

STRATEGIC RESEARCH TO ACCELERATE THE FAST DEVELOPMENT OF GLAUBER'S SALT INDUSTRY IN CHINA

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INTRODUCTION

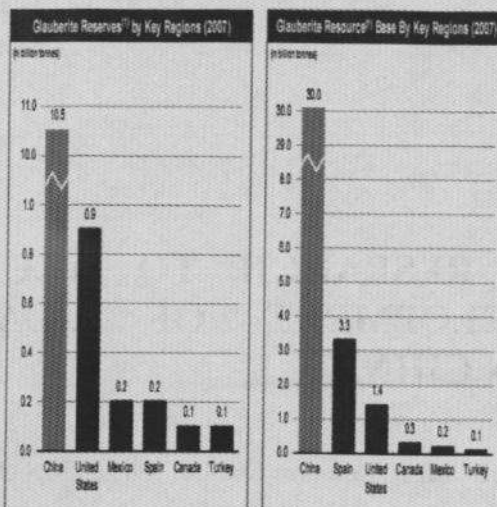
If coal is compared to subterranean "tungsten alloys", Glauber's salt should be called hypogeal platinum, because the value of utilization and economy brought by exploitation of glauber's salt mine is as plentiful as which brought by coal mine. Glauber's salt industry is an important basal chemical industry and a crucial industrial department of national economy. It supplies raw material and complete consumable for industry, agriculture, transportation, national defense and people's daily life. Through the half-century development, Chinese glauber's salt industry changed a lot. It has had a industrial system with the generative scale and made china the toppest exporter of glauber's salt trade. With the advancement of human society and the improvement of living standard, glauber's salt industry must will become a more and more important part in the construction of national economy.

So far, 171 kinds of mine have been

explored in China, 158 kinds among them have been ascertained on their reserve and only about 10 of them ranges the top of the whole world. According to the disclosure of Dolber appraisal company, worldwide glauber's salt reserve is estimated as about 35.3 billion tons, and Chinese reserve is 30 million tons which assay more than 90 percent sodium sulphate of the total reserve and have 1.776 billion RMB's potential value. The white book "Policy of Chinese Mineral Resources " published by Chinese state council in December 2003 specified glauber's salt mine as the mineral resources which china has obvious advantage and describe it as treasure of our country.

Chinese glauber's salt industry can be divided into three main areas: west(SiChuan,Yun Nan, Gan Su, Xin Jiang...), middle and downstream section of the Yantze river(HuBei, Hu Nan,Jiang Xi , Jiang Su...) and drainage basin of Yellow river(Lei Meng, Shaan Xi, Shan Xi , He Nan ...). These three areas have their own

- Global glauberite resources are estimated to be approximately 35.3 billion tonnes, sufficient to meet demand well into the future
- China has the largest glauberite reserves and resource base in the world



Source: Statistics China (2008)
Note: (1) As presently defined in the industry, not subject to internationally accepted protocols

Peculiarity, however, compared integrately, the first area is more outstanding, than the second one. 70 percent glauber's salt mineral resources is stored in the west area, especially Si Chuan province where the resources of calcium glauber's salt mineral is abundant (the reserve is 45.66 percent of it in the whole country), the quality is excellent (30~50 percent of the mineral is Na_2SO_4), the quantity is steady, the geology is simple, and the mine possibility is high. Si Chuan, which produces and exports 50 percent glauber's salt of the whole county, has become the biggest province producing and exporting Glauber's salt.

This article studies how to use unique fruitful glauber's salt resources; how to speed up the development of glauber's salt industry by adjusting industrial structure; integrating the distribution of productivity, and strengthening vocational regulation and control; how to make Chinese glauber's salt industry a monopolist in the worldwide market, and finally become a power in the field of glauber's salt industry.

1. History and status quo of Chinese glauber's salt industry and it's main problem existing.

1.1. Fifty-year development and the status quo of Chinese glauber's salt industry.

1.1.1. The technical expertise is close to advanced world standard

Although China has a long history of glauber's salt making, the real commercial process started from 1950s last century, so the industrial history is about 50 years. It developed slowly in the last 30 years, but its producing technology quickly promoted during the following 20 years. In the early time, glauber's salt making was completed by using sun-lured or pan-boil out which lead to low producing efficiency and poor quality. China brought in two techniques at the end of 1970s that are vacuum evaporation by natural circulation and vacuum evaporation by standard pot which has simple structure, high-energy consumption and low productivity. In 1985, SiChuan MeiShan Glauber's salt Factory succeeded in using a new glauber's salt-making technique which called force circulation evaporation by external heating. Its superiority and efficient are so outstanding that its average evaporation intensity can be more than $30.62\text{kg/m}^2\text{h}$, evaporation heat economy is greater than 3.4, energy saving rate is high and productivity multiplied. With the continuous promotion of the vacuum glauber's salt making technology, Chinese glauber's salt making and production has made considerable progress. On the basis of bringing in foreign advanced technology of salt industry, China developed the new process of the five stages for the circulation of vacuum evaporation glauber's salt making

with axial feed which has been utilized early, and the standard pot device is being weeding out. In the recent years, the scale of the new vacuum glauber's salt industries are more than 0.2 million tons in average, and a DCS terminal adaptive control system started to be used in the production run which makes the production automatic gradually. During the producing process people put more emphasizes on the improvement of productive efficiency, the cost reduction, the economy of scale, and also the protection and the treatment to the environment. In domestic glauber's salt field, the running technical-economic index of pioneer enterprises has caught up with advanced world standard, which symbolized our country's technical expertise has ridden into the advanced world standard.

1.1.2. the scale of the production is all the way up.

