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Analysis of Energy Consumption Status in Shanxi Province

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Abstract: *Based on the energy statistics of Shanxi Province from 2015 to 2020, the total energy consumption, industrial composition and energy consumption structure of Shanxi Province in the past 6 years were analyzed. The results show that the energy consumption of Shanxi Province is increasing year by year. The energy consumption of the secondary industry occupies a dominant position, accounting for more than 75%; In the energy consumption, coal consumption accounts for the largest proportion, but the proportion of coal shows a downward trend, while electricity and natural gas show an opposite trend, and the proportion of energy consumption increases year by year. Finally, some suggestions are put forward according to the current situation of energy consumption.*

Keywords: *Shanxi Province; Energy consumption; Low carbon*

1. Introduction

Shanxi is most famous for the variety of coal resources, its wide distribution area, rich reserves, is one of China's important heavy industry bases. For a long time, in Shanxi Province economic development mainly depends on its own advantage of abundant energy, go the way of "high carbon" type development, as an important energy production and consumption in China, the total energy consumption, low use efficiency, compared with other provinces, shanxi's carbon footprint is larger and has been in a rising stage, the adverse impact on the environment [1]. This paper analyzes the total energy consumption and industrial structure of Shanxi Province from 2015 to 2020, and puts forward countermeasures for the current situation, providing reference for Shanxi Province to pursue low-carbon green development.

2. Analysis of current situation of energy consumption

2.1. Analysis of total energy consumption status

Economic development cannot be separated from energy consumption. By sorting out the data of statistical yearbook of Shanxi Province, the statistical table of total energy consumption and energy consumption of each industry from 2015 to 2020 is completed.

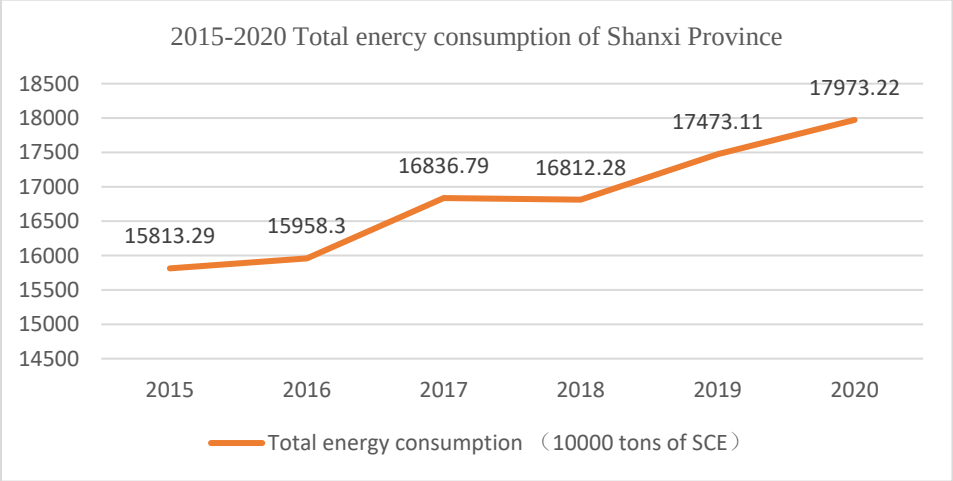

Figure 1: 2015-2020 Total enercy consumption of Shanxi Province

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From Figure 1, it can be seen that the total energy consumption of Shanxi Province increased from 2015 to 2020, and reached 17,973.22 (10000 tons of SCE) in 2020.

2.2. Analysis of current situation of energy consumption in industrial composition

As can be seen from Table 1, the energy consumption of the secondary industry has always accounted for more than 75% of the total and is rising year by year, reaching 134,533,200 tons of standard coal in 2020. In terms of the overall trend, the energy consumption of the primary industry is decreasing. In 2015, the energy consumption of the primary industry is 3.1337 (10000 tons of SCE) , while in 2020, the energy consumption of the primary industry is 2.9669 (10000 tons of SCE). The tertiary industry's energy consumption has always accounted for more than 12% of the total, rising first and then declining, and will reach the lowest in 2020, reaching 19,088,300 tons of standard coal. People's domestic energy consumption first rose from 2015 to 2020, then fell, and began to rise again in 2019.

Table 1: 2015-2020 Industrial energy consumption.

Year	Primary industry (10000 tons of SCE)	Secondary industry (10000 tons of SCE)	Tertiary industry (10000 tons of SCE)	Residential consumption (10000 tons of SCE)
2015	313.37	12041.17	1930.17	1528.09
2016	320.24	12098.16	1993.52	1546.37
2017	323.60	12712.58	2125.80	1674.81
2018	294.24	12954.63	2076.10	1487.29
2019	308.12	13453.32	2139.48	1572.19
2020	296.69	14138.01	1908.83	1593.69

2.3. Analysis of current situation of energy consumption structure

(1) Analysis of coal usage

From 2015 to 2020, the raw coal consumption in Shanxi Province has been decreasing year by year, from 40,730,200 tons of standard coal in 2015 to 29,3988 tons in 2020. The washed coal and other washed coal also show the same trend, from 5,801,800 tons of standard coal in 2015 to 2,596,600 tons of standard coal in 2020. And the coke consumption is increasing year by year, from 20.2386 (10000 tons of SCE) in 2015 to 2598.65 in 2020[2]. Shanxi is a large coal-producing province, with low price and convenient use of coal, coupled with the inertia of "path dependence" for a long time, making coal consumption absolutely dominant in energy consumption. Secondly, the industrial structure of Shanxi Province is dominated by traditional high energy consumption industries such as electric power, coal, coking, chemical industry, building materials and metallurgy. These resource-oriented industries have a high demand for coal.

