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Analysis on the optimal path of economy-energy system in Fujian province based on SD model

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ABSTRACT. In response to the national "13th five-year plan", Fujian province needs to make macro control of the economy-energy system. In this paper, with the help of SD model of system dynamics, the technical progress and industrial transformation were analyzed in a unified framework. According to the present situation of industrial structure and energy structure in Fujian province, the GDP and energy consumption in 2019-2025 were predicted. Industrial adjustment parameters and technical improvement parameters were set according to the national macro-control objectives, and the scenario under the corresponding optimization path was set with different optimization objectives. The conclusion that technological progress and energy consumption change, industrial structure optimization and economic development had the same trend of change was obtained through comprehensive analysis, which provided quantitative reference and decision-making basis for industrial transformation policy and the direction of technological innovation development.

KEYWORDS: *"13th five-year plan", Industrial structure, Energy structure, System dynamics*

1. introduction

Energy development is the material conditions and foundation of economic growth and social progress. The number of energy production and consumption is important to measure the degree of economic development in a region. There are three aspects embodied in the close relationship between economy and energy. First, economic development has a strong dependence on energy utilization efficiency. Second, excessive energy consumption will cause environmental damage to pressure

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of the economic development, becoming a stumbling block to social development. Third, economic growth is conducive to technological improvement and energy efficiency.

great-leap-forward development of China after the 12th five-year plan has rapidly made China the second largest economy in the world. The 13th five-year plan pointed out that economic development should be coordinated from a holistic perspective. While focusing on economic development, energy-related indicators should be paid attention. The relationship between energy, economy and environment should be well handled. With the continuous improvement of the market economic system, the market mechanism is becoming more and more involved in the allocation of resources and the balance of supply and demand. In order to achieve the country's long-term goals, the government's macro-control policies are particularly important. National policies can promote the healthy and sustainable development of economy by adjusting industrial structure and supporting the progress of low-energy industries. To realize the win-win goal of economic structure optimization and energy structure optimization, it is necessary to carry out industrial macro-adjustment on the basis of scientific and reasonable prediction of current energy-economy development.

Energy efficiency is determined by energy structure distribution in various industries. In the past two decades, the dependence of Fujian province on coal consumption reached 50-70%, and the consumption of clean energy, such as natural gas, only broke through 1% in 2009. The improvement of energy efficiency depends on technological innovation for promoting the adjustment of energy structure, and achieving the state that energy structure is matching with industrial structure optimization.

Based on the actual situation of economic development and energy development in Fujian province, this paper used the system dynamics model to analyze the relationship between energy and economic development. The industrial structure and energy structure were optimized by means of industrial structure adjustment and technological progress, so as to achieve the dual strategic goals of steady growth and energy consumption reduction in the new normal.

With the acceleration of industrialization, China has made great achievements in economic development in the past decades. Today, China is one of the world's most

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important manufacturers and industrial producers. However, significant economic achievements are based on excessive energy consumption and environmental risks. China has been the world's largest energy consumer and carbon emitter, with more than two-thirds of energy consumption coming from industrial activities (IER, 2015). In this context, improving industrial energy efficiency is of great significance for building an sustainable industrial system with low energy consumption and low emission.

Due to the uneven economic development in the past decades, regional differences in energy efficiency of Chinese industries are obvious. For example, the ratio of energy consumption to total industrial output in xinjiang was 1.30 tons of standard coal (tce) per 10,000 yuan in 2016, while Beijing was only 0.07 tons of coal equivalent per 10,000 yuan, which was about 20 times of Beijing's unit energy consumption (NSBC, 2017). In order to ensure the differentiation and pertinence of industrial energy efficiency improvement policy, it is a basic work to analyze the influencing factors of provincial industrial energy efficiency. At the same time, a large number of researchers were making efforts for a variety of methods used in the study of provincial industry energy efficiency . For example, Wang and Wei (2014), Wu et al. (2014), Zhang et al. (2016), Zhao et al. (2016), Chen and Jia et al. (2017) evaluated China's provincial environmental efficiency, energy efficiency and CO2 emission efficiency based on data enveloping analysis (DEA). Wang et al. (2012) established the total factor energy efficiency framework and found out the differences in energy efficiency of various industrial sectors from 2005 to 2009. Li et al. (2016) put forward energy pollution efficiency index and index of change in energy pollution productivity to evaluate the performance of regional industrial energy pollution in China from 1995 to 2014. Bian et al. (2015) proposed a measure based on two-stage relaxation measure (SBM model) to evaluate regional industrial efficiency. Also, he decomposed these efficiencies into production efficiency and emission reduction efficiency. These studies revealed the regional differences in industrial energy efficiency (or other related efficiency indicators), which were generally quite low.

