

Strategic Research of China's Potash Industry Development



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September, 2013

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1、Resources Status

(1) World Potash Resources

- World potash production is mainly the production of soluble potash resources, which are mainly potassium rock salt , carnallite , potassium sulphate and mixed salt mine, among which potassium rock salt is the best.
- According to the U.S. Geological Survey, currently the world's proven reserves of potash is about 9.542 billion tons (in K₂O). At the current production level, existing proven reserves can provide more than 240 years' world exploration. Estimated total global potash resources of all kinds are about 250 billion tons (in K₂O)

表 世界钾盐储量 单位：万 t K₂O

| 国家或地区 | 储 量 | | 增减 | 国家或地区 | 储 量 | | 增减 |
|-------|--------|--------|------|-------|--------|--------|-------|
| | 2010 年 | 2011 年 | | | 2010 年 | 2011 年 | |
| 加拿大 | 440000 | 440000 | 0 | 乌克兰 | 2500 | - | 0 |
| 俄罗斯 | 321900 | 330000 | 8100 | 英国 | 2200 | 2200 | 0 |
| 白俄罗斯 | 75000 | 75000 | 0 | 西班牙 | 2000 | 2000 | 0 |
| 德国 | 15000 | 15000 | 0 | 智利 | 7000 | 13000 | 6000 |
| 巴西 | 30000 | 30000 | 0 | 中国 | 21000 | 21000 | 0 |
| 美国 | 13000 | 13000 | 0 | 其他 | 5000 | 5000 | 0 |
| 约旦 | 4000 | 4000 | 0 | | | | |
| 以色列 | 4000 | 4000 | 0 | 世界 | 942600 | 954200 | 11600 |

资料来源：Mineral Commodity Summaries, 2012。

(2) Chinese Potash Resources

- Potash resources mainly refers to soluble potassium salts. Rich potassium rock(potassium feldspar, alunite , etc.) has been continually used to make potash in many places in China and breakthroughs have been made in recent years development, but large scale supply is still impossible in a short time.
- Chinese government attaches great importance to potash prospecting work since the founding of P.R.C. with a large amount of human and material resources devoted to it. The proven potash reserves are mainly located in the modern lakes.
- By the end of 2010, seven provinces in China have identified 39 potash producing sites with a proven reserves of 930,122,500 tons (KCl), including basic reserves of 438,856,300 tons, which accounting for more than 40%.
- By the end of 2011, China's proven potassium resources were 1,069,300,000 tons of KCl (40 proven potash producing sites in 7 provinces) , an increase of 14.98% compared to the previous year.
- China's potash reserves accounts for 2.2% of the world 's total.

The distribution of China's potash resources shows that China's potash reserves are mainly in the Qaidam Basin in Qinghai and Lop Nur region in Xinjiang, which accounting for more than 96% of the total. But these locations are relatively remote and inconvenient. In addition, our potash resources are mainly potash brine, but solid potassium salt is less, which is contrary to the condition in world's potash. China's potash brine accounts for more than 98% of the total, while solid potassium salt accounts for only about 2%. The low grade potash in China has a large amount of associated components. Potash brine generally has a KCl content of 10-20 g /L, while the KCl content before the quaternary period is 5% -10%. Potassium and sodium salts generally symbiosis. Magnesium, boron, lithium, iodine, rock salt, glauber's salt or minerals symbiosis with salt lake potash and can be used comprehensively.

2、Production and Consumption Status



(1) World potash consumption and production status

(2) Chinese potash production status

(3) Chinese potash consumption as well as imports and exports status

(1) World potash consumption and production status

- ◆ In 2011, estimated global potash production was about 37 million tons (K₂O), a growth of 9.63% over the previous year. After a strong recovery in 2010, potash production further increased to the pre-crisis (2008) levels. Meanwhile, the global potash production capacity increased by 4.45 %. In 2011 , the world's potash production capacity increased by 6 % to 44.6 million tons K₂O , it increased to 46.8 million tons in 2012 and may reach 54.69 million tons by 2014 , and in 2015 it will increase to 59.6 million tons . In 2010, the potash industry operating rate reached 74% of nominal capacity, while in 2009 it was only 48%.
- ◆ In 2010, the world's potash production began to recover. There are 12 major potash producing countries globally (no data for Ukraine), mainly in Canada, Belarus, Russia, China, Germany, Israel , Jordan and the United States , which account for nearly 95% of world total production . In 2011, Canada, Russia, China, Belarus, Israel, Germany, the United States and Jordan saw increased production, with Brazil only had a reduced production. The detail is shown in the following table:

