

Energy Saving and Emission Reduction in Xuedian

Transportation of people and goods



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Introduction

In present society, the speed of development is incompatible with time. This requires huge amounts of energy and resources. In other words, human society cannot exist without all the resources in nature, such as oil, natural gas, coal and so on. But unluckily, most of these resources are irrecoverable and cause environmental problems. Hence, one of the most popular topics these days is how to find the balance point between development and the protection of our mother earth.

Now, the Chinese Government has raised a lot of new rules to encourage citizens and companies all over China to reduce energy consumption and emission of materials which are harmful to our environment. ¹ Emission of CO₂ from vehicle waste is becoming one of the most serious environmental problems in China.²

The area I chosen named Xuedian, it is a town and apart from the capital city of Zhengzhou 25 kilometers in Henan Province of China. The measure of area is 74 square kilometers; establish area formed in 1950, 9874 households and 42,000 populations in there. In recent years, along with the traffic developing, the development of industry in Xuedian is goes very fast.³

In Xuedian, specifically, the vehicle population has grown very fast throughout recent years. The percentage of CO₂ in the air has risen constantly in the past 10 years. One of the reasons for such huge growth is the central location of Xuedian. It lies 25 kilometers away from the capital of Zhengzhou, facing the Zhengzhou International Airport to the east. To the west, lies the No. 107 national highway. The Beijing-Zhuhai expressway and Beijing-Guangzhou railway run through Xuedian from south to north. The Henan Provincial Highway No.04 runs across from west to east. The two national key projects: The West to East Gas Pipeline, and the South to North Water Transfer Project through this area. In recent years, Xuedian has raised the construction of 18 asphalt highways; the total length is 84 kilometers. All of these forms include railway, highways and shipping in the larger traffic pattern.

¹ The aim of the reduction of CO₂ is that annual emissions should not exceed more than 28.93 tons, average per 2.3 tons <Kyoto Protocol 1997,Dec>

² In recent years, the growth rate of petrol consumption of Chinese transportation is 10.8%.

<http://www.cnki.com.cn/Article/CJFDTOTAL-CSFY201101014.htm>

³ <http://baike.soso.com/v631439.htm>

Executive summary

Along with the increasing amount of transportation of people and goods in China, the consumption of energy for vehicles has therefore also increased year by year. At the same time, the environmental problem has come out, because the emission load of CO₂ has increased.

In China, the transportation industry includes railway, airline, highway and water transport. One result of the research from the Government shows that the biggest consumer of energy is the highway. It takes up 52% of all transportation, and oil¹ is the main fuel for these vehicles. Thus energy saving and emission reduction is an important topic in China. Although, Xuedian is a small town, but it is like a miniature of China, the development bring negative effect cannot be underestimated.

This report presents the problems I find in Xuedian and to solve them. To find out the problems and solve in subject for this semester project, I combined with Chinese national condition that I decided to work on reducing CO₂² and energy saving for the car and bus in Xuedian.

Desk research and interview showed that the development in Xuedian goes very fast and the policy from the government roots for the development. Along with high speed development, many environment problems are coming out. Now, the government is aware of the development and protect environment should be parallel. So fact to the increase amount of transport, how is the government of Xuedian will do.

After that I made a questionnaire for people who work in factories or airport in Xuedian. The questionnaire showed me that the problems people face are that the bus is too slow, they spend lot of time in the way, the station of shuttle bus is not good for some of them, the price of the petrol is more and more expensive, and so on.

My solution is from the traffic planning for Xuedian, public traffic system and to improve environmental awareness of people in Xuedian to solve.

Problem formulation:

The aim of this project is to create a solution that saves energy and reduces CO² from the car and bus to build a better environment in the area I have chosen, to find a concept to solve these problems, how is the transport today in this area, what is the problem today, data collection from my area of study, which questions people face.

