

# 陕西省煤炭消费总量控制方案和政策研究

Research on the control scheme and policy of coal consumption  
in Shaanxi Province

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# 1. 陕西省概况 (Basic situation of Shaanxi Province)

## (1) 自然地理情况 (physical geography)

陕西省横跨陕北黄土高原、关中平原、秦巴山区三大地带，

自然条件复杂多样，人类活动历史悠久。陕北地区是中国重要的能源生产基地，也是水土流失严重地区；关中平原则是陕西重要的现代产业带和人类活动密集区；秦巴山区是中国中部地区重要的水源涵养区和生态屏障，对区域社会经济发展发挥重要的服务功能。

Shaanxi Province, across the Loess Plateau, Guanzhong Plain and Qinba Mountain, the natural conditions are complex and diverse, and it has a long history of human activities. Northern Shaanxi is an important energy production base in China, but also a serious area of soil erosion; Guanzhong is an important economic industrial zone and the intensive area of human activities in Shaanxi, Qinling Bashan is an important water conservation area and ecological barrier in central China, Social and economic development play an important service function.



Fig.1 Map of Shaanxi Province

## (2) 煤炭产业及经济发展情况 (Coal industry and economic development)

“十二五”期间，陕西省煤炭及煤化工、电力等产业获得了快速发展，煤炭产量和消费量大幅增长，煤炭消费占能源消费的70%以上，GDP年均增速达到11.1%。2015年陕西省生产总值已达到18171.86亿元，经济总量位列全国第十五位。

During the 12th Five-Year Plan period, coal and related power and coal chemical industries in Shaanxi Province gained rapid development. Coal production and consumption increased substantially. Coal consumption accounted for more than 70% of total energy consumption in Shaanxi Province, effectively supporting Shaanxi Provincial economic development, GDP annual growth rate of 11.1% in 2015, Shaanxi Province, the annual GDP has reached 1,817,186,000,000 yuan, the total economic output ranked 15th in the country.