Chinese gross production of Glauber's salt doubled up every ten years. It was 1.18 million tons in 1985, 2.2 million tons in 1995 and 5.5 million tons in 2004. Furthermore, it grows faster these years and had reached 8.7 million tons in 2007. Foreign gross production which are 5.36 millions in 1995, 5.4 millions in 2004, and still are a few more than 5million tons. Their producing scale lingered for over ten years. So far, Chinese gross production has surpassed the sum of it overseas.

Following distribution list is the capacity of the main producing provinces and regions:

The productivity of sodium sulphate in the main provinces and regions

Producing provinces and regions	Total capacity (thousand tons)
Si Chuan	4500
Xin jiang, Nei Meng, Gan Su, Qing Hai	650
Yun Nan	1800
Jiang Xi	60
Shan Xi	300
Hu Nan	800
Jiang Su	1700
He Nan	1500

The above total capacity include 0.2 million tons' by-productivity of nation-wide producing areas.

1.1.2.2. The capacity of single device is at the top of the world.

The capacity of single device promoted quickly. It increased from the beginning 10 thousand tons, 50 thousand tons, 100 thousand tons to nowaday 600 thousand tons, 1000 thousand tons every year. And it is the NO.1 in the world.

1.1.2.3. Expansion of producing area.

The producing area is also expanded drastically. In 1980s last century, most producing areas are in Si Chuan, Shan Xi, Nei Meng, Xin Jiang, Hu Bei and Yun Nan province. In recent years, with high-line and big scale, it developes fast in Jiang Su, Hu Nan. Guang Xi province and shows strong mometum growth.

1.1.3. The market developes vertically, takes on diversification and intensify the competition.

With the fast development of chinese economy, the glauber's salt market developed from simplification to diversification, and expanded from light industry towards chemical, medical, textile, building material, metallurgical, energy storage industry and some other frontiers.

1.1.3.1. The market of basic raw chemical material advanced.

With the rapid growth of national economy, the volume of Glauber's salt used to produce Na_2S , Na_2SiO_3 , K_2SO_4 , BaSO_4 and some other basic chemical product appreciates substantially.

1.1.3.2. The volume used by wash trade increased swiftly.

More than 40 percent of the total product is used to produce synthetic detergents. With the improvement of people's living standard, washing goods developed drastically from 1980s last century and has become the major driver stimulating the development of Glauber's salt industry. According to the statistics of State Statistics Bureau, Chinese output of synthetic detergents was about 4.23 million tons in 2004, and it consumed about 1.5 million tons of Glauber's salt.

1.1.3.3. The glauber's salt market takes on diversification.

Product segmentation is a representation of a mature industrial market. In 1960s and

1970s last century, glauber's salt was mainly used in the field of soap making and leather finishing which only required single quality of product. In the late 1980s, Chinese GDP velocity of increase is always more than 8 percent every year. According to a theoretical research that the improvement of people's living standard is proportional to economic growth, social consume ideas are changed a lot and quality of consumption grows fast. The quality requirements of market needs towards glauber's salt showed diversification after 1990s. Different brands of washing powder demands different quality standard of sodium sulphate. The market of special glauber's salt expands gradually with the launch of neutral glauber's salt and low-chlorine glauber's salt.

1.1.3.4. Export volume is higher than import volume in rate of increase.

In 1985, China exports 99 thousand tons of Glauber's salt which is 8.3 percent of domestic gross output. Ten years later, the export volume increase to 5.35 thousand tons which is 24.3 percent of the total. Finally in 2004, it had increased to 1.5 million tons and took up 27.2 percent of the gross production. The export volume increased four times in previous ten years and grew two times in the latter ten years. So we can see export volume is higher than import volume in rate of increase.

The places of export is also expanded from neighboring countries to South Asia, West Asia, the middle East, Africa, Europe and USA. Having 74 export countries or areas, China becomes the biggest export of glauber's salt in the world.

1.1.3.5. The market competition is unprecedented fierce.

Because domestic market needs increase quickly, the volume of Glauber's salt used in trades of paper making, glass, chemical industry, metallurgy, leather and wash shoots up and nearly doubles. It leads to a investment fever in Chinese glauber's salt industry recent ten years. The rising of the new districts and the expansion of the output intensifies the domestic and foreign competition. Nowadays, Chinese contradiction between production and sales is not reasonable and controllable. In some areas, the price is relative low and there are

big discrepancies among different areas. In the meanwhile, export market is active than ever before, which lead to a keen competition among export manufacturers. Anyhow, aggregate market is prospective, but the market competition is unprecedentedly fierce and the competition cost takes a large proportion.

1.2. Main questions of our county's glauber's salt industry

1.2.1. As for glauber's salt industry, China is a big country in the world, however, it is not powerful enough.

China is a big country in the worldwide glauber's salt industry but not a powerful one. Its yearly 15 million tons' exports, which are sold 60 dollar a ton, only take totally 90 million dollar in the foreign market. However, Spain, whose yearly exports are 710 thousand tons, mainly traditional market goods, Italy, some other European countries and American states sale by 150 dollars as the max price and 100 dollar as the average price which are higher than the other exporters. Their total sales are 71 million dollars, and their mass of profit is much higher than us. In China, there are so many export manufacturers that domestic competitive costs and even the competitive costs of various districts remain at a high level which cause the declination of sale value and thin profits of export sales. As a result, our country's average price is much lower than overseas (90 dollar a ton). Spain is the fifth big country producing glauber's salt but the second one in exportation, because its glauber's salt are mostly made by two huge factory Suerkuisa and Keruimidesa(both in Madrid) which have advanced equipment, high productivity, high level of technology and outstanding industrial vantage. So in the world trade of Glauber's salt, its domestic competitive cost is extremely low, competitive capacity is considerably strong, export price is high and export volume is vast. Spain, which is difficult to compete with, is a power in this field.