Industrial energy efficiency is more closely related to industrial structure. There are significant differences in energy efficiency between industry sectors. For example, Bosseboeuf(2015) pointed out that primary metal manufacturing industry

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needs 30 times more energy to produce one unit of added value than mechanical manufacturing industry. Other studies had also highlighted huge differences in energy efficiency between sub-industries (Kang and Lee, 2016; Xie, 2016,2017; Li and Lin, 2017; Wang et al., 2017). Thus, under the same condition, the increasement of the share of the efficient sectors in the industry as a whole will improve the average energy efficiency of the industry in a given region.

2. Analysis of economy-energy situation in Fujian province

2.1 current situation of energy consumption

Since 1995, the total energy consumption of Fujian province has increased exponentially. In 2016, the total energy consumption reached 123.5775 million tons of standard coal, and the average annual consumption growth rate reached 103.6 percent from 1995 to 2016. From the perspective of energy consumption structure, the energy were mainly consumed by coal, oil and non-fossil energy (mainly hydropower) in Fujian province, while natural gas accounted for fairly small proportion. In the early 1990s, coal consumption in Fujian province accounted for 70.9% of the total energy consumption. Although it showed a slow trend of decline, it still dominated the total energy consumption in Fujian province. According to the terminal consumption structure of 2010, 2013 and 2016, coal energy and coke energy tended to decrease, while oil, natural gas and electricity consumption had increased. Although natural gas accounts for the smallest part of the energy consumption in Fujian province, the growth rate was kept about 40%. It indicated that the proportion of clean energy consumption in Fujian province has increased significantly in recent years, which was also one of the important reasons for the increase of energy consumption intensity. Consider the change of energy structure in consumption in recent 22 years, in addition to the increase of total consumption of natural gas and oil, the consumption of renewable energy was also rising steadily.The proportion of renewable energy consumption in recent three years had an obvious upward trend.

Table 3-1 The structure of energy consumption(tce) in 1995-2016.

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Year	Coal	Oil	Gas	Primary electric energy and others	Total energy consumption
1995	1249.39068	444.58245	0	585.93687	2279.91
1996	1358.50772	522.31434	0	571.35794	2452.18
1997	1269.54788	527.31221	0	702.24991	2499.11
1998	1338.30378	572.45364	0	667.86258	2578.62
1999	1493.91396	629.16228	0	648.56376	2771.64
2000	1600.7744	685.6258	0	656.1998	2942.6
2001	1625.82826	695.8798	0	841.38194	3163.09
2002	2010.12348	860.44854	0	744.75798	3615.33
2003	2494.4057	995.32475	0	572.81955	4062.55
2004	2888.7364	1136.4778	9.0556	493.5302	4527.8
2005	3417.87006	1369.44962	5.75399	960.91633	5753.99
2006	3825.3163	1439.29125	6.39685	1125.8456	6396.85
2007	4471.72454	1620.91128	7.10926	1009.51492	7109.26
2008	4841.6092	1554.5742	23.2026	1314.814	7734.2
2009	5471.65385	1628.96565	116.95138	1136.09912	8353.67
2010	5090.93868	2278.97616	385.95564	1433.54952	9189.42
2011	6187.7426	2395.2552	459.09058	938.14162	9980.23
2012	5983.76024	2462.6684	503.01312	1529.99824	10479.44
2013	6367.05879	2618.43894	660.20469	1544.20758	11189.91
2014	6418.1516	3245.40496	666.0346	1780.12884	12109.72
2015	6150.88485	2996.27262	608.9985	2423.81403	12179.97
2016	5387.979	2928.78675	642.603	3398.38125	12357.75