According to the research, the actual emission load of CO² is higher than expected, the increase is 2.5%-5% per year from 2004 to 2010. But an analysis shows that every year the rate of increase is at least 11%. In 2010, the emission load will increase 6 hundred million tons. And according to the statistics, the per capita emission load is 2.7 tons. The emission load from the motor is the biggest pollutant source.⁴

Currently, along with the increasing amount of factories and the extending of airport, the motors in Xuedian are gradually increasing. The emission load of the motor is stepwise becoming one of the main pollutant sources. Thus, I want to start from traffic planning, public system and to improve the environmental awareness of people in Xuedian.

Problem delimitation:

Due to time and distance limitations, the data I sometimes need is not too particular. And sometimes because this is just a town that I cannot get the data I want. Because I write this project only myself and the area I work with is in China, my hometown, I have no time to get the reflection from that area to know if my solution is useful for them.

⁴ <http://wenku.baidu.com/view/3e94010e6c85ec3a87c2c5ac.html>

Methodology:

From the research, I want to know Xuedian deeply, Based on this I used the method below

1. Desk research
2. Interview
3. Questionnaire

I want to use these three ways to find the problems Xuedian has and which kind of problem people face now. The desk research helps me to have a general knowledge of Xuedian and uncover the problems. The interview, I contacted a man named Genchi Zuo, who is works in the government of Xuedian, from the interview I want know about the policy, the attitude of the government, how is Xuedian's development now. the questionnaire is for the employees, who works in Xuedian, to find out which problem they face and know about their attitude for the environment.

Desk research:

To uncover the problems this area has, I did some desk research. Through the internet I found out some basic information in Xuedian.

Interview:

After the desk research, I made an interview to an officer in the local government, who is responsible for the construction plan of Xuedian. I had several questions in the interview and I contacted him through telephone. The responder is called Genchi Zuo. He is the director of developmental department. Because the high position of his, I consider him as the best person to do the interview. As my questionnaire covers a wide range of aspects, it is easier if the person had the authorities to the information needed.⁵

The questions I asked in the interview include these aspects: the construct planning, some information of CO² emission and the policy of reducing CO². Among these aspects, I am most interested in the last one, for China is a developing country, sometimes when there is conflict between development and environment conservation, sacrifice is made. This condition is even more common in the countryside, because of the huge need of development.

⁵ Appendix 1

Questionnaire:

To get the attitude of people work in this area, I made two questionnaires with different questions, one is for the people who have the car and use it goes to work every day, the other one is the people who go to work by bus. I send the questionnaire to my parents in China by email, and then they print out and go to Xuedian to give the questionnaire to people work in the factories or airport, because most of them have no e-mail address. Totally, they hand out almost 200, and in the end they only get 73 back; 44 from the first one and 29 from the second one. The informants are from different level in corporation, there not only leadership but also employee, almost of them are living in Zhengzhou.

I want to know about the attitude from people, because reducing CO₂ to protect environment is not only the responsibility of government but of the normal people as well. From the questionnaire I want to get to know how people think and the problem they face.

Data analysis:

Desk research:

The local transportation has grown largely through the years because of the perfect nature location. Several years ago, the Government of Xuedian put their focus on attracting investments.⁶ One of their specific strategies was using the perfect location of “six transportation harbor in one” (Zhengzhou-Xinzheng International Airport, highway, Beijing-Guangzhou rail way, South to North Water Diversion, West to East gas pipeline, high speed railway); the other was to accelerate urbanization by improving local industries and agriculture. In the end of 2008, the town completed a GDP of ¥3200,000,000(€393,600,000⁷); the main industrial value was increased by ¥1,866,000,000(€229,518,000); the pure finance income was ¥45,620,000(€5,611,260), and average personal income in the country reached ¥8192(€1007.616).⁸

Now, Xuedian has formed three industrial zones: Eastern warehousing logistics processing zone, the central area of the food industry, and the western ecological agriculture area. There are also three government-controlled companies, which give good occupation chances to local people: Chuying Breed Park, small and medium enterprises Business Park, Huahuaniu Milk Park. Among all the industries, the development of the food department owns the greatest growth of 116 new famous companies in one year. The scales of companies range from several hundred to over 20 thousand people.