表 世界钾盐储量 单位：万 t K₂O

| 国家或地区 | 储 量 | | 增减 | 国家或地区 | 储 量 | | 增减 |
|-------|--------|--------|------|-------|--------|--------|-------|
| | 2010 年 | 2011 年 | | | 2010 年 | 2011 年 | |
| 加拿大 | 440000 | 440000 | 0 | 乌克兰 | 2500 | - | 0 |
| 俄罗斯 | 321900 | 330000 | 8100 | 英国 | 2200 | 2200 | 0 |
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| 巴西 | 30000 | 30000 | 0 | 中国 | 21000 | 21000 | 0 |
| 美国 | 13000 | 13000 | 0 | 其他 | 5000 | 5000 | 0 |
| 约旦 | 4000 | 4000 | 0 | | | | |
| 以色列 | 4000 | 4000 | 0 | 世界 | 942600 | 954200 | 11600 |

资料来源：Mineral Commodity Summaries, 2012。

- ◆ **Production increased from 42.7 million tons in 2010 to 44.6 million tons (K₂O) in 2011, and it continued to grow to 46.8 million tons in 2012. In 2010, the potash industry operating rate reached 74% of nominal capacity, while in 2009 the value was only 48% . Potash supply and demand balance showed that nearly a potential surplus of 6000-6500 thousand tons of K₂O will be observed in 2011 and 2012.**



(2) Chinese potash production status

1. Production status of resource-type potash—KCl, K₂SO₄ and KMgSO₄ (unit: ten thousand tons)

| | KCl | K ₂ SO ₄ | KMgSO ₄ | 合计(K ₂ O) |
|---------|-----|--------------------------------|--------------------|----------------------|
| 生产企业(家) | 41 | 5 | 7 | 53 |
| 产能(实物) | 658 | 198 | 81 | 540 |
| 产量(实物) | 461 | 148 | 25 | 377 |

Compared with the same period in 2011 , resource-type potash:

Total capacity : an year-on-year increase of 12.5% (production capacity in 2011 was 480)

(Production capacity growth sites: mainly Qinghai Salt Lake Group , Golmud Zangge Potash Co., LTD, Qinghai Cold Lake Potash Co., LTD, Xingyuan Potash Co., LTD)

Total output: year-on-year decrease of 0.8% (output in 2011 was 380), production capacity increases, the output basically remained constant!

(The production of Qianghai Salt Lake Potash Co.,LTD and SDIC Xinjiang Luobupo Potash Co.,LTD had increased. The total potash production decreased mainly due to a decline in small potash)