Figure 3-1 Consumption of major energy types in 2010,2013 and 2016 (tce)

From the perspective of energy consumption structure in Fujian province, the long-term consumption of coal has damaged to the energy utilization efficiency and caused environmental pollution in Fujian province, Which made a result that the ecological environment was facing great challenges and pressure. At present, Fujian needs to vigorously develop clean technologies and promote the use of renewable

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energy and other clean energy to provide strong support for the sustainable development of society.

2.2 Distribution of industrial structure

For a long time, the light industry and tertiary industry accounted for the large part of industry structure, which became the main reason that its level of energy consumption was lower than that in nation. Since 1995, the proportion of the secondary industry in Fujian province has been rising continuously, reaching 51% in 2010.After that, It was reaching the peak to 52% after slow growth in 2014 and starting to decline in recent years. Overall, the second industry in Fujian province has passed the peak of development, and is now undergoing adjustment and upgrading of internal structural. During the eleventh five-year plan period, Fujian province was in the period of accelerated industrialization. It gave priority to the development of the secondary industry, followed by the tertiary industry and the primary industry, forming an industrial layout dominated by secondary industry with linkage of all industries. During this period, Fujian province strengthened the electronic information, mechanical equipment and petrochemical industry as three leading industries. And also, it promoted the traditional industries with competitive advantages, among which petrochemical, machinery, building materials and metallurgy are all energy-consuming industries. Consider the rules of the development of industry, tertiary industry in Fujian province have larger development space in the future, which will keep pace with the second industry. Now it is a good time in the development of the tertiary industry. This is a critical period when the demand structure of the whole society is changing from consumption of physical products to service products. The tertiary industry will gradually become the main engine driving economic development.

The main industries and products of Fujian province did not show obvious advantages, with weak competitiveness and poor benefits. The reason for this was that the industrial chain of Fujian province is mostly in the middle and lower reaches, which develops with the advantage of low cost. Most products lack independent innovation and the content of new technology. Therefore, it is extremely urgent to transform the former processing trade to core industries, promoting the research and development of enterprises to build high-end industrial chain.

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Table 3-2 Energy consumption of different industries in Fujian province (tce)

	2000	2005	2010	2016	2017
Primary industry	99.36	107.14	179.41	225.53	232.44
Secondary industry	1953.26	4102.84	6677.93	8797.8	9075.96
Tertiary industry	502.46	904.96	1316.46	1892.12	2056.5
Living consumption	387.52	639.05	1015.62	1442.3	1525.07

Since the reform and opening up, the economy of Fujian province has grown rapidly, which was 655.469 billion yuan in 2005 to 3218.209 billion yuan in 2017. The growth rate of the total output value of the secondary industry has slowed down since 2014. The primary industry maintain stability at a low degree ,while the total output value of the tertiary industry has increased significantly since the 11th five-year plan. The development and change process of each industry shows that the industrial structure of Fujian province is undergoing adjustment and upgrading. The primary and secondary industries are gradually transferring to the tertiary industry.

3.SD model construction and simulation

System dynamics method is used to study the causal feedback relationship between energy development and economic development by establishing the relationship equation between various variables, building the SD model under the dual objectives of energy-economy optimization, and conducting simulation research on the industrial structure dominated by industry and the energy structure dominated by coal consumption.

Combined with the output demands of model indicators, five state variables (L) representing the accumulation state of horizontal variables were selected, including the output value of primary industry, output value of secondary industry, output value of tertiary industry, domestic energy consumption and total energy consumption. Five rate variables (R) that represent the rate of change in horizontal variables include growth of primary industry, growth of secondary industry, growth of tertiary industry, growth of domestic energy consumption and growth of total energy consumption. Besides, there are 32 ancillary variables (A) and one constant (C).

