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Energy Procedia 5 (2011) 824–828

Energy Procedia

IACEED2010

Enlarging Chinese Railway Scale in Chinese transportation System is the Key of Energy Conservation

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Abstract

That industries consume more energy is a snake in the grass of Chinese economic development. We must tie the industries' energy consumption down and it is the very important to reduce energy consumption in transportation industry. The key of reducing transports' energy consumption is to push on the development of the low-energy-consumption transports and the railway is not only the transport of low-energy-consumption, but also the transport which can be satisfied with Chinese transporting demand of long-distance and large-capacity. We should hasten to develop it.

Keywords: Railway transportation industry energy conservation

1. Introduction

That rising oil demand and high external dependence in China increase many uncertain factors and risks in Chinese social and economic development. It is the most important task for us to advocate reducing energy consumption in the future.

2. Reducing transportation energy consumption is the key of energy conservation

Transportation industry is a pacemaker and foundation. After transportation industry is invested, regional economy will enter into the economic take-off period. To expedite public transport infrastructure

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1876–6102 © 2011 Published by Elsevier Ltd.
doi:10.1016/j.egypro.2011.03.145

can improve urban geographical advantages fundamentally, it is to say, which can shorten the distance between cities and markets, reduce the transportation cost of products, strengthen urbans' external technical attraction and investments dynamics, which can create a more fair development opportunities for regional economy development and bring urban residents happy lives.

At present, the amount of public transport infrastructure is insufficient, it is difficult for public transport infrastructure to meet the demand from economic development, that transportation development lags behind the social and economic development is still the core of restricting Chinese economic and social development. So public transport infrastructure must expand in the future.

Table 1 Energy consumption in transportation, warehousing, post and telecommunication industry

year		2000	2001	2002	2003	2004	2005	2006	2007
Transportation, warehousing, post and telecommunication industry	Comprehensive energy consumption (ten thousands tons conversion into standard coal)	10067	10363	11171	12819	15104	16629	18582.72	20643
	coal（ten thousands tons conversion into standard coal）	1132	1041	1055	1067	832	815	724.8	685
	oil（ten thousands tons）	5509	5692.9	6163.7	7093.2	8620.6	9708.5	10969.2	12297
	# gasoline（ten thousands tons）	1388	1419	1504	1862	2038	2470	2722.35	2763
	# kerosene（ten thousands tons）	536	561	617	622	820	882	1000.54	1130
	# diesel（ten thousands tons）	2544	2671	2965	3485	4182	5019	5747.32	6794
	electric power (hundred million kilowatt-hours)	281.2	309.32	338	396.94	449.65	430.34	467.37	532
the percentage of transportation, warehousing , post and telecommunication industry	Comprehensive energy consumption	7.27%	7.24%	7.36%	7.33%	7.43%	7.40%	7.89%	8.77%
	coal	0.86%	0.77%	0.75%	0.63%	0.43%	0.38%	0.31%	0.29%
	oil	24.55%	24.93%	24.87%	26.15%	27.19%	29.84%	4.66%	5.22%
	# gasoline	39.60%	39.44%	40.11%	45.73%	43.40%	50.90%	1.16%	1.17%
	# kerosene	61.61%	63.03%	67.14%	67.46%	77.29%	81.89%	0.43%	0.48%
	# diesel	37.56%	37.58%	38.67%	41.44%	42.26%	45.74%	2.44%	2.89%
	electric power	2.09%	2.10%	2.05%	2.09%	2.05%	1.73%	0.20%	0.23%

Source: Finishing according to the Chinese statistical yearbook 2001-2009.

From the characteristic, transportation products can meet the demand of people and objects' moving. So transportation industry is a typical high-energy-consumption industry for transports depending on traction power. With growth of Chinese passenger traffic, transportation energy consumption is rising year by year, especially in recent years, it's reasing rate is higher than that of the whole society energy consumption, become one of the fastest-growing energy consumption industries in China. Statistics show that transportation, warehousing, post and telecommunication industry consumes 20643 ten thousands tons conversion into standard coal of energy in China in 2007, which is 7.4% of the whole society energy

consumption. It is worried us that the whole society oil consumption growth is 7.87% from 2000 to 2007, while the oil consumption growth rate of transportation, warehousing, post and telecommunication industry is as high as 15.4%, which is higher than the average growth rate about 7.53%. Let's see the table above.