Potash prices in 2012

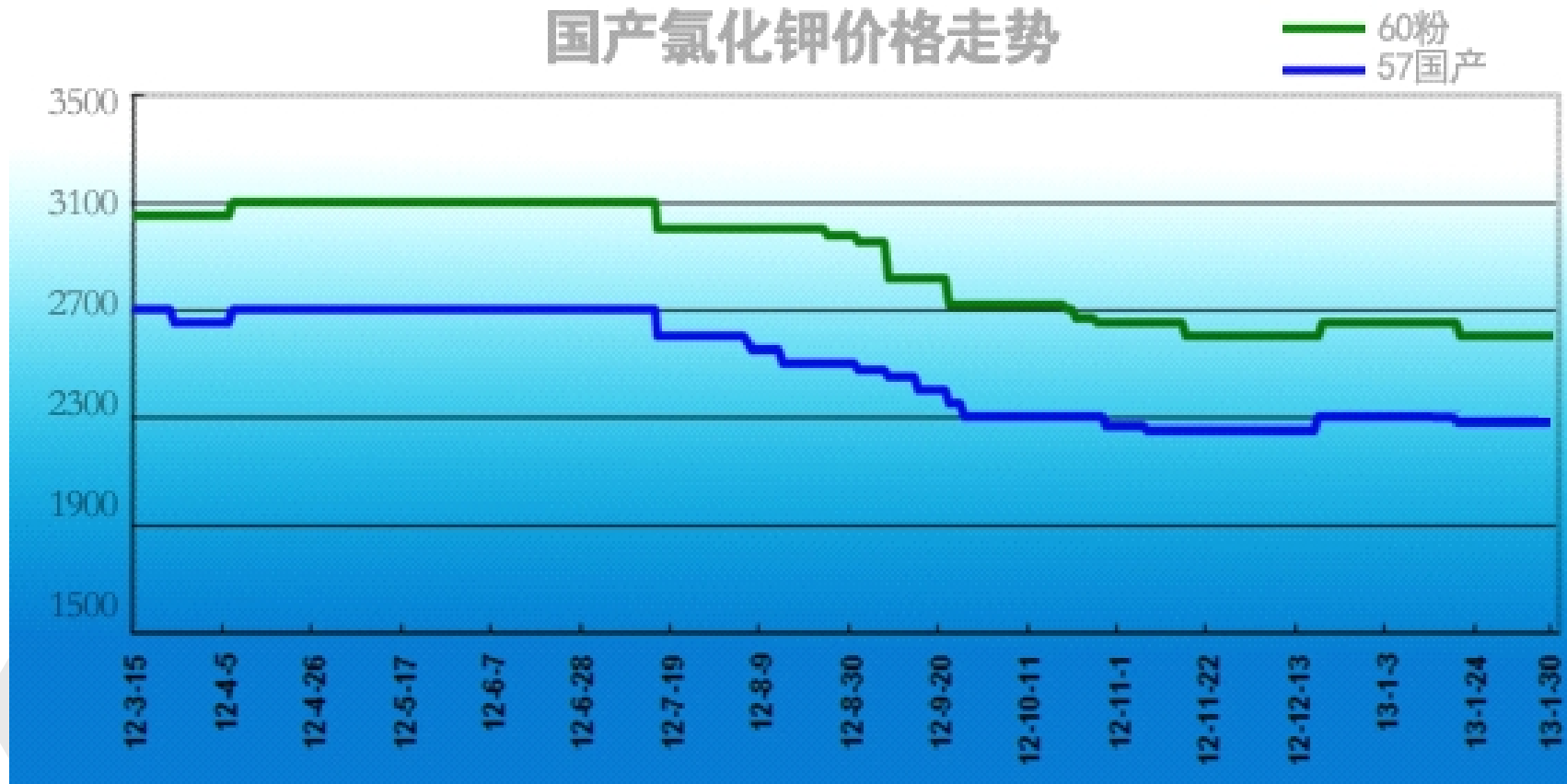
Overall market conditions were that market transactions will was low and the price continued to fall, which stabilized recently.