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Table 4-1 The attributes and names of model variable

Code	Name	Type	Unit
1	Growth rate table function of secondary industry output	A	Dmnl
2	Output growth of the secondary industry	R	100 million yuan
3	Output value of secondary industry	L	100 million yuan
4	Manufacturing output ratio table function	A	Dmnl
5	Manufacturing output	A	100 million yuan
6	Energy intensity table function of manufacturing	A	Dmnl
6	Construction output ratio table function	A	Dmnl
7	Construction output	A	100 million yuan
8	Manufacturing energy consumption	A	10 thousand tce
9	Energy intensity table function of construction	A	Dmnl
10	Construction energy consumption	A	10 thousand tce
11	Clean energy proportion table function	A	Dmnl
12	Clean energy consumption	A	10 thousand tce
13	Coal energy consumption	A	10 thousand tce
14	Petroleum energy consumption	A	10 thousand tce
15	Natural gas energy consumption	A	10 thousand tce
16	Electric energy consumption	A	10 thousand tce

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17	Other energy consumption	A	10 thousand tce
18	Manufacturing technology factor	A	Dmnl
19	Construction technology factor	A	Dmnl
20	Increase in total energy consumption	R	10 thousand tce
21	Total energy consumption	L	10 thousand tce
22	Growth rate of total energy consumption	C	Dmnl
23	Energy intensity	A	10 thousand tce
24	Technology progress factor	A	Dmnl
25	Domestic energy consumption	L	10 thousand tce
26	Increase in domestic energy consumption	R	10 thousand tce
27	Growth rate table function of domestic energy consumption	A	Dmnl
28	GDP, gross output value	A	100 million yuan
29	GDP, table function of total output target	A	100 million yuan
30	Adjustment factor of industrial structure	A	Dmnl
31	Adjustment factor of primary industry	A	Dmnl
32	Adjustment factor of secondary industry	A	Dmnl
33	Adjustment factor of tertiary industry	A	Dmnl
34	Growth rate table function of primary industry output	A	Dmnl
35	Output growth of primary industry	R	100 million yuan
36	Output value of primary industry	L	100 million yuan
37	Energy intensity table function of primary industry	A	Dmnl

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38	Energy consumption of primary industries	A	100 million yuan
39	Growth rate table function of tertiary industry output	A	Dmnl
40	Output growth of tertiary industry	R	100 million yuan
41	Output value of tertiary industry	L	100 million yuan
42	Energy intensity table function of tertiary industry	A	Dmnl
43	Energy consumption of tertiary industry	A	10 thousand tce

The data of output value of primary and tertiary industries, manufacturing, construction, and energy consumption of various energy types were obtained from the statistical yearbook of Fujian province and China energy statistical yearbook from 2012 to 2018. The growth rate of output value of each industry is calculated by means of average value method. The data of energy consumption in each industry were calculated by regression analysis and moving average method. The target GDP was calculated with the current control target of real GDP growth rate(6%). The result of the dynamic evolution during 2019-2025 was simulated based on 2011. It is generally believed that the system simulation error is less than 5%, which means the system is reliable and accurate. In this paper, total GDP and total energy consumption were selected for precision test. As can be seen from table 4-2, the simulation error was all less than 5%, which means that the system simulated by this model can accurately reflect the real behavior of the situation.

Table 4-2 accuracy test results of the model

Year	Gross output value			Total energy consumption		
	Fitting value	True value	Error(%)	Simulation	True value	Error(%)
2011	17560.18	17560.18	0.000	9980.23	9980.23	0.000
2012	19657.60	19701.78	0.224	10479.44	10512.93	0.319
2013	21813.47	21868.49	0.252	11189.91	11061.09	-1.165

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2014	23976.99	24055.76	0.327	12109.72	11640.05	-4.035
2015	26135.59	25979.82	-0.600	12179.97	12227.79	0.391
2016	28187.10	28519.15	1.164	12357.75	12832.34	3.698
2017	30867.18	32182.09	4.086	12889.97	13427.79	4.005