On one hand, the above phenomenon reflects the present situation that we didn't exploit the foreign and domestic market strongly enough, which means we only attach

importance to the existing market but lack the research and development of potential market; on the other hand, it reflects that our country's glauber's salt industry has completely swamped in the disorder and chaos of the cost competition.

We should learn the Spanish experience on the Glauber's salt industry and make a macro-adjustment.

1.2.2. Slight left of the total co-exists with structural shortage.

In last ten years, the production grows so quickly that its velocity of increase and rate of increase is one and only in our country's resources industry. It increased from 2.2 million tons a year in 1995 to 5.5 million tons a year in 2004. The rate of increase is 150 percent. At the same time the volume of consumer market is growing, but both the velocity of increase and rate of increase are slower than the accession of production. In 1995, the volume of sales is 2 million tons including 535 thousand tons of overseas market and 1.47 million tons of domestic market. In 2004, it increased to 5 million tons including 1.5 million tons of overseas market and 3.5 million tons of domestic market. Production is slightly more than sales, according to John Nash's theory of market balance. In a certain industry, the bigger the ratio of fixed costs and changeable costs is, the more possible the overcapacity of the industry is. Our country's fixed cost is about 80 percent of the total cost. It should be paid more attention by the whole industry.

However, our Glauber's salt industry still exist structural shortage. In the total volume of sales, more than 95 percent are normal glauber's salt in which the best of first class is less than 50 percent. The structure of products is unreasonable that the special glauber's salt needed by industry-specific are produced very few and the glauber's salt product meeting the requirement of special physical and chemical norms can't satisfy the needs of market.

1.2.3. The developing speed is over fast, but the systemic technology is in a low level.

In recent ten years, glauber's salt production develops fast, however, except a few advanced enterprises, the systemic technology is far from the advanced world standard. In one aspect, its layout of capacity is in disorder, production and sale are out of joint, production areas are not according to market needs but the location of resources and new projects are scattered everywhere. No matter how the situation of production and sale is, enterprises are keen on building mining factories, without science and rationality, on every place with glauber's salt resources. There is an ill formed layout in the glauber's salt industry that producing enterprises are numerous, the scale is small and the productive concentration is low. In the other aspect, plenty of backward producing devices still exist, the technical level is low, and the average productivity is only equal to one tenth of advanced world standard.

1.2.4. The ability of industrial innovation is weak.

The weak innovative ability of enterprises is the key leading to the inform ability of industrial innovation. Our country's glauber's salt industry doesn't have mature experience and a solid foundation in the innovation of producing technology, product development and management system. And there's no specialized research and design organization, which causes repeated industry construction in low level, unsustainable momentum of technology improvement and feeble industrial development.

1.2.5. The intensity of resources exploitation is too much and over fast, but the recovery is too low.

Natural resources are valuable asset of a country and are one of the potential elements deciding the national strength. It must confirm to scientific and orderly principle to exploit and use resources reasonably. We have advantaged in glauber's salt mine resources. However, in recent years, enterprises eager for quick success and instant benefit. They exploit and use resources unreasonably and disorderedly. Take the case

of enterprises using " chamber water soluble methods " , most enterprises only exploit resources which is thicker than 1.50 m in a mine, and give up all of the thinner resources(0.5m's thickness is mined bed in mineralogy). Their recovery ratio is about 40 percent, which means an enormous waste, but the advance world standard is over 60 percent. Furthermore, the mining intensity is much over strong that it is calculated that own country consumes more than 30 thousand tons resources to produce Glauber's salt every year. Exploiting at this rate, even more quickly, and still in that recovery ratio, our offspring will have no mineral anymore in hundreds of years. Because of the less glauber's salt storage, some foreign countries adopt retention policy. They would rather import Glauber's salt to consume other country's resources. The possession of resources is given by nature, what we can do is using them reasonably and orderly, so we should cherish resources, protect resources and use them scientifically and rationally.

1.2.6. Bad money drives out good.

Nowadays, our country has about 200 producers of which most have backward technology, out of date equipment and high energy consumption and poor quality. For existence, they can but knock the price down to bang the market, which causes the value of crowned product, is not relative to their price. Also, quality companies using advanced technology and equipment can't gain the market advantage. This phenomenon not only badly affects our country's improvement of overall technical level and national competitive advantage, but also is a representation of industry malformation which should be reversed as soon as possible.

2. THE EXTERNAL FACTORS EFFECTING THE DEVELOPMENT OF GLAUBER'S SALT INDUSTRY AND THE RELATIVE ANALYSIS.

2.1. National macroeconomic regulation is the direct acting factor of glauber's salt industry.

Since the reform and opening-up, our country made 4 times converging macro regulation, which are in four time scales: 1979~1981, 1985~1986, 1989~1990, the second half of 1993~1996. The average interval is about four years. According to the statistics of market need, the rate of new capacity and change of prices, we found that the cyclic variation matches each time scale of our national macro regulation. It is by no means fortuitous that any industry of any country is all controlled, stimulated and restrained by national macro regulation.

The macro regulation started from the second half of last year have two obvious characteristics. One is that the regulation attaches importance to preventability and perceptiveness. The other one is to differentiate the industries instead of across-the-board ruling. This policy is not that relevant to glauber's salt industry. So it is estimated that the effect in the downside is slight.

2.2 Pulling effect of the development of related industries on the Glauber's salt industry

Washing, textile, printing and dyeing, glass, paper and chemical industry are developing rapidly, which will greatly promote the development of Glauber's salt industry. The steady growth of the national economy, urbanization, and development of the central and western regions provide a rare opportunity for the development of Glauber's salt industry, and will directly stimulate the development of Glauber's salt industry.

