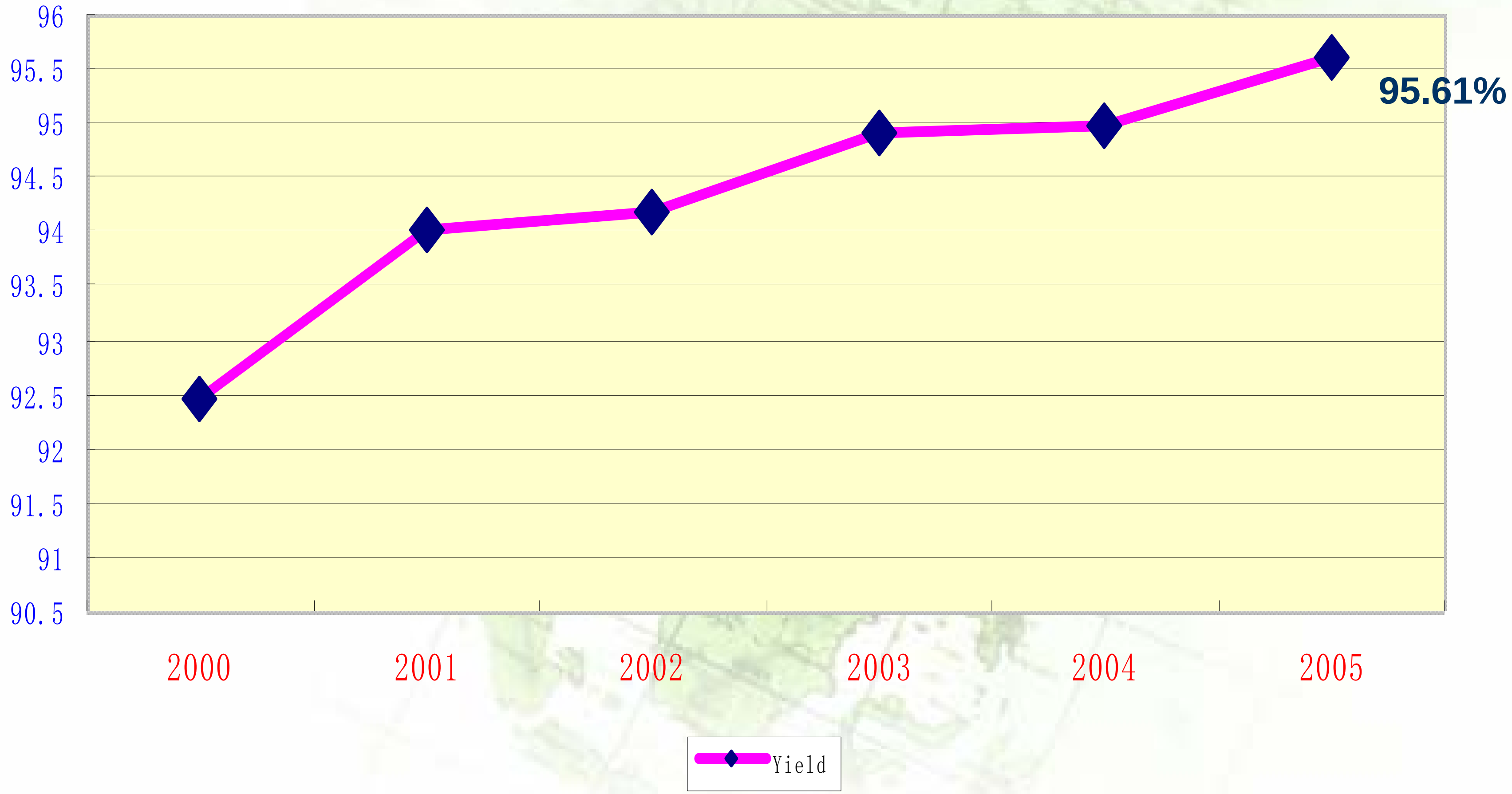
Comparison between 2000 and 2004

- Exhaust water per ton of steel was down by 14.3%
- Emission of SO_2 per ton of steel was down by 2.99Kg or 49.1%
- Treated gas emission rate increased from 97.33% to 98.9%