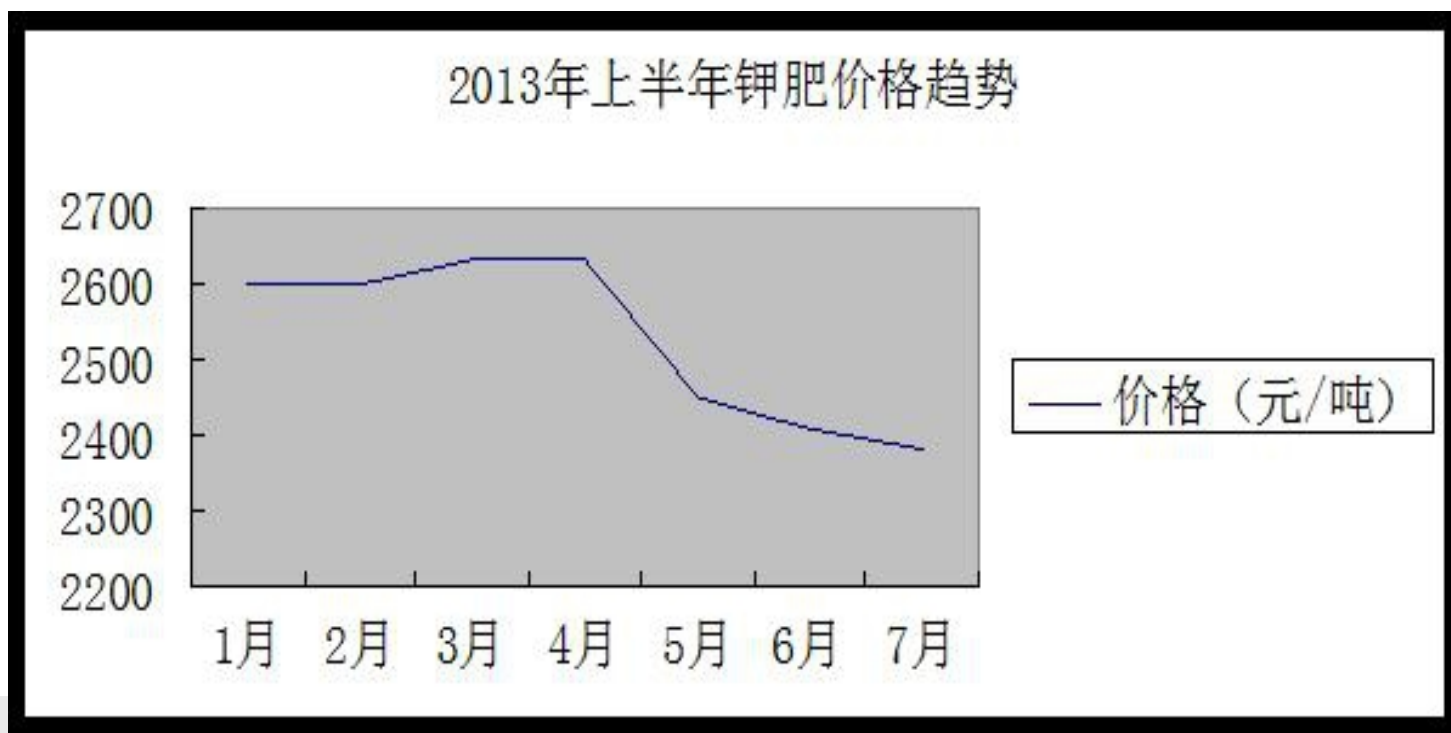
Potash prices in 2012 (take 60 KCl as an example), price decreased from 3400 RMB/ton at the beginning of the year to 2600 RMB/ton at the end of the year. Potassium chloride fertilizer price was only 2300 RMB/ton, with the fluctuation range up to 1100 RMB. And the fluctuation went back to 2010 level.



Recent domestic potassium chloride fertilizer price trend:

国产氯化钾价格走势





Major manufacturers are listed below

我国利用钾资源生产钾肥部分企业（已建项目）一览表 单位：万吨/年

| 资源地 | 企业（已建项目）名称 | 生成能力 (实物) | 钾肥种类 | 备注 |
|-----------|------------------|--------------|---------|---------------|
| 察尔汗 盐湖 | 青海盐湖工业集团股份有限公司 | 220 | 氯化钾 | 全资或控股 5 家钾肥企业 |
| | 格尔木藏格钾肥有限公司 | 60 | 氯化钾 | 整合铁路以东 |
| 马海盐湖 | 青海中航资源有限公司 | 40 | 氯化钾 | |
| 西台吉乃尔盐湖 | 青海中信国安科技发展有限公司 | 40 | 钾镁肥、氯化钾 | |
| 东台吉乃尔盐湖 | 青海高端盐湖科技有限公司 | 15 | 钾镁肥 | 依托青海锂盐公司 |
| 大浪滩 盐湖 | 中农青海茫崖兴元钾肥有限责任公司 | 15 | 氯化钾 | |
| | 青海茫崖康泰钾肥开发有限责任公司 | 15 | 氯化钾 | |
| 大盐滩 盐湖 | 青海滨地钾肥股份公司 | 30 | 钾镁肥 | |
| 罗布泊罗北凹地 | 国投新疆罗布泊钾盐有限责任公司 | 130 | 硫酸钾 | 10+120 |
| 玛纳斯 盐湖 | 新疆新雅泰化工有限公司 | 10 | 钾镁肥 | |
| 江城钾矿 | 云南江城泰裕钾肥有限公司 | 1.0 | 氯化钾 | 地下钾石盐矿 |

说明：青海柴达木盆地各盐湖还有十数家小规模（10 万吨/年 KCl 以下）氯化钾生产企业（已建项目），未列入该表。

2.Processing type potash - production of processing type potassium sulfate, potassium nitrate, potassium dihydrogen phosphate (unit: ten thousand tons)

| | 加工型K ₂ S ₀₄ | KN ₀₃ | KH ₂ P ₀₄ |
|---------|-----------------------------------|------------------|---------------------------------|
| 企业 (家) | 42 | 33 | 43 |
| 产能 (实物) | 190 | 92 | 46 |
| 产量 (实物) | 78 | 44 | 14 |

Mannheim potassium sulphate has a tough year. Firstly, it is shocked by resource-type potassium, and secondly it is affected by bad acid market which has a price of only tens of RMB with some given away as gift. The first reason for this condition is the poor export market, the second is the recessed real estate market and the third is the bad rare earth industry.