More energy consumption does not bring the growth of Chinese traffic correspondingly. We can see from transportation turnover, per ten thousands kilometer consumes 0.246 tons conversion into standard coal in 2000, while it rised to 0.281 in 2005, which increased 16.6% in 5 years. The reason that transportation energy consumption increasing rate is higher than traffic growing rate, is energy consumption growth of unit conversing transportation turnover.

3. We should pay great attention to adjust transportation development structure for transportation energy-saving

In recent years, Chinese transportation industry has achieved remarkable success, the conversing transportation turnover increased 49.8% from 2000 to 2005. The data shows that Chinese passenger turnover increased 52.86% and freight turnover came to double from 2002 to 2007. The increase of air passenger transport is the fastest, 1.2 times; road transportation is the second one which increased 47.41%; next is railway transport, growth of 45.21%; but waterway transportation fell of 4.9% due to its geographical adaptability bad. Among the freight transports, pipeline transport rised the most rapidly, 1.73 times; waterway transportation and air transport increased by 1.34 times and 1.26 times respectively, the increases of road transportation and railway transport are minimal, 67.41% and 51.98% respectively. The development of transportation industry provides a reliable guarantee for national economic stability and rapid development.

While with the development of transportation industry, the difficulty of we realizing energy conservation targets increases simultaneously. With Chinese transportation development, transportation energy consumption also appeared a huge increase, and the ratio of energy consumption increased closed to the ratio of global transportation energy consumption. Due to transportation infrastructure would expand in the future, we should develop transportation industry on the premise of reducing energy consumption.

There is certain regularity in Chinese transportation energy consumption, and its characteristics are:

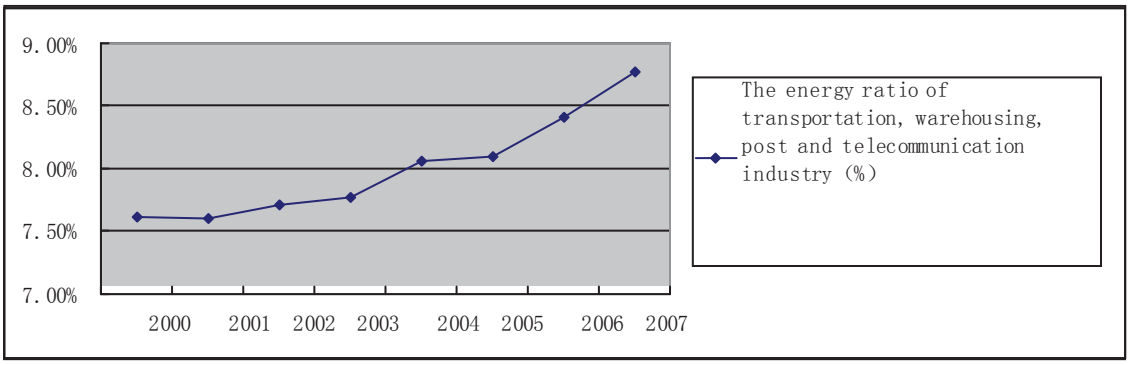

Fig. 1 The energy ratio of transportation, warehousing, post and telecommunication industry (%)

3.1 Transportation consumes more energy and transportation energy consumption increasses faster.

In 2007, Chinese transports consume comprehensive energy of 20643.37 ten thousands tons conversion into standard coal, which is 8.77% of whole society energy consumption, and increases 1.08 times from 2000 to 2007, annual rate is 15.45%; In addition, with the development of transportation, warehousing, post and telecommunication industry, its proportion in state comprehensive energy consumption rising quickly. Let's see the diagram above.

3.2 The development of high-energy-consumption transports is more rapidly, and transportation development structure is unreasonable

In recent years, Chinese transportation industry grows fast, but the developing rate of differdent transports differs.

From the growth of passenger turnover, the first one is the the highway, it created the most of growth share, increased 3700.2 ten thousands people, railway is the second one, has a growth of 2246.9 ten thousands people, the third one is aviation, which increased 1523 ten thousands people, that of waterways has declined from 2002 to 2007, please see the diagram below.