The model construction intends to divide the secondary industry into manufacturing and construction industry. As the processing manufacturing industry in Fujian province is the leading industry of the secondary industry, it is necessary to separately analyze its

Output value and energy consumption in detail. The total output value and energy consumption of the primary industry and the tertiary industry were relatively small in the total output value and energy consumption of Fujian province. Energy consumption is divided into coal, oil, natural gas, electricity and other energy according to the types of energy consumption in the statistical yearbook. The optimization included adjusting the industrial structure according to whether the total output value of GDP reaches the national GDP target. When necessary, it also included adjusting the growth rates of the primary, secondary and tertiary industries to improve the system. The technical adjustment was designed to make the target of energy intensity control reached the policy guideline standard of energy consumption reduction. The system prediction model is shown in figure 3-3.

4. simulation results and optimization path analysis

According to the simulation results, the simulation results of the total output value of the three major industries in table 4-3 and figure 4-2 are obtained. The results show that the primary industry will remain stable in the future development, while the secondary industry still has a slow growth trend. The most significant of which is the increasing trend of the tertiary industry. After 2018, the tertiary industry will widen the gap with the secondary industry and break through the economic system with secondary industry development-oriented in Fujian province. The results show that sticking to the current development direction will gradually form the situation that the primary and secondary industry transfer to tertiary industry.

Table 4-3 simulation results of the total output value of the first, second and third industries (unit: RMB 100 million)

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Year	Primary industry	Secondary industry	Tertiary industry
2011	1612.23999	9069.2002	6878.74023
2012	1773.46399	9794.73633	8089.39844
2013	1954.3573	10758.538	9100.57324
2014	2061.84692	11722.50293	10192.6416
2015	2216.48535	12707.19336	11211.90625
2016	2329.52612	13154.48633	12703.08984
2017	2599.75122	13785.90137	14481.52246
2018	2697.779556	14988.03223	17189.56641
2019	2633.244326	16187.0752	19768.00195
2020	2667.079039	17482.04102	22733.20313
2021	2672.823429	18356.14258	26143.18359
2022	2710.567819	19273.94922	30064.66211
2023	2717.312209	20237.64648	34574.36328
2024	2744.056599	21249.5293	39760.51953
2025	2780.800989	22312.00586	45724.59766

Figure 4-2 simulation results of the total output value of the primary, secondary and tertiary industries

On the basis of current development, it is found that there is still a gap between the optimized target of national GDP and the forecast of actual GDP. In order to speed up the target of GDP slowdown, the paths of industrial structure adjustment and industrial output growth regulation were studied for scenario analysis. In scenario 1, the industrial structure adjustment factor of the secondary industry is set as 0.8. In scenario 2, the growth rate of output value of the secondary industry is reduced year by year on the basis of scenario 1 with the growth rate is finally lowered to 0.7 in 2025. The result of scenario analysis is shown in figure 4-3.

Figure 4-3 simulation results and scenario analysis of total GDP

From scenario 2, reducing the structure of the secondary industry and controlling the output growth of the secondary industry make the short-term simulation possible

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to reach the goal of national regulation. Controlling the industrial scale of development will effectively reduce the overall economic growth rate. The government can promote the transformation of industry from scale expansion to quality improvement. It will eliminate backward industries, give prominence to key and characteristic industries, or upgrade and transform traditional industries to raise their added value. To expand industrial clusters and improve competitiveness, it's necessary to select human capital investment through differentiated policies, cultivate key projects and leading enterprises,.

From the energy consumption structure of industry in figure 4-4, the primary industry always maintains stable at low level. The energy consumption of the secondary industry still occupies a dominant position in the short term. And the dominant trend declines year by year. In 2025, the energy consumption of the tertiary industry break through the energy consumption of the secondary industry for the first time and led the change of the trend in energy consumption together with the secondary industry.