Since China's largest potassium nitrate production corporate undergoes relocation and production capacity adjustments, supply and demand of potassium nitrate is basically balanced. But the price is affected by the broad environment and drops to 5000 RMB or less.

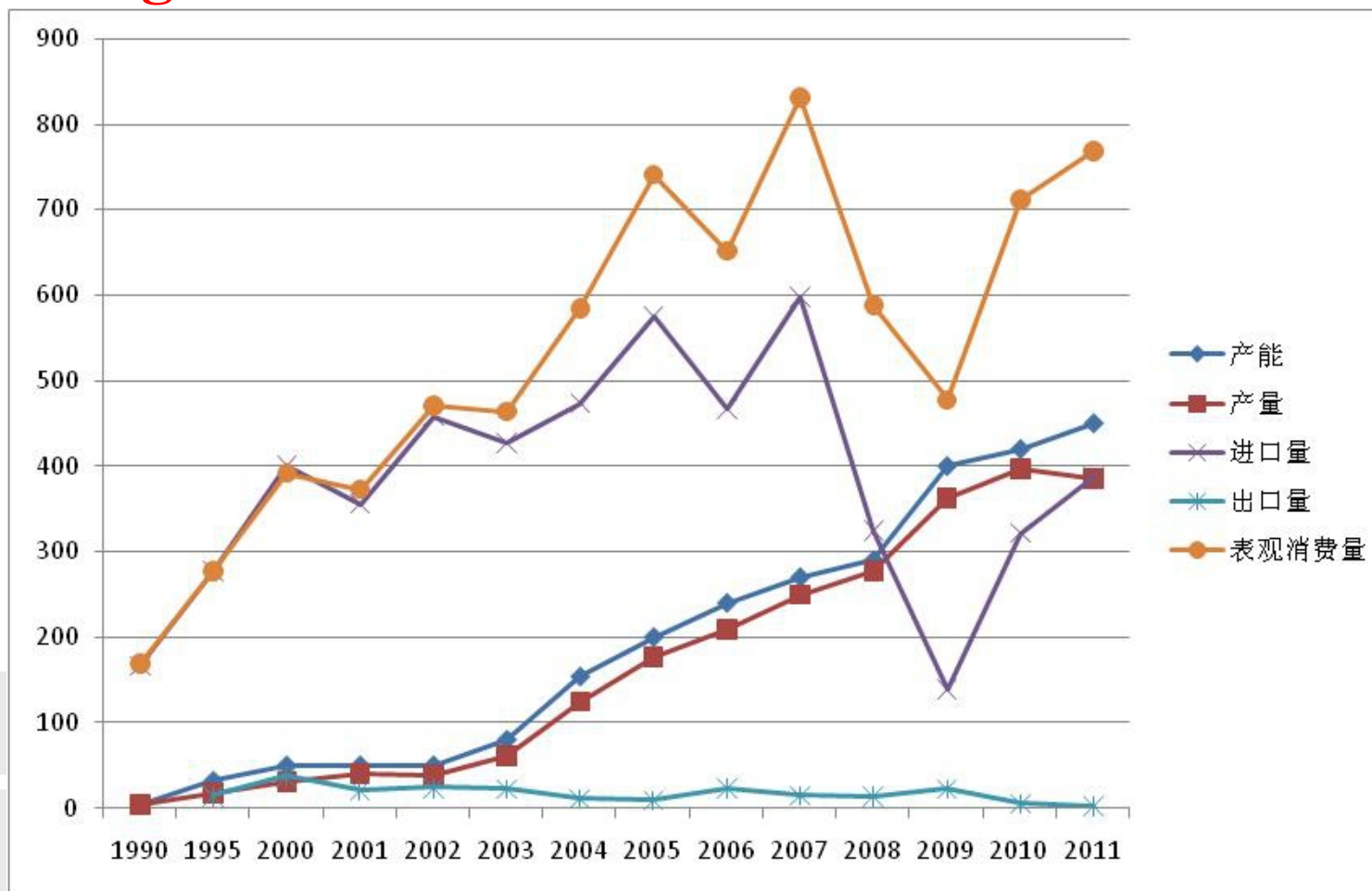
The production capacity and output of potassium dihydrogen phosphate increase slightly compared to last year's (43,13.2). The potassium dihydrogen phosphate industry is now entering an chaotic situation, mainly due to the new equipment installed this year, which has produced excess capacity with uneven quality levels. And 90% of the market share are fake commodities.