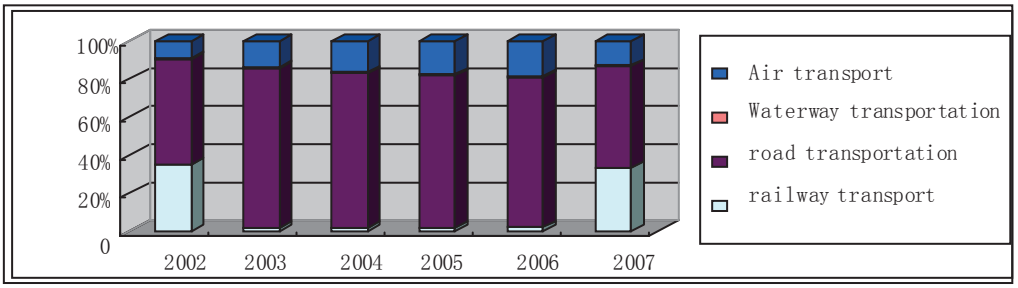

Fig. 2 Passenger growth (ten thousand people)

Let's see from the growth of freight turnover quantity. transportation by waterways grows fastest, and then is railway, pipeline grows somewhat, but the growth of highways and aviation is slower from 2002 to 2007, please see the diagram below.

That the unbalanced growth of different transports changes unit energy consumption traffic growth pattern of transportation industry.

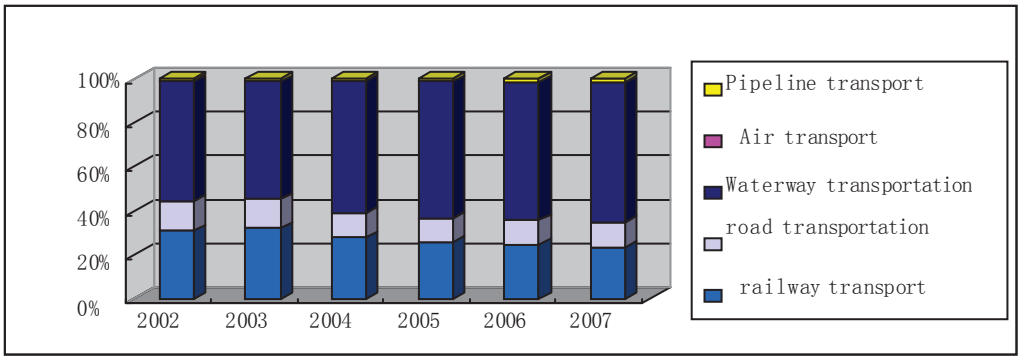

Fig. 3 Freight turnover growth (hundred million tons-km)

Let's see the data of 2002. We make the consumption of gasoline and diesel oil of the road transportation as the reference frame. After we contrasted railway transport, waterway transportation, air transport and pipeline transport to the reference frame, we find that the energy consumption of air transport, which is 364 kg/thousand ton-km, the next is the road transportation, and then is the pipeline transport, the last two are railway transport and the waterway transportation. The transportation development structure is unreasonable, the development of high-energy-consumption transports is more rapidly. Let's see the table below.

Table 2 Chinese energy consumption indicators of different transports in 2002(per thousand ton-km)

item		sort	unit	energy consumption indicators
railway transport	Rail diesel locomotive	Diesel oil	kg	2.59
	Railway locomotive	Gasoline	kilowatt-hour	11.08
road transportation	Passenge	Gasoline	litres	100
		Diesel oil	kg	100
	freight	Gasoline	litres	80
		Diesel oil	kg	60
waterway transportation		Diesel oil	kg	6
air transport		Aviation oil	kg	364
pipeline transport			kg	20.7
Source: According to the China statistical yearbook 2003, Data of pipeline transport is the data of 2001				

Similarly, among all the transports' energy consumption in 2003, air transport is the most, 354 kg/thousand ton-km; road transportation is the second, 69 liters gasoline and 52 kg diesel oil; the third is waterway transportation, 0.6kg diesel oil; rail diesel locomotive is the last, 0.5kg diesel oil,which is the most energy-saving transport.

From above analysis, there is irrationality in Chinese transportation development structure: road transportation which consumes energy most develops fastst, the develop rate of railway transport and waterway transportation which are the low energy consumption transportations is too low.

4. Conclusions

Railway transport is just the most suitable transport for China, for it can be satisfied with Chinese transportation demand: it is also the most effective way of our adjusting transportation increasing structure and achieving energy saving in transportation industry, and it is also the best way for us to realize the goal of country's energy consumption.

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