2.3. Accession to WTO opens up a vast space for development of glauber's salt industry.

WTO, which is called " economic UN " , is one of top three global international economic organizations. WTO has same system based on rules. It is WTO's target to open markets , provide a free, non-discriminating, foreseeable, fair playing field of market economy and supplying several rights for member-country exporters. Our country will acquire some privileges like

generalized system of preferences. These privileges will completely bring our country into the main stream of worldwide economy uniformity and globalization, and fully enjoy the benefit of international division of labor. Estimated by foreign experts, after entering into WTO, our country's GDP will increase 2~4 percent. Labor intensive industry and resource development industry will benefit most. Glauber's salt is our competitive resources which should enjoy predominant market resources, and the export of our glauber's salt product also will increase unprecedentedly, because increasing export of relative industries (like textile and building material) will increase glauber's salt used in those industries inevitably. All above will drive glauber's salt industry to develop fast.

2.4. the guidance function of law, statute, industrial policy and standards for glauber's salt industry

The law, statute, industrial policy and standards of nation or local play a great role in healthy developing, regulating market order, exploiting markets steadily, adopting advanced technology and eliminating backward productivity in glauber's salt industry and has important effect on guidance. According to "suggestions to regulate and develop the glauber's salt industry of our province" published by Si Chuan committee for Economic Affairs, Department of Land Resources and Environmental Protection Administration, which bring up a "industrial access standard", put forward strict requirement of productive scale, technique route, state of the art and corporation arrangement. These measures will play a position role.

2.5. The driving force made by international developing statues of glauber's salt industry.

There are more than 30 major foreign countries of origin, like America, Spain, Russia, Canada, Mexico, Japan, Turkey and Chile. The total production capability didn't change a lot from 1995, In foreign glauber's salt industry, the out put of natural Glauber's salt takes 50 percent of the total, and the

byproduct takes the others. Natural Glauber's salt mine resources is scarce. the market needs are mainly in wash (45%), textile, printing and dyeing (18% together), papermaking (13%), glass (10%) and the others (about 14%). The characteristics of foreign glauber's salt industry is very obvious:

a. Productive territory is imbalance. Most Glauber's salt is in European and American territory. It is nearly nothing in Africa, Latin America, Southeast Asian, Central Asia and West Asia.

b. Market distribution is malformed. 80 percent of glauber's salt are sold to European and American market. The other places takes 20 percent, and Africa is in growing rising situation.

c. Corporations are centralized and large-scale. For example, South American chemical Industrial Corporation in American, Spanish Crimidesa Corporation and other two companies are all big glauber's salt-industry corporations controlling 50 percent of capacity and market in their own county.

d. Technology is advanced and automatic level is high. They use fluidized bed to dry.

e. Research and development of new uses is active. Using glauber's salt as the raw material, the research and development in chemical industry, energy, medicine, rubber, paint and some other fields are gradually gain results.

In recent years, however, foreign glauber's salt industry is hesitating and even declining.. It absolutely provides a strategical opportunity to our country. Foreign technology and market situation must will impulse our development and promote our reformation and innovation.

3. THE ANALYSIS AND ANTICIPATION OF OUR COUNTRY'S DEVELOPMENT IN GLAUBER'S SALT INDUSTRY.

3.1. There will be 5~10 years' turbulence, in which period our industries will be collectivized.

According to statistics of 1997 last century, there is up to 186 enterprises in our country, it is over 200 now, which is

small-scale, non-concentrated and low-level-technology. There are only 17 American corporations. Spanish industry is controlled by Crimidesa, Vnet, Suerkuisa and Tolsa. In the 5~10 years from now on, our country's glauher's salt industry will have a turbulent period of differentiating, integrating and reorganizing. Many weak corporations will disappear, be broke or be merge red under the shock of market competition and the reform of state-owned enterprises. Glauber's salt industry will be fully collectivized. Only the strong survive in the fierce competition, so competitors must prove their vitality of strong enterprises. In the unprecedented industrial revolution, strong corporations must will never miss a trick to strengthen themselves, be stronger and bigger. However, weak enterprises will give up market share and room to strong enterprises. Ten years late, there won't be many glauher's salt corporations in China. It is enough about 15.

3.2. With benefit of scale and advanced technology appears, backward productivity will be eliminated.

a. The advanced technology of five stages for outer heating forced circulation vacuum glauher's salt making technology will replace all backward technologies. The devices which has evaporated heat economy ≤ 3.7 can't afford the energy costs.

b. The level of control will upgrade. The DCS (distributed automatic control system) will be used widespread that the observation and controlling points will be added to about 200, which monitor the whole producing process. The technical-economic indexes will be in the level of advanced world standard.

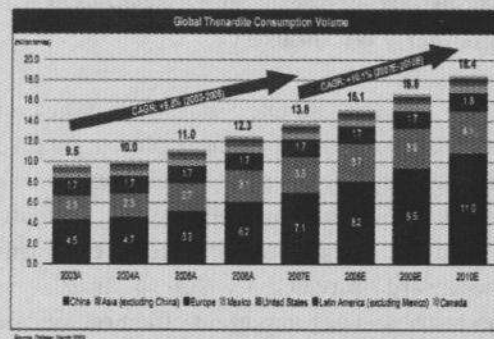
c. The drying section is generally completed by drying bed which is assembled heat exchanger inside and outside, has high-availability of energy, can adjust temperature automatically and has a grid plate with new structure, small resistance and good drying effect.

d. The capacity of single device will increase. The capacity of new devices will be bigger and bigger, and there will be a single device

producing more than 600 thousand tons every year, which will hit historically high level. Devices producing less than 200 thousand tons will not be built again. Inferred by that, ten years later, the number of our country's glauher's salt producing devices will be at most 35. And those hundreds of devices will be stopped or dismantled. Backward productivity will be replaced by advanced productivity and exit historical stage. At that moment, our country's technology will jump into a new level and be competitive to advanced countries in the world.