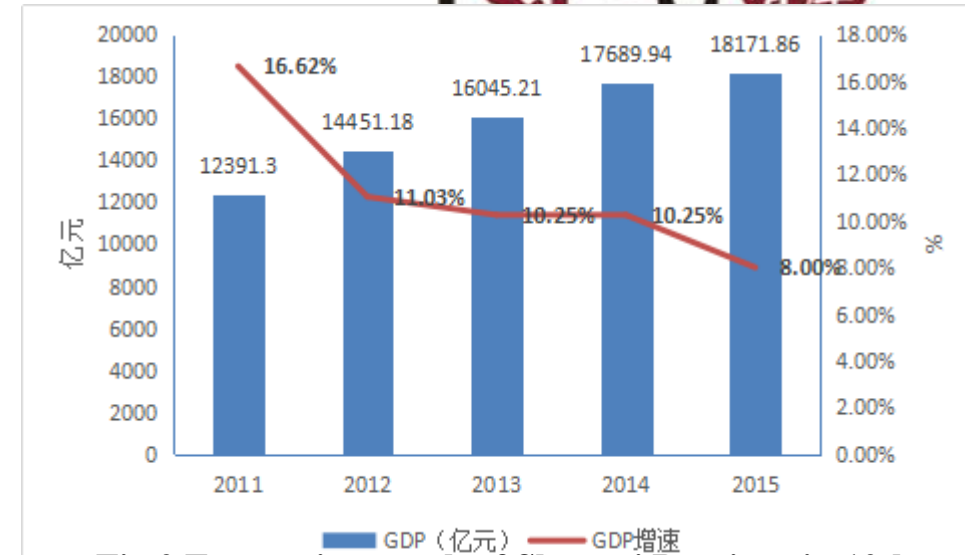


Fig.2 Economic growth of Shaanxi Province in 12th Five-Year

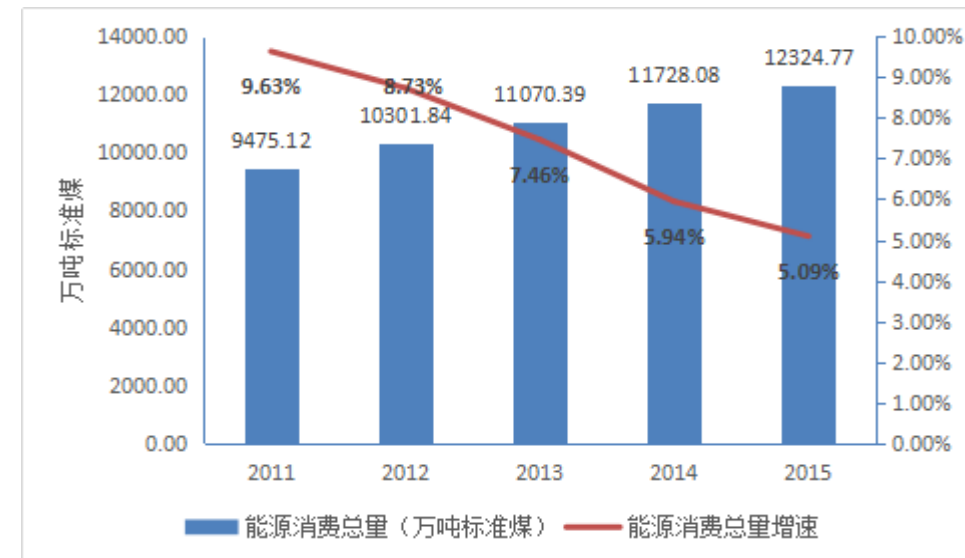


Fig.3 Energy consumption of Shaanxi Province in 12th Five-Year



煤炭及相关产业的快速发展产生了严重的环境污染，例如资源浪费、气候恶化和其他环境资源问题以及公众健康。

But at the same time, the rapid development of coal and related industries also produced serious environmental pollution, such as waste of resources, environmental degradation and other environmental issues and public health issues.

★大气污染日趋严重。 Air pollution is becoming more and more serious.

★水资源短缺逐步加剧。 The shortage of water resources is gradually increasing

★温室气体排放居高不下。 Greenhouse gas emissions remain high.

★公众健康受到严重危害。 Public health has been seriously violated.



Fig.4 Serious soil and water loss in the Northern Shaanxi



Fig.5 Group of pneumoconiosis patients caused by coal mining

## 2 陕西省能源生产与消费现状 Energy production and consumption

### (1) 能源生产持续增长 (Energy production continues to grow.)

“十二五”期间，陕西省能源生产总量持续增长。2015年全省能源生产总量达到**49070.52万吨标准煤**，**原煤产量占能源生产总量的75%**，**原油产量占比11%**，**天然气产量占比12%**，**水电、风电及其他能源发电量占比2%**。(In 2015, Shaanxi province's total energy production reached **490.7052 million tons** of standard coal.)

### (2) 能源消费逐年攀升 (Energy consumption is increasing year by year)

2015年，陕西省综合能源消费量**达到12324.77万吨标准煤**，比上年增长**5.09%**，比2011年增速下降**4.54%**。(In 2015, Shaanxi Province, the comprehensive energy consumption reached **123.2477 million tons** of standard coal.)