(3) Chinese potash consumption as well as imports and exports status

| 近几年我国钾肥消费情况 | | | | | | | | | |
|-------------|------|-------|--------|-------|------|-------|------|-------|--------------|
| 年份 | 生产能力 | 产量 | 开工率% | 进口量 | 出口量 | 表观消费量 | 工业钾盐 | 农业用钾肥 | 产量/表观消费量 (%) |
| 1980 | 0.5 | 2 | 421.3% | 36.6 | | 38.6 | | | 5.2% |
| 1985 | 1.7 | 2.4 | 139.0% | 44.5 | | 46.9 | | | 5.1% |
| 1990 | 3.8 | 3.7 | 97.9% | 166.2 | | 169.9 | 8 | 161.9 | 2.2% |
| 1995 | 32 | 16.7 | 52.3% | 277 | 15.1 | 278.6 | 13 | 265.6 | 6.0% |
| 2000 | 50 | 30.25 | 60.5% | 399.8 | 37.7 | 392.4 | 27 | 365.4 | 7.7% |
| 2001 | 50 | 39.5 | 79.0% | 355.4 | 21.4 | 373.5 | 30 | 343.5 | 10.6% |
| 2002 | 50 | 38.6 | 77.2% | 457.7 | 24.5 | 471.8 | 36 | 435.8 | 8.2% |
| 2003 | 80 | 60.7 | 75.9% | 426.5 | 22.8 | 464.4 | 40 | 424.4 | 13.1% |
| 2004 | 154 | 124.2 | 80.6% | 473 | 11.9 | 585.3 | 46 | 539.3 | 21.2% |
| 2005 | 200 | 176.3 | 88.2% | 574.2 | 9.6 | 740.9 | 52 | 663 | 23.8% |
| 2006 | 240 | 208.9 | 87.0% | 466.9 | 23.6 | 652.2 | 61 | 591.2 | 32.0% |
| 2007 | 270 | 249.6 | 92.4% | 597.2 | 15.5 | 831.3 | 68 | 763.3 | 30.0% |
| 2008 | 290 | 277.5 | 95.7% | 324.9 | 14.2 | 588.2 | 71 | 517.2 | 47.2% |
| 2009 | 400 | 362.8 | 90.7% | 138.5 | 23.3 | 477.9 | 68 | 409.9 | 75.9% |
| 2010 | 420 | 396.8 | 94.5% | 321.3 | 5.8 | 712.3 | 71 | 641.3 | 55.7% |
| 2011 | 450 | 385.6 | 85.7% | 386.2 | 2.8 | 769.0 | 76.0 | 693.0 | 50.1% |
| 2012 | 480 | 377.0 | 78.5% | 410.0 | 18.0 | 769.0 | 76.0 | 693.0 | 49.0% |



■ Chinese potash supply and demand balance diagram



1. Production of resource-type potash is 3.77 million tons (100% in K₂O), the import amount is 4.1 million tons, export amount is 180,000

tons and the apparent consumption is 7.69 million tons, of which about 6.93 million tons are potash. The foreign dependence is 51%.

2. Inventory

1. Port stocks at the end of 2012 (estimated) : 1.4 million tons in kind; enterprise inventories : 2.3 million tons in kind; pipeline inventory : about 2.5 million tons in kind.

2. Total inventory: Port stocks + Enterprise inventories + pipe inventories = 4.79 million tons of K₂O (pipeline inventories are larger).

3. Carry-over amount by the end of 2011: 4.15 million tons in kind (port and business enterprise are larger).

Keypoints:

China is a country lacking soluble potassium resources; potash production operation rate is high in China in recent years.

Apparent consumption stabilizes at 7-8 million tons; self-sufficiency rate has constantly increased to 50% or even higher.