3.3. The requirements of domestic market and foreign market doubled.

- Therandite demand growth is forecasted to continue to be strong, with projected CAGR of 10.1% from 2007 to 2010
- Emerging markets are expected to be key contributors of growth as these regions become more industrialized:
 - China, Asia (excluding China) and Mexico expected to grow at CAGR of 15.7%, 5.4% and 5.9%, respectively from 2007 to 2010
 - By 2010, it is anticipated that 65.5% of global demand will be from China, Asia (excluding China), Mexico and Latin America



3.3.1. The consumption patterns are steady. The needs of normal glauher's salt increase a lot.

Our country's biggest consumer is wash industry, which used 36.9 percent of total consumption to produce synthetic detergent. The second biggest is printing and dyeing industry taking 13.1 percent and then the sodium sulphide. In recent years, domestic production of synthetic detergent, which has been over 4 million tons in 2004, grows in double-digit, and it is expected to be kept for rather a long time. As a main part of detergent, takes over 44 percent, millions tons of glauher's salt will be consumed in this trade every year with the expansion of detergents market and development of seriation and personalization, it is expected to consume more than 3 million tons of glauher's salt.

According to the tenth five-year plan of glass industry, the domestic production of

sheet glass in 2005 will be up to 180~190 million measuring tanks, which is 27 percent of worldwide gross production. In paper making industry, anhydrous sodium sulphate is mainly used to replenish sulfur to the reclaimed waste. There are 3068 corporations of pulping, paper making and paper products, of which 89 enterprises produce over 100 thousand tons a year, needing thousands tons of Glauber's salt, the fast development of above industries will stabilize and continuously support the market space and strongly fuel the growth of consumption.

3.3.2. Market segmentation. Special glauber's salt develops faster.

Our country's long and short term market will be diversified and segmented father. As a result of market extension, the market has made requests on the diameter of glauber's salt pellet in recent years. The market needs of coarse glauber's salt particle, which 100 eye sifted residue $\geq 60\%$ and 60 eye sifted residue $\geq 60\%$, has been up to 300 thousand tons. The colorful particles gain more favor of solid detergent factories. Differentiation is more obvious in market economy which inflects personality. There are no more than ten glauber's salt varieties in China, however, various glauber's salt will be over a hundred types in a long term, and create a munificent multiplication space of profits.

3.3.3. The quantity used by raw material market of basic chemical products increases drastically.

The volume of Glauber's salt used to product Na_2S , Na_2SO_4 , K_2SO_4 , BaSO_4 and some other chemical products will show a strong rising tendency. K_2SO_4 , which is one of our country's scarce resources, is mainly utilized to produce chemical fertilizer. It is disclosed by "eleventh five-year plan of chemical mineral resources" that China is a big agricultural country and has become the No.1 import state, which imported 6.56 million tons of potash fertilizer in 2003, in the whole world. Therefore, it is promising to product K_2SO_4 , using glauber's salt as raw material, by double decomposition methods. Our country's export of Na_2S is 300~400

thousand tons every year. Because the glauber's salt Na_2S is 3:2, we need 450~600 thousand tons of Glauber's salt. As a basic chemical raw material, glauber's salt consumption will more than a million tons every year with the development of relative chemical industry.

According to the above analysis, Chinese domestic annual demand may exceed 7 million tons. And this is a reliable conclusion.

3.3.4. Exports go up.

In the world, more than half of anhydrous sodium sulphates are by-products which are produced by recovering secondary resources and have a poor quality. International high-quality glauber's salt is relatively in shortage at present. Our country's glauber's salt, of which 95 percent are made of raw glauber's salt mineral and more than 99 percent are anhydrous sodium sulphate, has superior quality and enjoys a high reputation. Due to the constrained resources, the worldwide biggest export countries, like Spain, Mexico and so on, shrink their export these years. So, our glauber's salt industry get a huge multiplication space of international market. It is expected that our country's yearly exports will increase 10~15 percent on average and be more than 3 million tons in 5-10 years later.

3.4. The gross production doubled and an equilibrium phase appears.

According to marketing theory, the use value of commodities which is represented externally by trading volume is the primary element of trade value. The enterprises should work out their plan according to trade value in the market. In terms of above analysis, our country's yearly gross production will surpass 10 million tons in a long-term, and will be kept steadily for a long period which is a equilibrium phase.

3.5. Foreign capital will enter our glauber's salt industry actively.

Because of limited resources, both the

possibility and reality for foreign capital to participate in our resources development will increase. Firstly, the investment from countries of export is what their own market needs. Furthermore, the investment of European and American manufacturing countries with technical advantages is that they need to sustain their foreign market. For example: Singapore Ocean Corporation and HongZe Eunjoo Chemical Group Limited initiate an anhydrous sodium sulphate project which produces 200 thousand tons a year, and it was completed and put into use in May 2003; Jiang Su Souther corporation transformed to Chinese-foreign joint venture after the affiliation of Spanish Crimidesa International Limited which holds 56.1 percent of share. Our country's glauber's salt industry changed from local production to global production with the injection of foreign capital. This situation will accelerate the development, but also will effect the development on both positive and negative sides. There were foreigners building factories in China since The Opium War. We should regard history as a mirror and endow a totally new significance to the condition. Basing on resources protection, we should establish a policy which is good for Chinese economic development and can protect our long-term benefits.

4. THE GUIDING CONCEPT AND MAJOR OBJECTIVE OF DEVELOPMENT STRATEGY ON GLAUBER'S SALT INDUSTRY

4.1. The guiding concept.

We should give full play to resources advantages, insist on generalized market-oriented, adjust industrial structure in great effort, regard technical innovation as a leader, adhere to industrialization in high starting level and persist in the way of high technology, big industry, collectivization and internationalization. We also should throw ourselves into the main stream of international economic integration, participate in the international division of labor and take the active position in it, share the profit of economic globalization as much as possible and promote our competitive advantages

utmost.