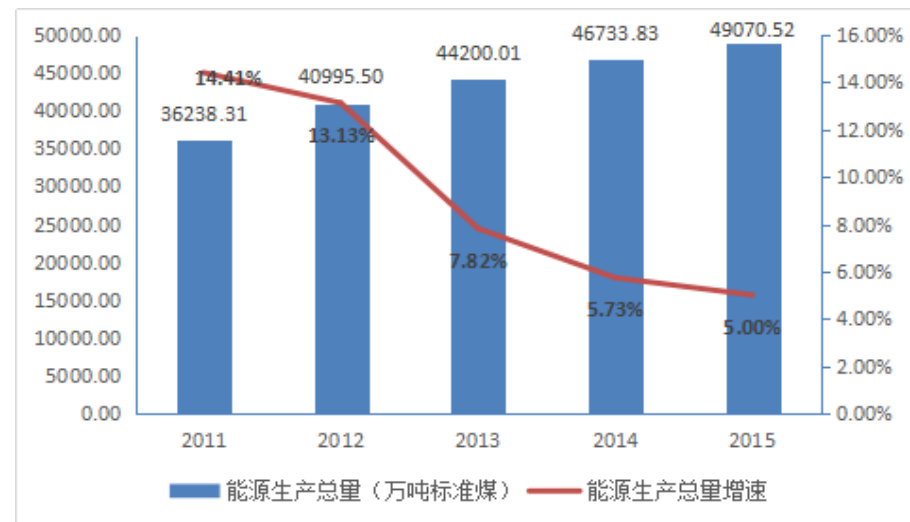


Fig.6 Shaanxi Energy Production

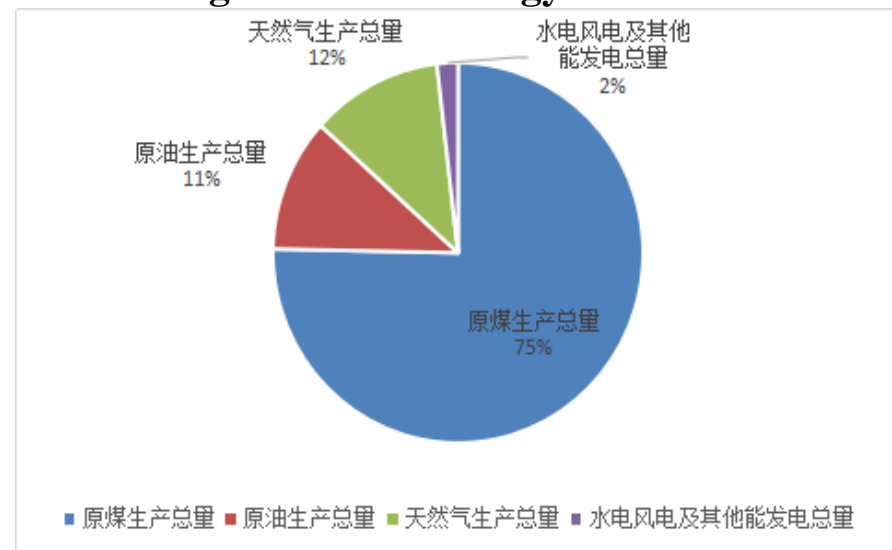


Fig.7 Shaanxi Energy Production

### (3) 煤炭生产与消费总量增长较快 (Coal production and consumption increased rapidly.)

2015年，陕西省煤炭产量 (coal production) 和消费量 (coal consumption) 分别达到**37303.72万吨**和**9251.82万吨**标准煤，“十二五”期间年均增长**8.3%**和**7.57%**。

### (4) 煤炭生产与消费占能源生产与消费的比重较大 (Coal production, consumption accounts for the proportion of energy production and consumption is larger)

2015年，陕西煤炭产量占到了能源生产总量的75%，占比高出了同期全国平均水平 (74%) 1个百分点；**煤炭消费总量占到了能源消费总量的72%**，比全国平均水平高出了8个百分点。(In 2015, Shaanxi coal production accounted for 75% of total energy production, coal consumption accounted for the total energy consumption of 72%.)