Figure 4-4 structure of industrial energy consumption

On the premise of achieving the overall economic goal, changing the technical factors of manufacturing can appropriately improve the technical level of manufacturing sector to reduce energy consumption. In the study, the manufacturing technology progress factor was adjusted from 1 to 0.8. The simulation results show that manufacturing is highly dependent on coal resources. The coal resources save the most after the technical level is improved, and next the electricity. However, it can be found from the data of change rate that the manufacturing 's dependence on coal is gradually decreasing. Figure 4-5 shows the comparison between the analysis results of the original scenario and scenario 4. The construction industry is less dependent on coal and more dependent on oil consumption. By adjusting the technical progress factors of the construction industry, it can be found that the oil consumption level has a significant downward trend. Due to the shortage of oil resources in Fujian province, the oil supply depends on the import of oil from outside the province, which causes a certain pressure on the energy security of Fujian province. To change the single source of energy consumption and improve

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the energy utilization efficiency by improving the technical level of the construction industry, the dependence on oil consumption in Fujian province can be effectively reduced, and the risks of economic development and residential daily life can be reduced in a degree.

Table 4-4 Scenario analysis by manufacturing technology adjustment path

Year	Oil		Natural gas		Coal		Electricity	
	Scenario 3	Fitted value	Scenario 3	Fitted value	Scenario 3	Fitted value	Scenario 3	Fitted value
2011	1133.82	1133.82	298.07	298.07	1652.61	1652.61	1304.01	1304.01
2012	1154.37	1175.75	300.19	305.75	1661.83	1692.61	1313.73	1338.06
2013	1215.02	1265.23	317.09	330.20	1756.27	1828.85	1387.54	1444.88
2014	1249.00	1327.36	325.35	345.77	1801.56	1914.59	1423.78	1513.10
2015	1286.39	1393.58	336.02	364.02	1861.35	2016.45	1470.33	1592.84
2016	1225.51	1338.92	322.37	352.20	1787.53	1952.94	1410.32	1540.83
2017	1196.36	1322.03	314.20	347.21	1741.85	1924.82	1374.65	1519.05
2018	1215.62	1370.25	317.47	357.86	1758.57	1982.27	1389.19	1565.89
2019	1244.71	1429.02	322.42	370.17	1783.91	2048.07	1411.19	1620.15
2020	1281.48	1498.49	329.38	385.15	1820.34	2128.59	1441.96	1686.14
2021	1290.97	1509.57	329.47	385.26	1818.97	2126.99	1442.66	1686.96
2022	1310.11	1531.96	332.32	388.59	1833.08	2143.49	1455.42	1701.88
2023	1340.45	1567.43	338.39	395.69	1865.22	2181.07	1482.21	1733.20
2024	1383.69	1617.99	348.17	407.13	1918.23	2243.06	1525.21	1783.49
2025	1441.93	1686.10	362.30	423.65	1995.63	2333.56	1587.17	1855.93

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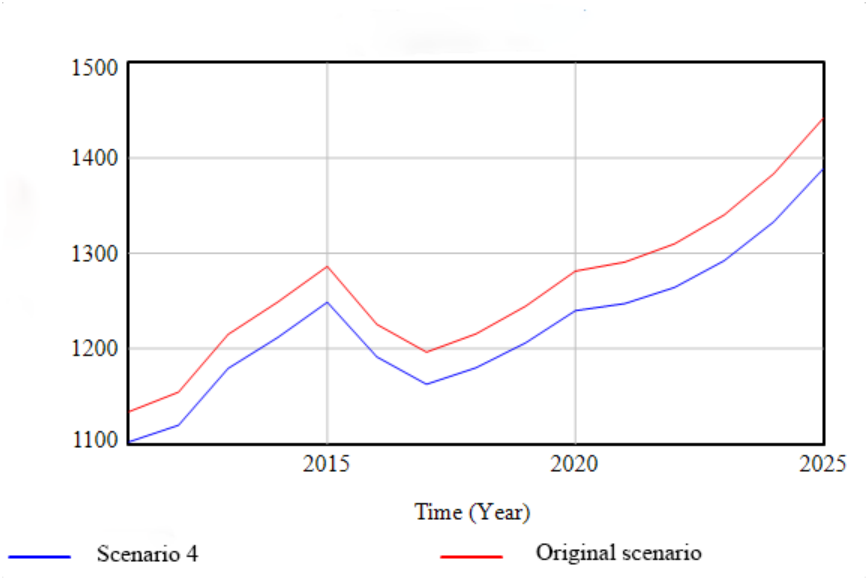