4.1.1. The theory and reality basis of guiding concept

Famous management gurus Michael E. Porter, professor of Commerce College in Harvard, firstly put forward the concept and theory of national competitive advantage in "National Competitive Advantage". He considers a country's natural resources as the primary element of national competitive advantage and demand factors as the second one. He thinks possession of natural resources and market needs strongly affect the national competitive advantage of a country. If a country's certain industrial natural resources is abundant and domestic market needs are more than foreign market, it must have scale economic advantages which is good for the country to establish the competitive advantages. According to Porter's standard, glauber's salt industry is the most competitive industry in China. So we must think over its development strategy on a high standard.

In International Comparative Economy Forum, an officer of Chinese development Research Centre of the state council brought up that in industrialization period, although China needs to develop high-tech energetically and increase the proportion of new and high technology industries in national economy, overall, in the situation of international division of labor, Chinese comparative advantage at the present stage is still the manufacturing and petrochemical industry which was transformed by high technology.

It is no doubt that our country's glauber's salt industry should be included into priority industries and, according to guidance of government, construct industrial strategies of development practically.

4.2. The main target of the short and long term

Striving 5 to 10 years, we will generally push the modernization process of our country's glauber's salt industry, construct the group framework with high concentration ratio, fundamentally change our country's feature which is strong but not great and lay the foundation for our industry to gain a

monopoly position in the international market.

4.2.1. The control objective of production-scale.

The total output should be controlled as 10 million tons a year in which special glauber's salt should be 0.5~1 million tons.

4.2.2. The target of structure adjustment.

4.2.2.1. The adjustment of product structure

Normal glauber's salt should have 80 percent superior qualities of first class and first-class products, less than 20 percent second-class products and no third-class products. We should reinforce the research of special characteristics and functions and quicken the research and exploitation of special glauber's salt. Using 5 to 10 years, we will research and exploit types of glauber's salt and put hundreds types of them on the market. At the same time, we should emphasize the market access of glauber's salt using for basic chemical raw material and expand its share structure.

4.2.2.2. Adjustment of technology and equipment.

Though making replacement and technical innovations or withering away by themselves in the market competition, the backward productivity should be eliminated, which means the elimination of small producing devices which is unreasonable on technology and economy and old devices with backward technology. After the adjustment, the production scale of our devices, including 90 percent of the five effect for outer heating forced circulation equipment, should be over 200 thousand tons every year.

4.2.2.3. Adjustment of enterprise structure.

The degree of glauber's salt production intensification will be promoted, and the small, scattered and chaotic situation of glauber's salt enterprises should be changed

thoroughly. Then those enterprises will produce more than average 500 thousand tons every year and their average labor productivity will be up to 2 thousand tons a person every year, which is as well as domestic advanced enterprises.

There is 1~2 international competitive large enterprises group of integration of science, technology and commerce, which is transnational, transregional, inter-trade. This group will produce over 2 million tons of Glauber's salt every year. It has excellent equipment and advanced technology and has modern production base with world advanced standard, and also has its own research center which is full of professionals, advanced equipment and instrument and is full-measured and can afford the application research and the exploitation of new technology and new product in the entire industry. This group also has its own transnational, transregional companies and business. At the same time, we build 3~5 competitive regional enterprise group which produce more than 800 thousand tons every year. All above make our country's glauber's salt industry step on the way of collective operation.

4.2.3. The target of exportation

The exportation of high-quality sodium sulphate is up to 3 million tons, which is 75 percent of worldwide total volume of trade, and earn 200~250 million dollars as yearly exports.

4.2.4. Target of environment and energy-saving.

Waste treatment hits the standard and the multiple crop index of slag yard is up to 80 percent. Average comprehensive energy consumption using for glauber's salt making is less than 150kg coal per ton.

5. THE STRATEGICAL FOCUS OF GLAUBER'S SALT INDUSTRY DEVELOPMENT.

The competitive advantage and competitiveness constructed by a country's natural resources has no necessary logical

relationship with the creation of actual added value. The former is just a sufficient condition but not necessary condition of the latter. For example, Singapore is short of resources, but give us a eye-popping fast development in recent 30 years; the 19th century English industrial revolution is a process to transform natural resources, like coal and iron, into added value. But when its result transformed into capital, it didn't transform again and kept in a lingering stage.

In the economic developing process of the world, what we lack is not resources but the understanding and mastery of reality. Our country's glauber's salt industry shouldn't walk on the old path which means we shouldn't realize increase by putting capital, labour, natural resources and other elements into market roughly. We must integrate competitive resources, advanced technology and group industry, deeply understand and research the reality, master the law of the world economy operation and transform the advantages into added value.

When we study the long-term development strategy of our country's glauber's salt industry, we must lay stress on the key points, concentrate on getting rid of the principal contradiction which restrict the development of industry and accelerate healthy development of industries.

5.1. Propel all-directional innovation of industries.

In "The Theory of Economic Development", the economist J.A.Schumpeter said that categories of innovation include the new combination of business people and factors of production and the importation of a new product, new quality, a new technology, a new market, and new forms of enterprise organization and new source of raw material or semi-finished material. Innovation plays a more and more important role in the competition of advantage. Our country's Glauber's salt industry needs the series of innovation and must make an all-round revolution.