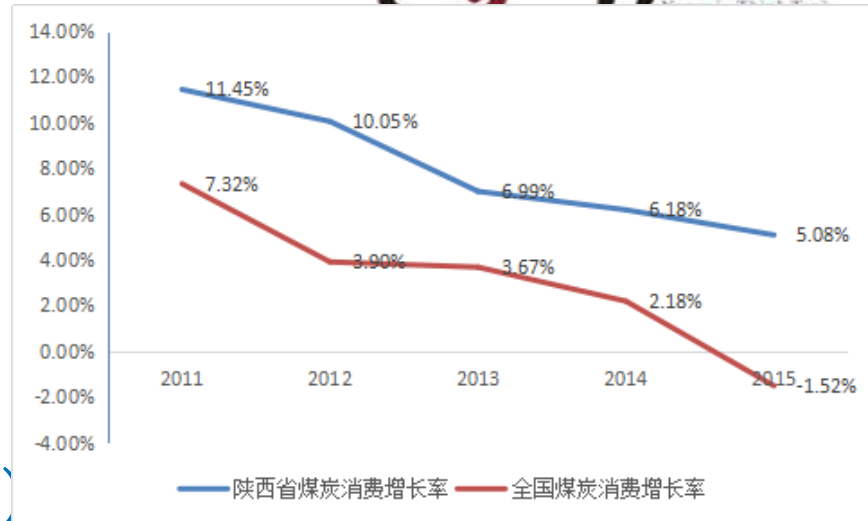


Fig.8 Shaanxi coal consumption growth

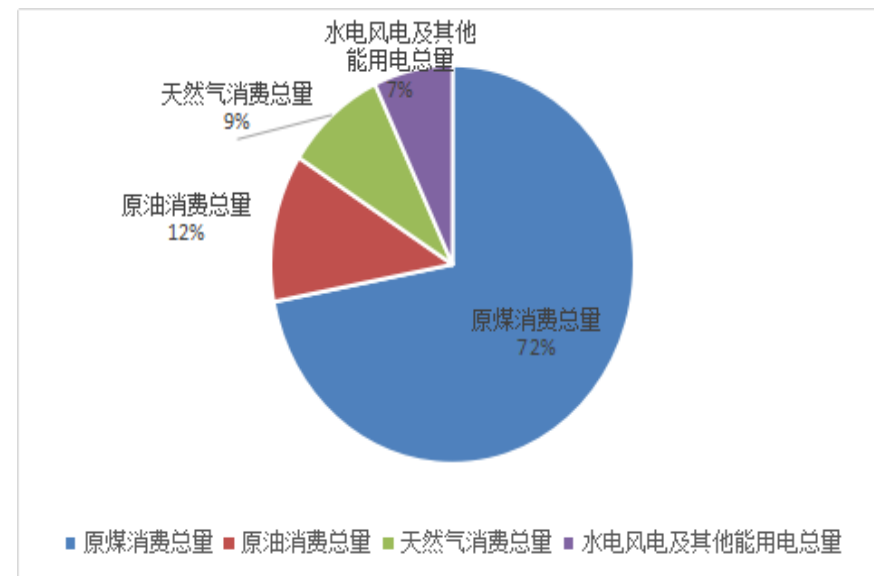


Fig.9 Shaanxi total energy consumption

### (5) 煤炭外销比例较大 (Greater proportion of coal export)

“十二五”期间，外调煤炭销售量占到了煤炭销售总量的73%以上。(“Twelfth Five-Year” period, the transfer of coal sales accounted for more than 73% of the total coal sales.)

### (6) 煤炭利用效率较低 (Coal utilization efficiency is low)

2015年陕西省火力发电能源加工转换效率为39.17%，炼焦能源加工转换效率为90.07%，均低于全国同期水平。(In 2015, the thermal energy conversion efficiency of thermal power generation in Shaanxi Province is 39.17%, the coking energy conversion efficiency is 90.07%.)