3. Production and Consumption Forecast

(1) Going out status of potassium resource-related industries

(2) Domestic potash production forecast

(3) Domestic potash consumption forecast



(1) Going out status of potassium resource-related industries

China is a country lacking available and high-quality soluble potash resources. China must spare no efforts to open up foreign potash resources market, and cooperate with Laos who has abundant quality potassium resources and other neighboring countries as well as Canada, Congo (Brazzaville), Russia, Belarus and so on, so as to complement its potassium reserves deficiency. Thus modern China potash resources deficiency can be supplemented, China's potash fertilizer yield can be improved and the potash resources reserves for the sustainable development of potash industry for future generations can be guaranteed. So it is of great strategic significance for China to make full use of foreign potassium resources.



Laos: By the end of 2011, China already has a certain amount of potassium reserves in Laos (specific mining area of about 700 km²), Congo (Brazzaville), and Saskatchewan, Canada; among which China has four operating companies in Laos. Now China has obtained 700 km² mining land area with mining rights, more than 324.8 km² exploration area , about 500 million tons of total proven potash resources reserves, 1 billion tons of controllable potassium resources, and more than 10 billion tons of prospective potash reserves. The proven mining depth is about 120m, and the potash mines are mainly potassium potash rock salt mines.



Congo (Brazzaville): The initial proven reserves in Congo (Brazzaville) is 8.3 billion tons and the prospective reserves are very impressive.

Canada: More than 10 thousand km² potash exploration permit has been obtained in Canada and the proven potassium resources are approximately 1 billion tons.

In addition, it is also likely that there will be a certain amount of potassium resources and potassium fertilizer supply from Uzbekistan, the Urals, Ethiopia, Russia, Belarus as well as other countries and regions, and the operation is still underway.

The toughest problem in potassium resource development in Laos is the environmental assessment. Though there are still some uncertainties in mining and processing technologies and the development cost is higher than the current market price of potassium chloride, currently potassium chloride has been given a high priority in planning.



(2) Domestic potash production forecast

(1) SDIC Xinjiang Lop Nur Potash LLC Phase II 1.7 million tons / year potash project.

(2) Qinghai Tai Long Beach Salt Lake liquid mine utilization, a new increase of 150- 250 thousand tons potassium chloride /year is expected.

(3) Qinghai Great Salt Beach Salt Lake use liquid mine to produce potassium chloride, the potassium chloride production capacity is expected to increase 450,000 tons /year.

(4) Salt Lake Group plans to use solid-liquid conversion process to develop 1 million tons potassium chloride/year.

Coupled with the current nearly 4 million tons potash production capacity from more than 20 manufacturers, the future Chinese potash production capacity could reach more than 5 million tons / year.

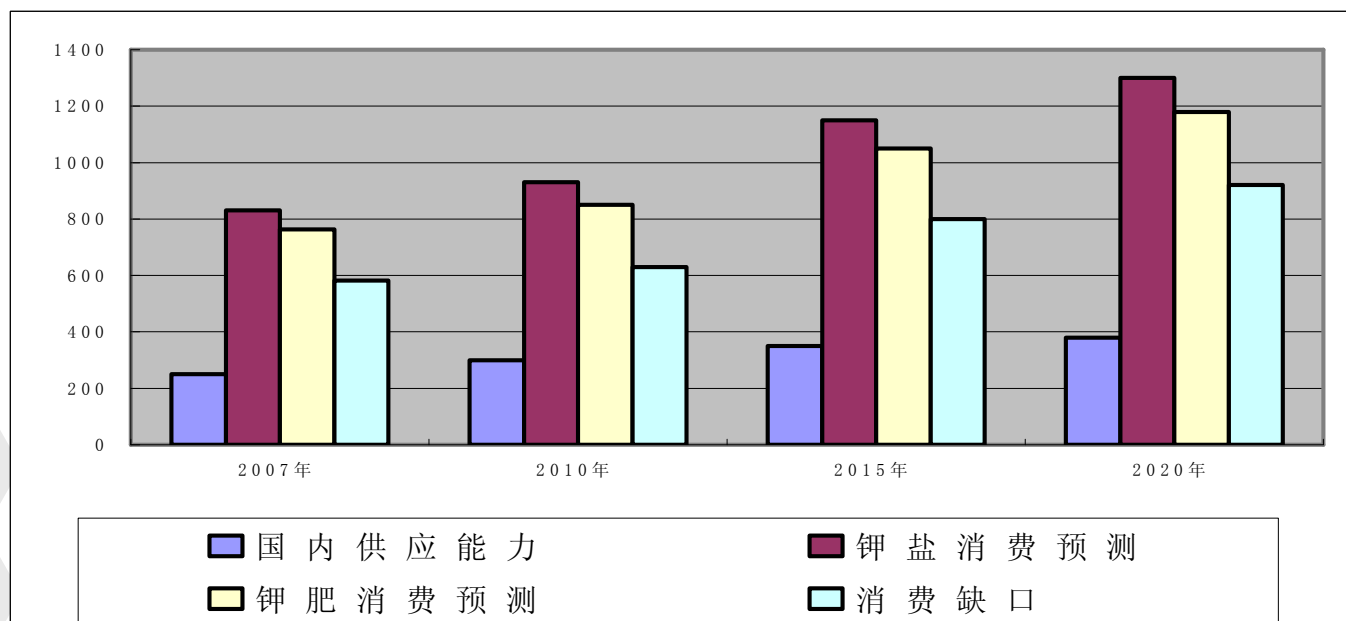
Key points:

Domestic production capacity expand rapidly and production capacity has reached resources reserves limit;

Foreign projects generally have flourish potential with large planning production capacity; three major supply systems are expected to be formed, and the third largest supply system develop rapidly with the potassium chloride production expected to reach 10 million tons / year before 2020.

(3) Domestic potash consumption forecast

| | 2007年 | 2010年 | 2015年 | 2020年 |
|--------|-------|-------|-------|-------|
| 国内供应能力 | 249.6 | 400 | 450 | 480 |
| 国外建厂 | | | 120 | 240 |
| 钾盐需求预测 | 831.3 | 930 | 1150 | 1300 |
| 钾肥需求预测 | 763.3 | 850 | 1050 | 1180 |
| 需求缺口 | 581.7 | 530 | 580 | 580 |



Key points:

Predicted demand is high and demand in 2015 will exceed 10 million tons, 2.5 million tons higher than current actual consumption; There is still space for demand, but actual consumption depends on product prices, market development capability, government efforts and some other aspects.



4. Ideas about Development Strategy of China's potash industry

- ◆ **During the "Eleventh Five-Year" Plan, China's major potash development strategies are: strengthen domestic potash fertilizer base, pay close attention to the domestic potash mineral resources exploration, encourage overseas potassium resource development , multi-channel use of slightly soluble potash , comprehensively utilize salt lake resources and develop various potash fertilizers.**
- ◆ **The aim is to gradually form three major supply systems: the domestic production system, foreign direct import system and foreign production base supply system. The strategic goal remains unchanged. Based on possible problems in the current domestic potash industry development, the following suggestions are proposed:**

◆ **1.Tighten domestic potash resources exploration**

◆ According to geologists' analysis of potash resources in China, it is very likely that China will find large soluble potash resources in the next few years. So to find the most effective way to solve the shortage of potash resources in China, we must develop basin potassium researching theory with Chinese characteristics, innovatively study potassium prospecting technology, and actively explore potassium resources.

◆ **2.Prevent over-exploitation of domestic potash resources**


◆ Over-exploitation of resources will result in a waste of resources. It will also drag comprehensive utilization process, shorten production equipment service life and waste investments.



◆ **3.Orderly promote overseas potash resources**

- ◆ Proceeding from current planning capacity, potassium chloride production capacity in overseas factories set up by Chinese companies may exceed 10 million tons / year, but most companies estimate benefit and competitiveness based on current prices. In fact, proceeding from a historical perspective, the world potash price volatility is quite large, thus building factories in foreign countries is risky. So full investigation and assessment are needed and blindness should be avoided.

◆ **4.Highlight marketing and development**

- ◆ China has a large planning capacity in Laos and some other countries. The sale cost will be high if we completely depend on domestic market. It is necessary to develop local and surrounding markets, so as to improve enterprises economic returns.
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◆ **5. Build a exchanges and cooperation platform for potash**

- ◆ **China is the world's largest consumer with production also ranking high in the world. China has the potential to be the world largest potash producer. Thus it is of great significance to build world potash exchanges and cooperation platform led by the related associations. As to how the platform will be built, everyone should share their ideas.**





Thank you!