5.1.1. Innovation of technology

First, in order to reduce the abrasion of

glauber's salt pellets and reduce the amount of dust, we should bring in drying section using drying bed with vibration and boiling. we also have to perfect the industrial design project of large-scale production units and build devices with 0.6~1 million ton's output every year which could be put on production, and to research and use the technology which is six stages for outer heating forced circulation vacuum to increase the quantity of output and reduce energy consumption, and to promote the automatic level of devices and raise labour productivity

Through improving the dirty and disorderly appearance of enterprises and production conditions, we finally get clean and crisp producing workshops, devices with high unharmed rate and orderly management to realize civilized production.

We especially should attach importance to the innovation of mining technology, which can enhance the degree of mechanical mining and increase recovery ratio, to solve the bottleneck problem of large-scale production on the under supply of raw material.

5.1.2. Innovation of marketing.

Bring in foreign advanced marketing philosophy and establish a modern marketing system. With the social development stepping into an era of knowledge economy, the marketing philosophy of industrial economies can't adapt to the change of consumption patterns any more. So we couldn't research the innovation of marketing concept without considering the change of consumption patterns. On one hand, there is market segmentation and self-expression. On the other hand, the market competition is intensified, which bring in new challenge and opportunity for products marketing. Mind-set should be innovated that the market difficulties are not only about how to compete, but also how to avoid competition, which need to use differentiation strategy well. We must study and carry out a marketing system which adapt to industrial features and characteristics of market consumption. We also must audaciously use the marketing experience of foreign countries or the other industries for reference to expand market

share and reduce sale cost.

5.2. Business restructuring, optimization of company business formation and support to the good, elimination to the bad.

We should pursue the Matthew effect, scale economy as the target, optimize organizational structure of glauher's salt industry, support predominant enterprises and eliminate weak ones. To our country's glauher's salt enterprises, which is poor managed and backward, their problem isn't how to straighten up but how to "die". In order to improve the enthusiasm of enterprises to take part in structural adjustment, government must energetically encourage and support their strategic reorganization, according to the condition of outstanding enterprises on development, production, management and market. Those enterprises will be turned into large corporation or group which has highlighted body, strong economic strength of investment and finance, sophisticated Natural Scientific Research & Development Institutions, powerful marketing system, superior international competitiveness and integration of industry, science and trade. So as to promote overall technical level of our country's glauher's salt industry, strengthen competitive advantages in international market and keep the industrial vigorous vitality, we must eliminate the industrial backward productivity without hesitation. Those enterprises, with high energy-consumption, small scale, low efficiency, backward technology and poor level of environmental protection, must be clamped down resolutely. In market economy, the motive force of structural adjustment is from two aspects: one is the autonomous development of enterprises themselves, the other one is government regulation. At the mean while, it draws support from two hands, none of them can be absent, one is a tangible hand—local restriction, guidance and remedial works; one is a intangible hand—cruel competition and elimination of market.

In the middle and long term, our county's production body should be controlled in 10~15 enterprises, which has

degree of industrial concentration closing to advanced world standard. They will intensify organizational system of industrial cluster, adjust and optimize the structure, promote core industrial competitiveness, and finally to complete establishing excellent industrial system.

5.3. Relying on prominent producing area, we will build our country's industrial strength and core competitiveness.

The key point of our country's strategic development in Glauber's salt industry is how to build industrial strength to form national core competitiveness, which is made up by prominent enterprises. The competitiveness of prominent enterprises is just that of national strength. There are three top outstanding producing area in China: glauher's salt of Si Chuan, in western plate, glauher's salt of Hu Nan, in the middle and lower reaches of Changjiang River and glauher's salt of Su Zhou. The former is located in inland but has abundant reserves, the latter has bad resource base but is benefit from their water-beside location. We should rely on those three producing area to construct a national team and transform their advantages into power. Consequently, we can build our country's core competitiveness.

5.4. Strengthen the development of new products and forging glauher's salt industrial chain.

Enhance the research and application of intensive process, and carry out R&D of special glauher's salt. In this section, we should augment the research and use of crystallization theory in glauher's salt industry, speed up the study on new producing technology of big glauher's salt pellet and open up the utmost application space of special glauher's salt by changing physical and chemical index of anhydrous sodium sulphate.

In the mean while, it is necessary to research and develop the basic chemical products which use Glauber's salt as raw material. Using anhydrous sodium sulphate as raw material, the production of sodium sulphate, potassium sulphate, barium sulphate

and so is promising and has large export space. So we should focus on building downstream industrial chain, enhancing the delayed effects of sustainable development of our country's glauber's salt industry and striving for the state that the output ratio of glauber's salt products and non-glauber's salt products is 1:1.

5.5. Expand the export share of international market and accelerate the transformation towards export-oriented industry.

Foreign glauber's salt industries appear shrinking gradually, however, the demand of international market is rising. In traditional markets, Southeast Asian market and European and American market are more mature. Demand in those markets is steadily and rising. Middle east market and African market grows quickly with consumption going up gradually. American yearly capacity is 650~740 thousand tons. Average consumption is 700~830 thousand tons. Every year, it needs to import 120~170 thousand tons and exports 60~110 thousand tons. The difference between the two is used to make up for insufficient production. Spain is a big exporter of glauber's salt which mainly supply for European, Latin American and South American market.

International market has many vacancies in middle and long term. Our country's glauber's salt industry should grab the opportunity to exploit external market by making a sophisticated exporting strategy, stabilize Asian market, foster Middle Eastern and African market, struggle for European and American market and expand places and countries of export to the utmost extent.

6. THE SUPPORTING MEASURES AND COUNTERMEASURES ON THE STRATEGIC DEVELOPMENT OF GLAUBER'S SALT INDUSTRY.

6.1. Integrate the distribution of productivity and carry out the industry entry certification system.

Our country's distribution of productivity is scattered and bedraggled. Vast

land and numerous enterprises lead to a high cost of domestic competition and also hinder the promotion of integral technical level and economic quality. We should integrate the distribution of productivity, give support to predominant enterprises, restrain those producing area with poor resources quality and backward technology and finally make the industry become thin but strong.