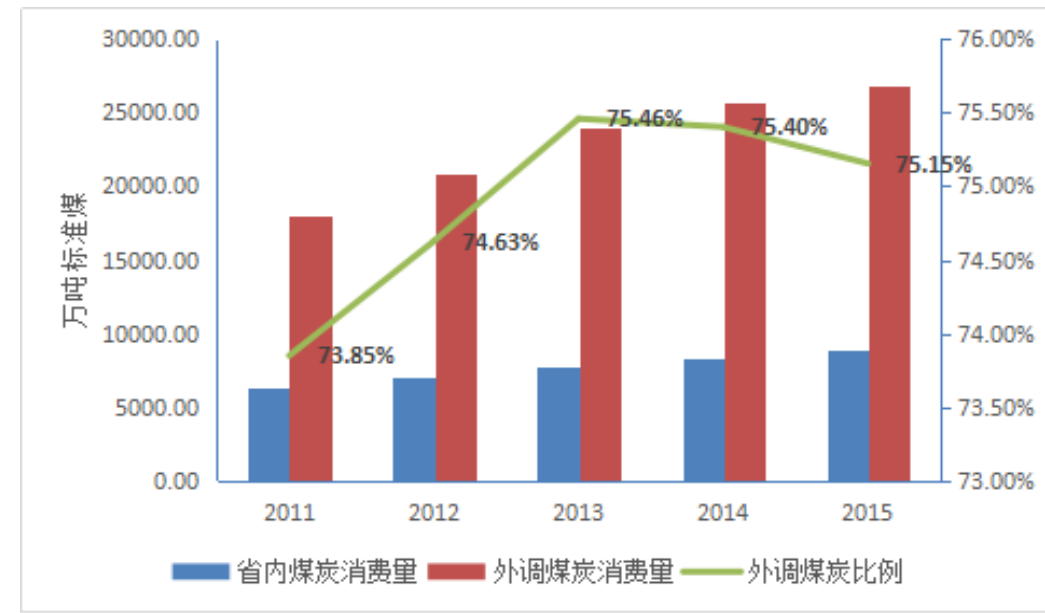


Fig.10 Coal Outburst in Shaanxi Province

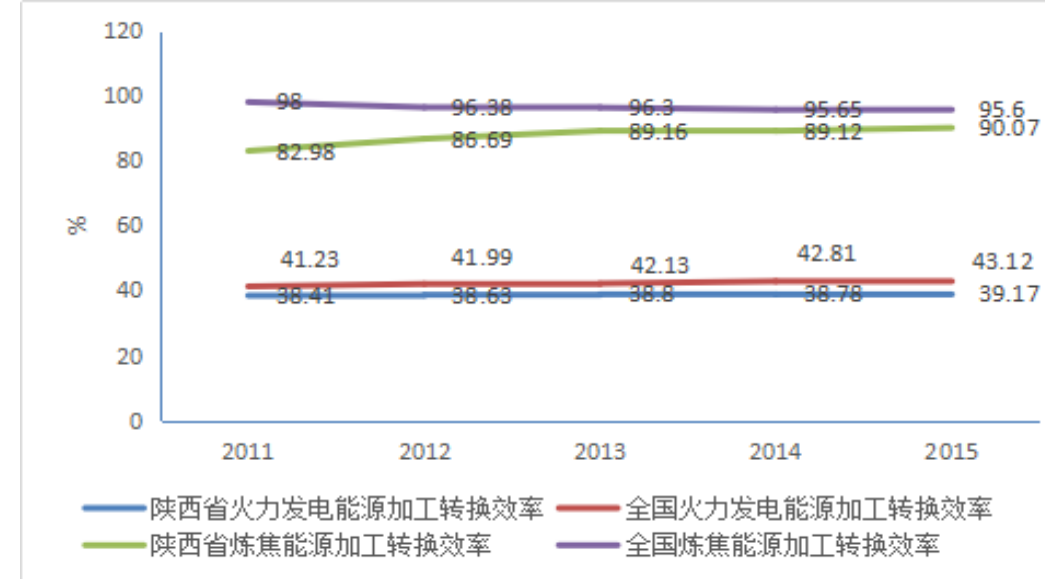


Fig.11 Shanxi coal processing consumption conversion rate



## (7) 煤炭生产与消费区域分布差异较大 (Regional differences in coal production and consumption.)

陕西省的煤炭资源主要分布在陕北地区及关中部分地区。与煤炭生产相一致，陕西省煤炭消费也呈现出明显的陕北关中多、陕南少的区域分布特点。

**The coal production and consumption of Shaanxi Province shares the same regional distribution characteristics, which is more in Shaanxi Guanzhong and less in Shaannan.**



### 3陕西省控煤思路 (Coal consumption control method)



★以煤炭消费总量控制为切入点，严守资源环境生态红线，根据陕北、关中、陕南地区差异，加快产业结构调整，大力发展第三产业与低碳产业，淘汰电力、钢铁、建材等行业落后过剩产能，减少煤炭消费。

★推进能源结构优化，增加天然气供应，加快风能、水能、太阳能、地热能、生物质能等可再生能源发展，替代煤炭消费。

★加速煤炭消费方式升级，深化煤炭产品加工，提高煤炭在二次能源消费中的比例，推广高耗煤行业节能减排技术，提高煤炭利用效率，清洁高效用煤。

Taking the control of the total consumption of coal as the starting point, strictly adhere to the resource environment and ecological red line, accelerate the adjustment of industrial structure, vigorously develop the tertiary industry and low-carbon industries;

Through promoting energy structure optimization and developing renewable energy to replace energy consumption;

By accelerating the upgrading of coal consumption and deepening the coal product processing to improve coal utilization efficiency and to keep the clean and efficient use of coal.

## 4 煤炭消费总量预测 (Total coal consumption prediction)



预测方法 (**Prediction method**) : 部门预测法 Department prediction

预测模型 (**Prediction model**) : 陕西省煤炭消费主要集中在电力、钢铁、煤化工、建材等行业部门。(Coal consumption in Shaanxi Province is mainly concentrated in the power, steel, coal chemical, building materials and other industry sectors.)通过对这些部门的产量预测, 预估陕西煤炭消费量。

预测结果 (**Prediction result**) : 2020年, 陕西省煤炭消费总量将达到12244.67万吨标准煤。按照煤炭消费占产量的30%测算, 陕西省煤炭生产总量将达到40815.55万吨标准煤 (Consumption of 122,336,700 tons of standard coal; production 408,155,500 tons of standard coal)。