Table 2: 2015-2020 Energy composition consumption.

Year	Coal	Washed coal and others	Coke	Petroleum products	Electricity	Natural gas,gas and others
2015	4073.02	580.18	2023.86	1133.28	5096.18	2906.77
2016	4083.13	369.83	2135.23	1188.01	5265.14	2916.96
2017	4281.02	362.36	1902.72	1285.70	5788.91	3216.08
2018	3083.98	246.29	2274.07	1147.48	6624.80	3435.66
2019	3051.86	235.85	2438.58	1205.58	6782.86	3758.38
2020	2939.88	259.66	2598.65	1009.44	7054.41	4075.18

Note: The unit is 10000 tons of SCE.

(2) Analysis of petroleum products usage

The consumption of petroleum products increased first and then decreased, from 1,332,800 tons of standard coal in 2015 to 1,285.70 tons in 2017, and then decreased to 10,094,400 tons of standard coal in 2020. Similar to the trend of energy consumption in the tertiary industry, the rise is mainly attributed to the continuous development of the transportation industry and the continuous rise of vehicle ownership, while in 2018, the popularity of new energy vehicles made the consumption of petroleum products begin to decline.

(3) Analysis of power usage

The electricity consumption shows a rapid growth, from 50.9618 (10000 tons of SCE) in 2015 to

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7054.41 in 2020. At present, the electricity consumption is mainly in agriculture and heavy industry, and the extensive economic development mode in Shanxi Province for a long time is the main reason for this phenomenon.

(4) Analysis of natural gas usage

Natural gas consumption also shows a rapid growth, from 29,067,700 tons of standard coal in 2015 to 4,075.18 tons in 2020. At present, natural gas consumption is mainly in agriculture and heavy industry. Compared with coal, natural gas is cleaner and cheaper, so it is feasible to increase its proportion in energy structure in the future.

As shown in Table 2, coal consumption accounts for the largest proportion of energy consumption, which is also in line with the situation of Shanxi Province. However, as energy consumption increases year by year, the proportion of coal decreases, while electricity and natural gas show an opposite trend to coal, with the proportion of energy consumption increasing year by year.

3. Suggestions on energy consumption in Shanxi Province

After analyzing the current situation of energy consumption in Shanxi Province, this paper finds out the main factors affecting energy consumption, and puts forward the following suggestions for energy consumption in Shanxi Province:

(1) Accelerating industrial restructuring and transforming the pattern of economic growth

In 2020, the secondary industry of Shanxi Province contributed 43.4% of GDP and consumed 78.7% of the energy of the whole society [3]. The tertiary industry contributes 51.2% of GDP and consumes 10.6% of the energy of the whole society, indicating that the energy efficiency of the tertiary industry is much higher than that of the secondary industry. The tertiary industry has high added value, low requirements for energy consumption, less environmental pollution and carbon emissions, and is the key development industry to be supported in the future [4]. Shanxi Province should gradually increase the proportion of tertiary industry in economic development, reduce the proportion of secondary industry, and optimize the structure of secondary industry, strive to build a modern industrial system, as soon as possible to get rid of heavy dependence on resource exploitation, heavy industry manufacturing and other industries with high pollution and low efficiency, to achieve green development.

(2) Actively promote scientific and technological innovation and optimize the energy consumption structure

In the energy structure of shanxi coal consumption proportion is very heavy, over the years, coal mining and use of shanxi ecological environment caused irreparable, strengthen the research of technology innovation of coal resources, more to the development of new energy and renewable energy use, improve the clean energy and the proportion of renewable energy in the energy structure [5]. The government should actively support and encourage the research and development and application of low-carbon technologies. For enterprises that consume a lot of energy, pollute a lot and do not actively adopt emission reduction measures, they should adopt fees or fines to promote them to move closer to low-carbon mode. Subsidies will be given to those enterprises that actively participate in energy conservation and emission reduction and meet the standards.We will vigorously develop the use of renewable energy such as solar, wind, biomass and geothermal energy, increase the scale of the use of renewable energy, shut down outdated production facilities such as small coal kilns and small thermal power plants, and improve the energy consumption mix.

(3) Advocating low-carbon and green living and deepening low-carbon development reform

In terms of clothing, food, housing, transportation and consumption, the public should be encouraged to adopt low-carbon modes of transportation, such as public transportation, cycling and walking [6]. Energy-saving products and appliances should be promoted and popularized, and residents should be guided to choose low-energy appliances. We will coordinate the use of energy in urban and rural areas, accelerate the reform of the way rural areas use energy from "bulk coal mainly to clean coal, electricity, natural gas, solar energy and other complementary energy sources, and foster a new awareness and concept of energy conservation for all [7]. We will encourage large coal enterprise groups to focus on the efficient development and utilization of coal resources and the safety of coal production, develop clean energy, share high and new technologies, accelerate the optimization of the allocation of production factors and deepen the reform of the industrial structure.

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