Continuous casting Ratio since 2001



Comprehensive yield increase since 2000



II.5 Breakthrough in science and technology advancement

- The Super Fine Grain Hardening and Control Technology for Low Carbon Ferritic/Pearlitic Steel
- High Grade Automobile Sheet
- The technology for continuous production of Vanadium-Nitrogen Alloy under normal pressure
- Blast furnace smelting technology for high Va-Ti Magnetic Iron Ore
- New concentrating technology for low grade Hematite, producing high quality iron ore concentrate with iron content over 68% and $SiO_2 < 4\%$.
- $400m^2$ and larger sintering machine, $4000m^3$ and larger blast furnaces, 260 ton and bigger converters, 1780mm hot strip rolling mill and cold strip mil

II.6 diversification of investors in the steel industry

- 31 steel enterprises were listed with a total steel production of 163.94 million ton, accounting for 46.52% .
- Non-state-owned steel enterprises produced about 127 million tons of steel in total, accounting for about 36%.
- 228.15 billion Yuan fixed asset investment, up by 27.5% over the previous year， nearly 40% were made by private entities.

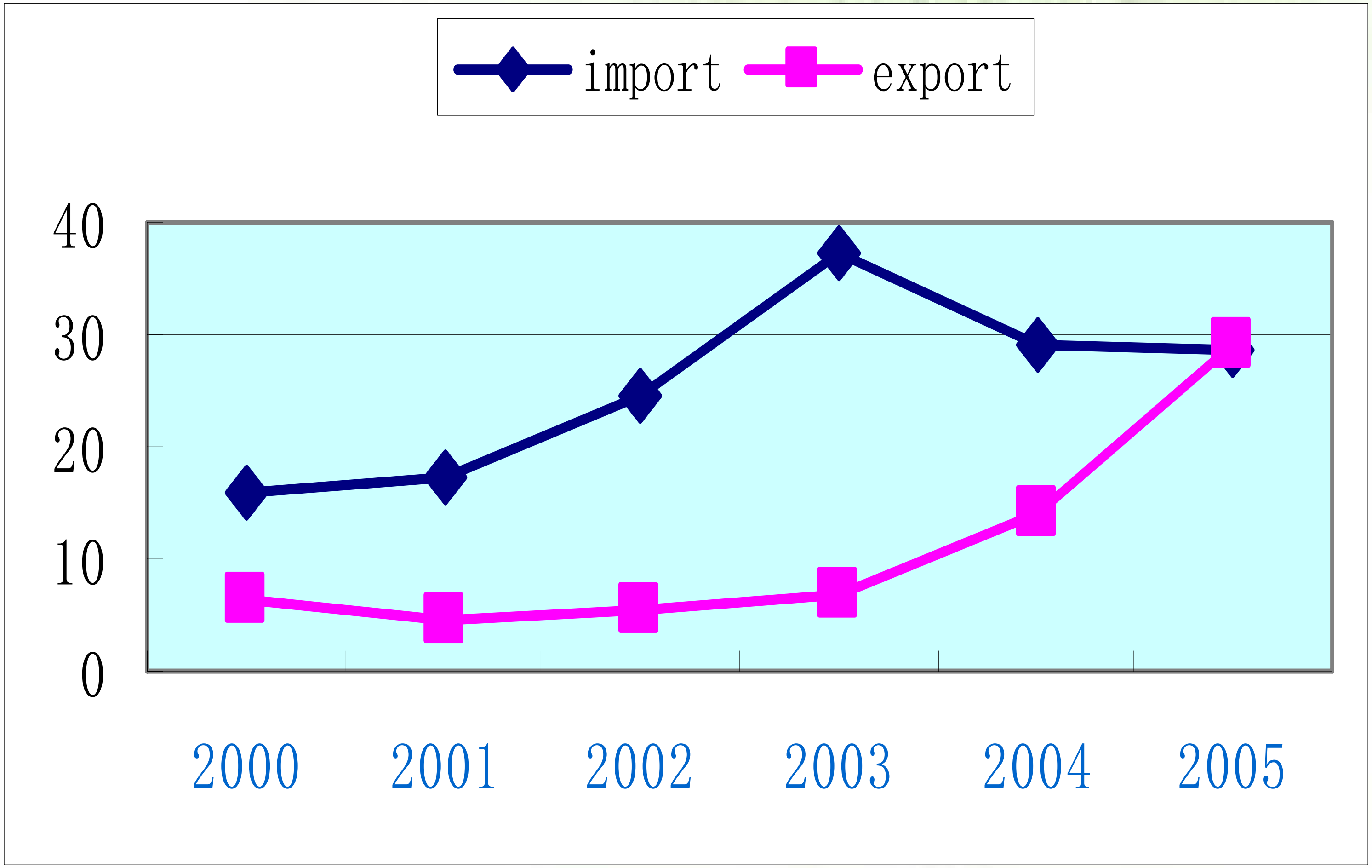
II.7 Enterprises concentration

- Formation of Northeast Special Steel Group by the three special steel enterprises (Dalian, Fushun and Beiman)
- WISCO,Er’cheng and Liuzhou Steel
- Anshan and Benxi Steel
- Tangshan Steel ,Xuanhua , Chengde Steel ,
- Shougang Corp., Shuicheng Steel
- Shougang Jingtang Iron and Steel Company
- New Fushun Steel by Tangshan Jianlon
- Hunan Valin and Mittal Group
- CITIC Pacific take over Daye Special Steel and Shijiazhuang Steel

II.8 Economic performance

- Contribution to the growth of national economy rose from 6.18% to 14%
- Gross profit rate went up from 3.34% to 7.03%

II.9 For the first time, China became a net exporter



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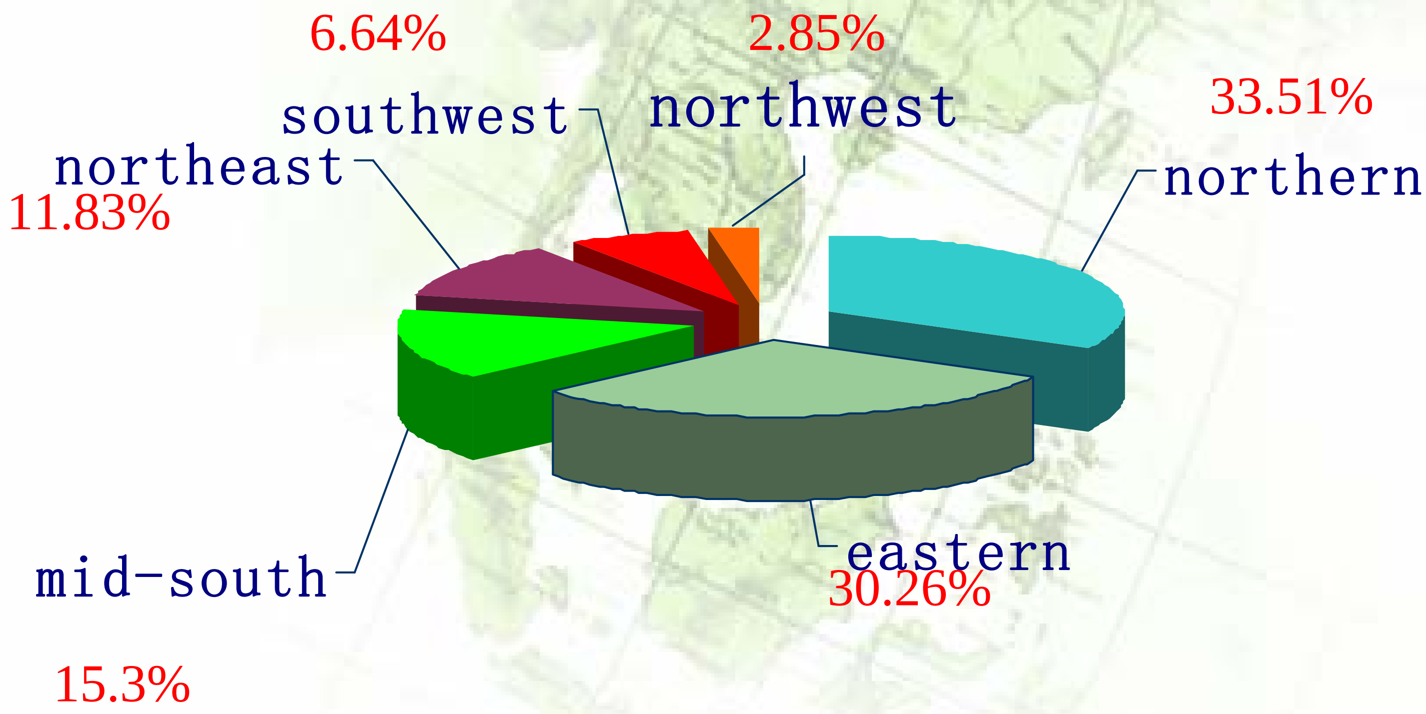
III.1 Market demand was underestimated