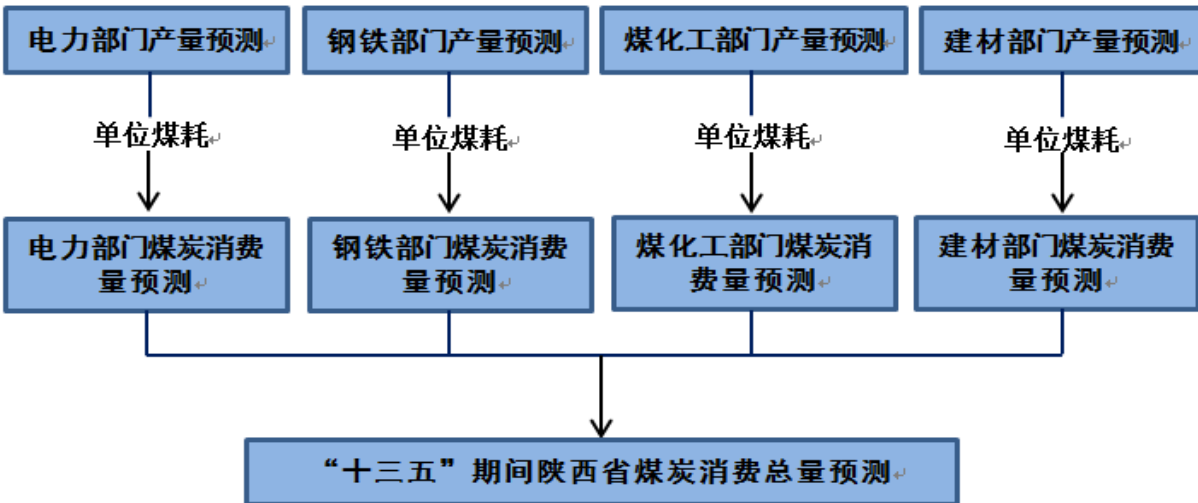


Fig.12 Forecasting Methods of Shaanxi Coal Consumption



Fig.13 Forecast of Coal Production and Consumption in Shanxi Province

# 5 煤炭消费总量控制目标制定 (Control target of total coal consumption)

## (1) 陕西省煤控目标的制定 (Development of Coal Control Target in Shaanxi Province)

★大气质量约束下的煤控目标 (Coal Control Target under Air Quality Constraint)

结合陕西省空气质量现状和《陕西省环境保护“十三五”规划》，最终得出在空气质量约束下陕西省煤炭消费总量应控制在9730万吨标准煤。

(In Shaanxi Province, the total coal consumption should be controlled at 97.3 million tons of standard coal.)

★水资源约束下的煤控目标 (Coal Control Target under Water Resource Constraint)

火电行业，选取煤耗1吨的用水定额为7.6 m<sup>3</sup>；煤化工行业，煤耗1吨的用水定额为12.5 m<sup>3</sup>。（For the thermal power industry, select a coal consumption of 1 ton of water for the 7.6 m<sup>3</sup>; for the coal chemical industry, coal consumption of 1 ton of water quota of 12.5 m<sup>3</sup>）

★陕西省煤控目标设定 (Target Setting of Coal Control in Shaanxi Province)

按照环境质量最优原则，到2020年，陕西省煤炭生产总量应控制在40085.68万吨标准煤，消费总量应控制在9730万吨标准煤。（The total production should be controlled at 400,856,800 tons of standard coal, the total consumption should be controlled at 97.3 million tons of standard coal.）