Figure 4-5 Scenario analysis of oil consumption under technical adjustment of construction industry

5. conclusion

In this paper, the energy consumption structure and industrial structure were simulated by system dynamics. The economic-energy system in Fujian province was analyzed by comparing the economic development level and energy consumption in different situations through setting parameter changes. The results show that the optimization of economic-energy system in Fujian province has the following constraints under the current development model:

1) Constraint of industrial structure. The development of the primary industry and the tertiary industry gave way to the secondary industry in Fujian. The energy efficiency of the secondary industry is quite low while the energy intensity is high. The environmental impact caused by excessive energy consumption imposes great constraints on economic development. In the forecast, it is found that the development level of the tertiary industry is growing rapidly. It will keep pace with the secondary industry in the near future, guiding the energy consumption structure and consumption trend of Fujian province. At present, the scale of manufacturing is

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still expanding, leading to a slow decline in the growth rate of industrial output. Only by properly adjusting the industrial scale and adjusting the growth rate of industrial output can the secondary industry transform to the tertiary industry faster and reach the target of national GDP regulation.

2) Constraint of technological progress. Under the existing technology level, the manufacturing development of Fujian province shows a great dependence on coal consumption, while the construction industry also has a preliminary dependence on oil consumption. The simplification of energy consumption in primary energy further puts pressure on the environment and leads to low energy efficiency of the whole system. On the one hand, the consumption mode of a single energy type lies in the insufficient investment technology in the development of clean energy and renewable energy. Energy distribution between enterprises is insufficient, which can only continue the traditional energy utilization mode. On the other hand, the enterprise's energy utilization technology is limited. So, it is unable to accelerate the use of other clean energy. Some backward enterprises lack energy recycling technology. Making environmental damage and energy shortage by abusement of resources.

Through the system constraint analysis, the following policy suggestions are given:

1) Investing manpower, capital and technology into core industries. Improving the development level of traditional industries and strengthening emerging leading industries. Eliminating backward and energy-intensive enterprises. Promoting the agglomeration and development of the secondary industry. Expanding the industrial chain, and forming local industrial clusters with Fujian characteristics.

2) Accelerating the development of tertiary industry. Raising funds to encourage and support the development of high-tech industry, science and research, electronic information, housekeeping service and other industries. Developing primary industry appropriately to build solid foundation for the advance in local.

3) Offering funding and support for the progress of renewable energy usage. Making full and rational use of nuclear, wind, water, tidal, biomass and solar energy by taking advantage of Fujian's unique geographical advantages. Making scientific planning and arrangement for the dispatch and distribution of clean energy.

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4) Regulating industrial energy use and consumption reasonably. And timely rectifying and supervising energy-consuming enterprises. Accelerating the elimination of backward products with limited advantage in enterprises. Encouraging industrial equipment upgrading and technological innovation, and strengthening the exploitation of competitive products.

5) Establishing a technology information sharing platform between enterprises to promote the promotion and improvement of clean energy technology. Industries that have taken the lead in green energy technology will be given subsidies and tax breaks, while companies that have stuck to the path of high energy consumption will be punished with higher taxes.

The core of the implementation of the 13th five-year development plan is to change the original ideology of financial progress, break the previous industrial development mode and energy consumption concept, and explore driving forces of system balance under the existing market rules. For Fujian, which is in the critical period of industrial transformation and upgrading, it is necessary to give full play of the favorable policy advantages and make full preparations for transformation. Strengthening mutual assistance and cooperation among enterprises to improve the technical level of all parties. Fostering the competitiveness of Fujian province to drive the economic and energy system of the whole nation to enhance toward multiple optimization goals.

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