Some producing areas, where has advanced technology, large capital, long history and reliable resource base, should be developed quickly. Nevertheless, those areas not fulfilling above conditions will tend to disappear by the confinement of industrial policy and effect of price leverage. In the horse racing of international glauber's salt market, we abandon weak horse and choose strong horse to keep our advantage.

When a new capital enters the glauber's salt industry, we should raise market access requirements.

6.2. Exploit, save and store up resources orderly.

21 century is a century of plentiful resources consumption, fast treasure accumulation and economy development. It is shown by research which, recently, those developed countries which has less than 15 percent of world's population still are consuming more than 60 percent of energy and 50 percent of mineral resources. Developing countries having 4/5 world's population is continually stepping in the process of industrialization in which these countries consume a lot of mineral resources, accumulate social wealth quickly and accelerate living standard. It is a insurmountable developing stage for all countries. It is asserted that if Chinese people consume mineral resources like American three earths are not enough. The earth resources are consumed heavily by the fast development of world economy, rapid increase of population, fast industrialization and urbanization, large population and continue promotion of living standard. Frequent human activities constantly change the look of natural environment which is formed for millions of years. Thousands of years' harmonious relationship between

nature and human beings is broken sharply. Beyond country, geography and politics, the contradiction between nature and human beings is intensively embodied by population, resources, environment and economic development. And this contradiction has become a co-problem of sustainable development in human society.

Although our country's glauber's salt resources are abundant, we can't over consume them without limit. We should exploit and utilize it orderly and systematically, choose mining order and methods which is scientific and reasonable and control mining recovery, mining dilution rate and ore dressing recovery in the index stipulated by national administrative department. We also should give priority to the resources of old producing areas and the reliable resources with steady basic reserve and high grade. When the mining technology is not advanced, we should prevent wasting resources by slowing down the exploitation of new zone and slackening the exploitation of resources with poor quality and inadequate basic reserve. It is necessary to change recent situation that east development is fast and the west is slow, to strictly confine foreign capital to develop and use our country's glauber's salt resources, to establish a guarantee system of resources and to strengthen the construction of resources reserve system. Except all above, we still should perfect resource management act, treat the permit system of resources exploitation strictly, thoroughly regulate and specify the exploit order of glauber's salt industry, try to carry out the market configuration of mineral resources in an all-round way, and grasp the best time to share abroad glauber's salt resources up to the hilt.

6.3. Form a substantial industry association which acts industrial management and coordination.

The end-result of the country's economic system reform must be that government gives up all of the concrete management and only offer macro-guidance to each industry with the law. Industry association, as an organization managing and coordinating industrial self-development and

self-regulation, will take the place of existing governmental functional departments. The new substantial industry association is totally different from existing industry association with governmental function. It will become the spokesman of enterprises, the bridge between industry and government, and also perform their responsibility on behalf of industrial intensive benefit and the will of most enterprises. It makes statutes, rules, and regulation protecting the economic benefit of member enterprises. Such like "price alliance", and supervise them. The association is not a leader but a server and manager who manage the market but not factories and not a second government at all.

We should prepare to build national association of glauber's salt industry earlier and be in line with foreign economy.

6.4. The government should strengthen the guidance of glauber's salt industry development

Government intervention and extreme indulgence of industrial development are two extremes which is not recommended.

The reasonable choice should be modest in industrial policy. In full of basic role of compound resources market at the same time, the government should strengthen macroeconomic guidance of glauber's salt industry development, should pay great attention to the application of law and economic means to administrative measures to strengthen the development of industry standard and glauber's salt guidance. The government should formulate the strict industrial policy, and technical policies and eliminating backward technology and equipment, and export from the macroscopic preferential policy, based on the development of it industry and guidance. Products to the international standard benefit standards shall be conducted, the scientific, strengthen pertinence and its maneuverability. The foreign product quality supervision and management of the functions of the government's executive (such as French salt supervisory function in the Treasury), and belonging to most countries have legislation. The government should increase glauber's salt product quality supervision team, testing,

law enforcement, strict implementation of the standards, the function is unqualified products into the market. To effectively improve the overall technical level, standardize the market competition, and ensure that the order of the industry structure adjustment.

6.5 set professional import and export glauher's salt corporations, explore international market.

Modern industry must have modern logistics support service in the industry, to develop the modern logistics, a domestic logistics global logistics, transformed into play world-class logistics functions.

At present, more complex glauher's salt channels for export goods, resellers. No professional export agency acceptance, the cost of middle margin is high and consignees undercut each other's prices --which influence international export earnings. Being like grain, oil and steel industries, it should establish its own glauher's salt industry in China import and export companies, accepting the export business of glauher's salt. From the organizations of domestic sources, storage, exportation, Port customs clearance to Land, sea transport matters, Implementing a one-stop service. To ensure the reasonable logistics and reduce logistics cost in domestic competition and multi-level export cost, to realize the export trade profit maximization, and play the advantage of industrial competitiveness. After the professional Import and export companies had operated in routine, it could establish overseas offices, in order to ensure effectively stability, and explore international market.

7. CONCLUSION

This study is based on the Industrial economics—the theory of industrial organization, industry layout of relevance theory, the theory of industrial development theory, the basic principles and norms, empirical analysis of statistical analysis and comparison and analysis, static analyses and dynamic analysis of the combination of analysis, the formation of the above points. Due to the lack of authoritative research statistics, sample collections, the evolution of

economic policy, and the uncertainty of market environment, which some arguments cannot proved strong and seemed my eyes are narrow, so it can only be used for reference. I hope it could benefit for the good and rapid development of glauher's salt industry

Strategic research is not the source of wealth, but fortune. In this study, if due to causes a debate and arguments, that's what I expected.