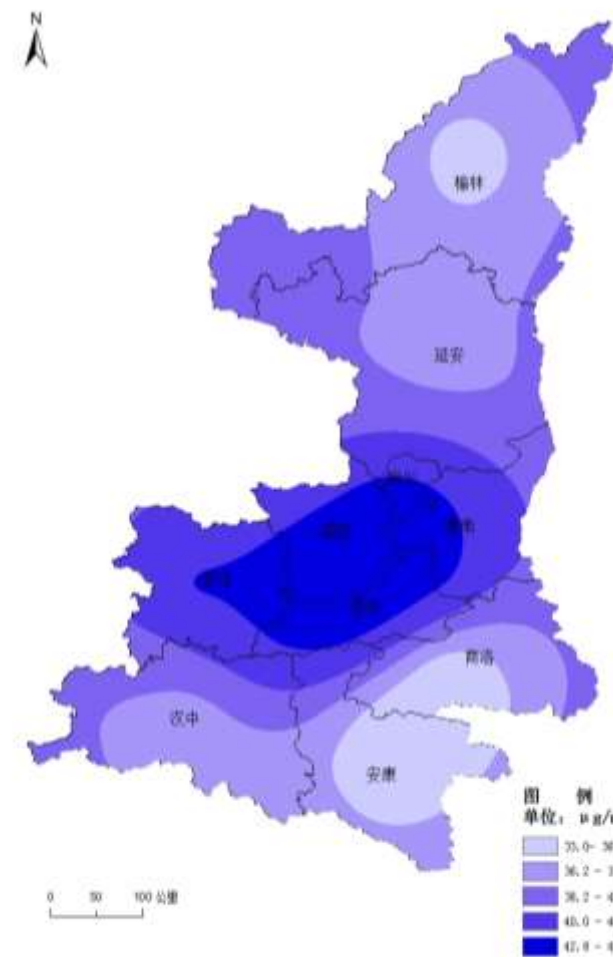


Fig.14 Shaanxi PM2.5 constraint value

## (2) 地区煤控目标的制定 (Development of Regional Coal Control Objectives)

### ★分配方法 (Allocation method)

从各地区控制煤炭消费的责任、抵抗控制煤炭消费对经济发展影响的能力以及削减煤炭消费潜力三个方面，选择常住人口、城镇化率、各地区煤炭消费总量、人均GDP、财政收入、第二产业占比、单位GDP煤炭煤耗等指标，建立地区煤炭消费总量控制目标分解体系，计算各地区控煤分配指数，制定“十三五”期间陕西省各地区煤炭消费总量控制目标。

### ★分配结果 (Allocation result)

陕北地区消费控制目标4929.08万吨，削减总量1430.67万吨；关中地区消费控制目标3354.88万吨，削减总量558.81万吨；陕南地区消费控制目标1446.04万吨，削减总量510.81万吨。

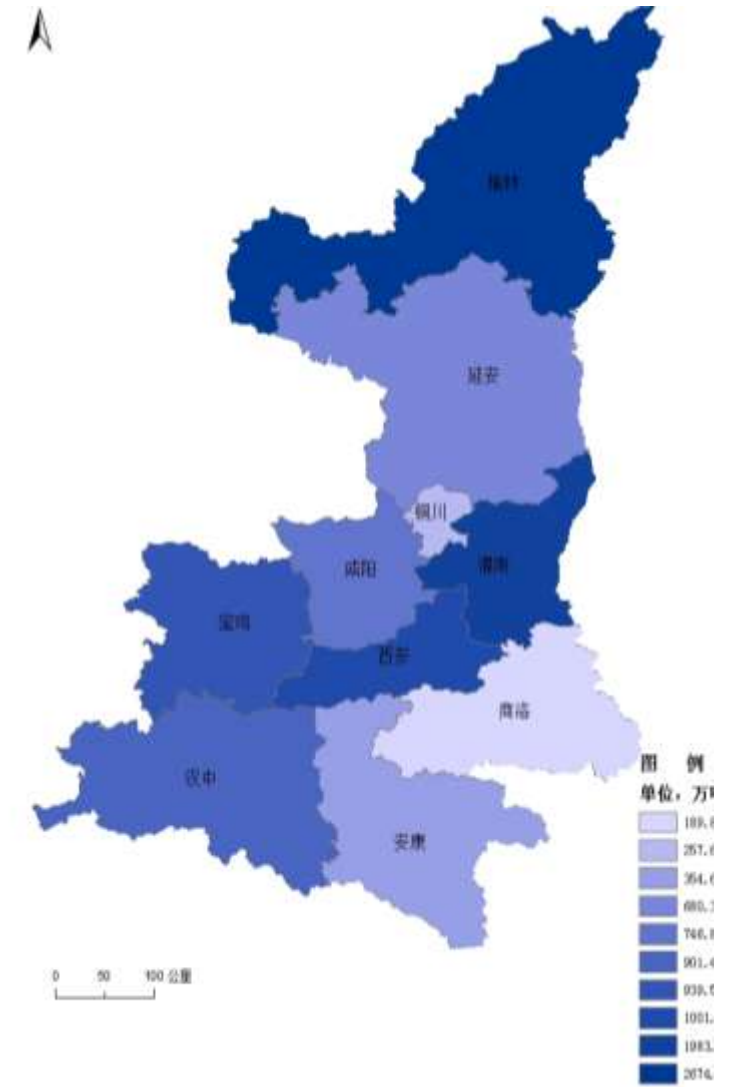


Fig.15 Shaanxi coal control targets

地区 (Region)	控制消费量 (Control consumption)	削减量 (Cutting quantity)
陕北地区 (Northern Shaanxi)	49,290,800tons	14,306,700tons
关中地区 (Guanzhong region)	3,548,800tons	5,588,100tons
陕南地区 (Southern Shaanxi)	14,460,400tons	5,108,100tons