Along with improvement of industries, traffic and economy, more and more vehicles are brought in. As one of the results, CO² percentage has increased greatly. This has become one of the biggest problems for the local environment. According to my research, the main emission of carbon dioxide comes from the locals. The ratio between the locals and the amount of people outside is 3:1. People from outside normally live in the dormitories offered by their companies, only locals have to travel daily to their works. The most common transportation is motorbikes. There are 100-200 cars for the leaders in each factory, on average.

Zhengzhou-Xinzheng International Airport, it is located in the southeast of national

⁶ http://zzrb.zynews.com/html/2010-04/12/content_176157.htm Xinzheng daily newspaper 2010.4.25
<http://zhengzhou.mofcom.gov.cn/aarticle/dxsw/200812/20081205953694.html> the report of attract investment 2008.12.15

[Investment by the local government (or local government was established in the Development Zone) to absorb investment (primarily non-local investors) activities. Capital attraction became the local government's main work, and at all levels of government reports and work plan in.]

⁷ <http://qq.ip138.com/hl.asp> (currency software, 3th Jan, 2012)

⁸ http://v.youku.com/v_show/id_XMjM5NzcxNDE2.html (this is a video, the finance in 2:03)

key tourist city Zhengzhou and the distance is 25km. The airport built and opened up navigation in 1997, and then it is the main transport airport and the first class of national airport. In the end of 2007, the airport was expanded, the total area was enlarged to 384,000 square meter (terminal is 128,000 s.q, parking apron is 256,000s.q). In 2008, the total number of passengers travelled through the airport reached 5,887,600, and 7,000,000 in December 14th, 2009, which was a record achieved in the Henan aviation history of the development in the past 5 years. In 2010, the airport passenger flow broke 8,000,000 person-times, achieving 8,700,000 person-times. In other words, with a growth of 18.6%, the passenger flow of Zhengzhou-xinzheng International Airport ranked the twentieth of countrywide congener.⁹

The Civil Aviation Resource Network in 10th February 2011 claimed that from 19th January to the 9th February, the average passenger flow was more than 26,000 everyday, and the airport had been in a tense state of operation. From the 6th Feb to the 9th Feb, the passenger flow in airport broke 30,000 person-times daily. The specific passenger flows were 31254, 33604, and 30646. Compared with the same period last year, the improvement was 14.69%, 17.76%, and 10.42%; the transport vehicles were 280, 280 and 277. Compared with the same period last year, the flow was increased by 4.87%, 7.69% and 9.92%.

In the airport, there are 2800 employees. Among them, 1000 people use their private cars to go to work and the rest 1800 employees use the 30 buses, which are arranged by the airport every day. There are approximate 100 cars driving for the daily tasks in different departments in airport. But the traffic passing the airport is much bigger than the traffic flow inside. Every day, there are over 10,000 cars for transporting passengers. On the other hand, there are also buses going to Zhengzhou every 30 minutes and to other cities every 2 hours.

According to my desk research, the traffic flow is magnificent in this area, not only in factorial zones, but also at the airport. The huge growth of traffic in Xuedian has become the trend of the development of society. And the development of the local traffic and logistic will keep be in the high rate in the future. This will bring great development to Xuedian, but at the same time, environmental problems follow. Hence, protecting the environment in Xuedian becomes a more and more important topic.

Interview:

Based on Genchi's answer, I found that the transportation in Xuedian is little messy. There are certain periods of a day where there are traffic jams in different parts of

⁹ <http://www.zzairport.com/experience.php?t=&fid=1&PHPSESSID=9f1c5b3d2f303bd41c8e2700f7f14ac7>

Xuedian. The main reason is the huge development of this town has brought a lot of factories and hence, huge population and vehicles into the town. This causes extremely high pressure on traffic.