- 150-160 million tons of steel were planned for the year of 2005
- Key steel maker’s development was affected
- Large amount of small ones emerged

III. 2 Irrational production capacity layout



Steel Capacity mainly in North and east

III. 3 Disadvantages of capacity layout

- Small and widespread basing on scattered mines;
- Cities based : 18 LME in provincial cities, 34 in 1 ml population cities
- 60% of capacities in areas short of water
- Pressure of environmental protection.

III.4 Low concentration rate of the industry

- 4,992 metallurgical mills , small and scattered;
- 18 Steel Producers over 5ml tons, accounting for 49% of the national capacity

The first four steel works' production

- China 18.52% USA 61.29%
- Japan 75.17% Russia 66.89%
- EU (15) 72.59% Korea 79.55% (2 works)

III.5 product mix need to be improved

- 100% self-sufficiency products:

Large sections， bars, reinforcing bars, wire, heavy plate, heavy & medium plate, narrow strip, seamless pipes, welded pipes;

- Close to self-sufficient products:

Rails, hot rolling coils;

- Low degree of self-sufficient products:

Cold rolling sheet, color-coated sheet, electric steel.

III.6 Enterprises are still week at independent innovation

- Scientific research is not well matching with industry development
- Advanced equipment and technology still need to be imported in large volume (over 21 billian USD were used for import equipment and technology in the last five years)
- The total number of persons engaged in different kinds of scientific and technical activities are small, accounting for only 6.3% of the labor force
- Funds allocated are not sufficient . In 2004, total funds used by LME was only 19.99 billion RMB, accounting for 1.99% of the sales income.

III.7 High proportion outdated capacity

Equipment & technology in most of the existing small steel plants are backward, high energy consuming and polluting :

- 300 M^3 BF capacity: 98.8 ml tons
- 20 tons or below Converters capacity: 34.13 ml tons
- 20 tons or below EAF capacity: 20.95 ml tons

III.8 Extensive production

- Comprehensive energy consumption per ton steel in China is 15-20% higher as compared to the world advanced level
- 299 ml tons of standard coal (including mining, ferroalloy and refractory material), was consumed, 16% of the national industrial energy consumption
- Only about 30% of the of thermal energy during the production process is effectively utilized
- Only 53% of solid waste has been recovered
  .
- Waste water and gas consist of 14% of the total industrial Waste
- Solid waste consists of 16% of the total industrial waste