## 6 煤炭消费总量控制目标实现路径 (Coal consumption total control target realization way)



### (1) 陕西省控煤的三个特点(Three Characteristics of Controlling Coal in Shaanxi Province)

★**清洁化为主思路**：陕西煤炭消费成本优势突出，清洁化利用是控煤的主路径，减量化和替代化是辅路径。

The cost comparative advantage of Shaanxi coal consumption is obvious, clean use is the main path of coal control, reduction and replacement is the auxiliary path.

★**两个过程相协调**：陕西涉煤产业地位重要，控煤过程应该与产业结构转型升级过程相协调。控煤过程实际上是一个产业结构调整过程。

Shaanxi coal industry status is important, coal control process should be coordinated with the upgrading process of the industrial structure. **Coal consumption control is actually a process of industrial structure adjustment.**

★**三大区域区别对待**：依据陕西三大区域的功能区划分，限制开发区和禁止开发区严格控制煤炭消费，重点开发区域放松煤炭消费限制。

According to the Shaanxi functional areas, restricted development zones and prohibited development zones strictly control consumption, and focus on the development of regional relaxation of coal consumption restrictions

## (2) 陕西省控煤的具体措施(Coal consumption control measures in Shaanxi Province)



控煤措施之一 (Measure1) : 促进能源效率提升, 高效利用煤炭 (Promote energy efficiency, efficient use of coal)

★加快高耗煤部门节能改造

**Speed up the high energy consumption of coal sector**

★加强重点用能单位节能管理

**Strengthen energy conservation management of key energy-using units**

★加大散煤利用治理力度

**Increase the use of household coal handling efforts**

★加快推进煤电污染减排改造

**Accelerate the coal&power pollution reduction and transformation**

## 控煤措施之二 (Measure2) : 推进产业结构升级, 减少煤炭消费 (Promote the upgrading of industrial structure, reduce coal consumption)



### ★加快发展第三产业 (Accelerate the development of the third industry)

根据陕北、关中、陕南地区发展差异, 大力发展金融、物流、信息服务、旅游、电子商务、商贸、健康养老等第三产业, 替代高耗能产业为主的第二产业, 进一步推动产业结构调整

**According to the development differences between northern Shaanxi, Guanzhong and southern Shaanxi, the Bank will vigorously develop tertiary industry such as finance, logistics, information services, tourism, e-commerce, commerce and health to alternative energy-intensive industries and further promote the industrial structure adjustment.**

### ★进一步淘汰落后过剩产能 (Eliminate backward excess capacity)

针对煤炭、电力、钢铁、建材等产能过剩产业, 清查企业过剩落后产能和僵尸企业情况, 制定处置工作方案。

**For the current coal, electricity, steel, building materials and other overcapacity industries, inventory excess capacity and zombie enterprises' overcapacity situation, and develop a disposal program.**

### ★审慎发展现代煤化工产业 (Develop modern coal chemical industry carefully)

稳步有序推进煤制清洁燃料、大力推进煤基化工产业链延伸。

**Steady and orderly push coal clean fuels, and vigorously promote the coal-based chemical industry chain extension.**

## 控煤措施之三 (Method3) : 加快能源结构优化, 替代煤炭消费 (Accelerate the optimization of energy structure, alternative coal consumption)

### ★扩大天然气消费比例 (Expanding the proportion of natural gas consumption)

多方组织气源, 增加天然气供应; 积极实施“气化陕西”工程

**Through multi-organization gas source to increase the supply of natural gas; actively implement the "gasification of Shaanxi" project.**

### ★加快可再生能源发展 (Accelerate the development of renewable energy)

稳步发展水电; 加快发展风电; 规模化发展光伏发电; 有序扩大地热能应用; 稳妥推进生物质能发展

**Steady development of hydropower; accelerate the development of wind power; large-scale development of photovoltaic power generation; orderly expansion of geothermal energy applications; and steadily promote the development of biomass.**



**thank you !**

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