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IV.1 Opportunities:

IV.1.1 in pace with Industrialization, steel demand will keep increasing for long time

Steel demands continue to increase in the process of industrialization

Steel demands will become stable and slow down when Per capita GDP reaches 3,500– 4,000USD and Third Industry goes up to 60%

IV.1.2. More variety and higher quality products are needed to meet the demands of different industrial sectors

Automobile

Household appliances

Ship building

Chemical Industry

Petrol and Oil industry

Railway

Other manufacturing industries

IV.2.3 Various- level products to meet social demands

- Unbalanced development: urban and rural areas, eastern and western regions

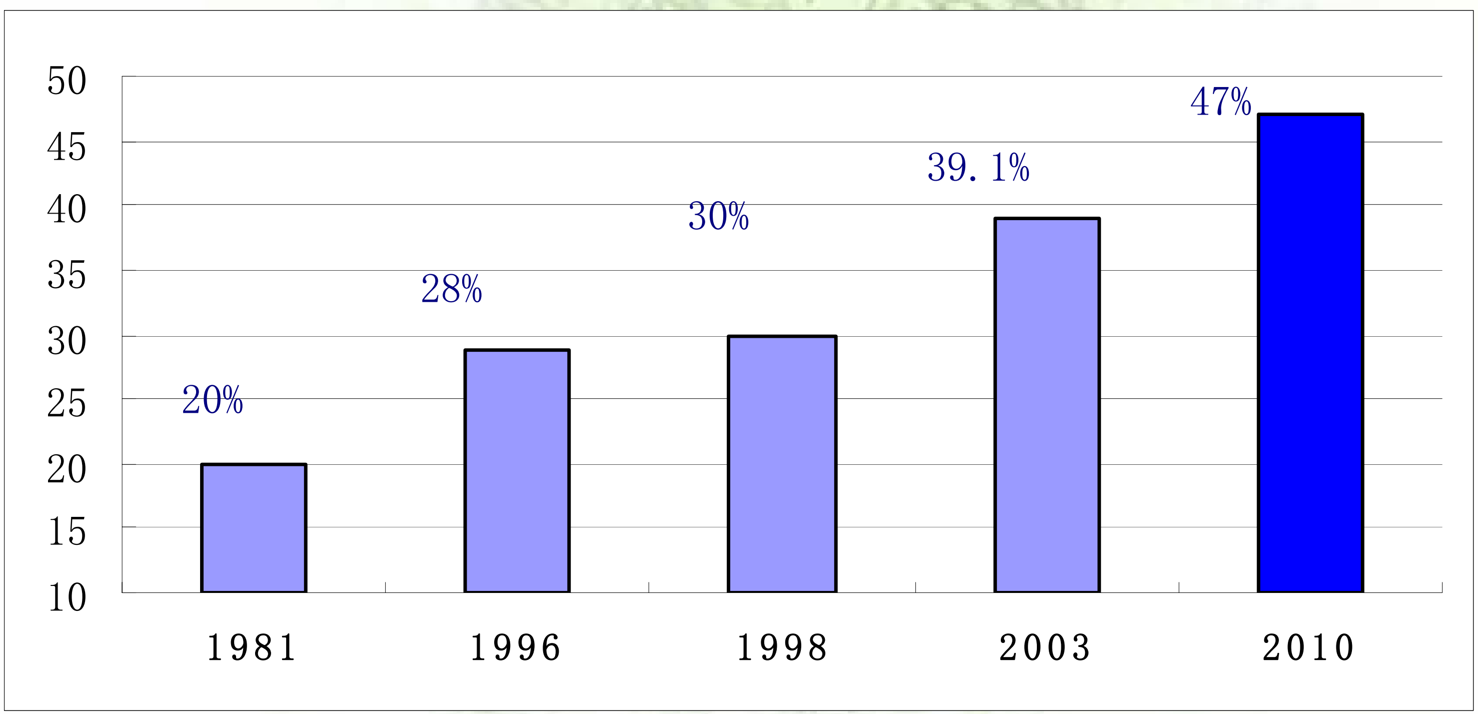
- High quality: Cars and Electrical appliances in Urban area require high technology-steel products, including CR sheets, color-coated sheets, electrical steel, stainless steel

- Common quality: Residential Building require common products, such as wire rods and reinforcing bar. These products will still account for relatively large proportion of the social consumption.

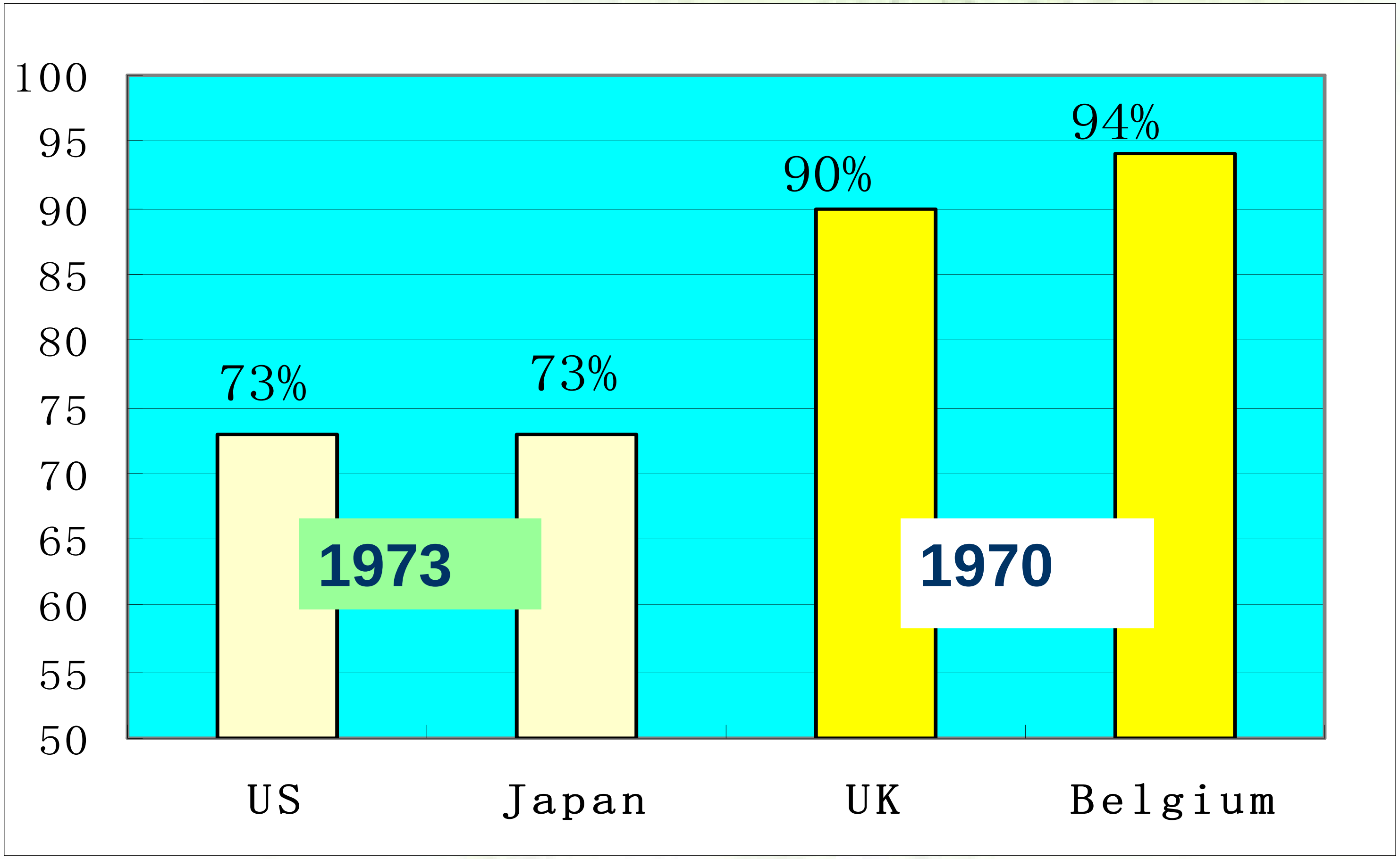
IV.1.4 Urbanization rate will increase

560 million urban residents in 2005

640 million urban residents in 2010



Urbanization of Some Developed countries



IV.2 Challenges

IV.2.1. Constraints for the development

- 52% hot metal depend on imported iron ore
- Insufficient railroad transportation
- Short of electricity

IV.2.2 Stronger competition

Largest steel market draws the attention of global steel Competitors

China still is one of the largest steel importers in the world

Not only the price, but also quality, variety and service

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V.1 More efforts devoted to Technological and Scientific Progress

V.1.1 R&D institutions are to be set up in major steel works

V.1.2 Investment will be increased for research work

to upgrade technology

to improve the innovative capabilities and

to develop technology, equipment and product with their own intellectual property rights

V.1.3 The technology to be applied:

TRT,CDQ, BF and BOF coal gas recycling

Power generation with coal gas and steam

BF redundant pressure power generation

Smoke, dust and slag recycling

The Producers over 5 million tons are required :

to be self-sufficient in power supply

to supply the surplus power to others

V.1.4 Technical Threshold will be stricter

For Green-field construction projects:

Sintering machine: 180 square meters

Coking oven: 6 meters high

BF: 1000 cubic meters

BOF: 120 tons

EAF: 70 tons.

V.1.5 Constructions of steel mill in coastal areas should have:

- Annual capacity: 8 ml tons of crude steel
- BF : 3000 cubic meters,
- BOF: 200 tons

V.1.6 Requirements for Integrated steel enterprise construction:

Comprehensive energy consumption:

- 0.7 tons of standard coal equivalent via BF process,
- 0.4 tons of standard coal equivalent via EAF process
- fresh water: 6 tons via BF process , 3 tons via EAF process
- utilization ratio of water recycling shall be more than 95%

V.1.7 Goal for Reduction of energy and water consumption per ton of steel up to 2020

	2005	2010	2020
Comprehensive energy cons. (standard coal)	0.76 t	0.73 t	0.7 t
Comparable energy cons. (standard coal)	0.71 t	0.68 t	0.64 t
fresh water cons. (newly added)	12 t	8 t	6 t

V.2. **Layout adjustment**

V.2.1 Capacity will be decreased or relocated in :

big cities and famous scenic spots

Areas with severe water shortages

Considering factors such as:

mineral resources, energy, water resources

transportation, environment capacity,

market distribution and use of overseas resources

V.2.2 Alliances are to be formed

Goals:

- Several groups formed with more than 10 million tons
- Two Groups formed with annual capacity each of 30 million tons
- By 2010, the number of steel producers will be reduced considerably, and the Top 10 's output should reach more than 50% of the national total   and by 2020 reaching 70%

- **Conclusion:**

  China ‘s steel industry has made great progress in the past, and the record breaking of 300 million tons of production is not the end, future development will focus on quality rather than quantitative expansion

  The market changes dramatically, and competition will be more severe,. Steel Mills will face a new round of stronger competition for survival

  Challenges and opportunities co-exist in China’s steel industry, only those who are good at adapting to the new situation and seizing the opportunities will become stronger

  China has worked out a practical policy for steel development, the day when this policy’s goal is fulfilled, is the day when China’s steel industry can be regarded as a strong industry.

Thank you !