In 10th Oct 2011, the government raised a plan for next 10 years, named <The principles of Xuedian construction>. In this plan, they claimed: we must to put focus on promoting the comprehensive transportation, modern industry, ecological environment, infrastructure and energy resources, innovation of science and technology and information, high-quality human resources, culture characteristics, reform and opening-up.

Because Xuedian has become an important integrated transportation hub, to build a reasonable transportation plan has also become the number 1 priority of Xuedian's developing plan in a period in the future. Xuedian will consolidate and enhance the transportation hub, according to the principle of measurable lead, with the key of modern traffic infrastructure construction to build an international transportation hub. By 2020, air line passengers, throughput of cargo reached 406,000,000 passengers and 500,000 tons; the container reaches case of 2,000,000 standard starting weights.

The establishment of a modern industrial system followed by the integrated traffic system, it was placed in a prominent position. "The principles of Xuedian construction" put forward the requirement: "according to the structure optimization, advanced technology, safe and clean, high additional value, strong ability to absorb employment".

With industrial assemble area construction as the carrier, develop the equipment manufacturing industry, electronic information industry, trade and logistics industry, accelerate the development of advanced manufacturing, modern service industry and modern agriculture, and establish the level of industry structure gradually, reasonable of industrial layout, gathering industry development, high-end industry competitiveness. By 2020, equipment manufacturing sales income breaks through ¥100,000,000 (€12,300,000), logistics industry increases a value to achieve ¥20,000,000 (€2,460,000), total retail sales of social consumer goods reached ¥70,000,000 (€8,610,000).

The construction of Xuedian must adhere to the strategy of sustainable development. Therefore, Xuedian will establish the ecological-environment-supporting system; put strong force on energy saving, emission reduction, ecological and climate protection; adjust industrial structure. The goal is clear: Xuedian is working hard to build a scientific and reasonable ecological support system and be the country's industrial and agricultural composite circular economy demonstration areas.

Xuedian has two planning, one is named the low solution, and the other one is named high solution. In the low solution, the state will accelerate the transformation of the mode of economic development, efforts to increase energy-saving and emission reduction, the energy demand growth will appear the obvious decline. In the high

solution, during the “12th Five-Year Plan” every region still pursuit of rapid economic growth, increase investment strength, accelerate advance industrialization and city to change, energy demand will remain in a high growth rate.

Xuedian owns a great nature location: Flat, wide ground which is great for building transportation tracks; great location, as it is at the connection center of several big cities; logistics experiences, as Xuedian has been a transportation center for years, there are many old roads, tracks, and experiences that can be renewed and developed. With great attention from the government, more support and open policy reached Xuedian, making the even faster development possible. The financial situation of Xuedian has development greatly though the recent years and we consider the future very positive.

Because now Xuedian is a developing town, the development is considered more important to them that they adopted the low solution few years ago; but now along with the popularization of protect environment knowledge that they wake up to protect environment that development and environmental protection are both important. But if leadership group of Xuedian only consider the development of economy, the damage to the environment will greatly. If leadership group put the protect environment in the first place that the development of economy will slow. They are looking for a reasonable way to solve this problem currently, as far as possible to ensure that the economic development and the maximum to protect environment.

The idea to improve the policy is to adjust and optimize the industrial structure, promote energy saving and emission reduction, to adhere the new pattern of industrialization with Chinese characteristics. Accelerating the development of modern industry system, and gradually improve the proportion and level of service industry.

Questionnaire:

In the first questionnaire the first two issues are for entire respondents. The time for going to work is 20-60 minutes and 44 have their private cars, 29 by bus every day. In the second if he has a private that he will continue, but if he by bus that he will change to answer the second questionnaire. In these people who use car go to work every day, 31 people use 93# petrol (who have to pay for their own fuel), 12 people use 97# (who have support for fuel from their companies). When they were asked if they have new suggestions to change the fuel, 28 of them prefer gasohol, because it is cheaper than petrol.

39 people think that the problem of environment is serious, and it is very important to be environmentalists. Only 5 people show that they are not interested in this.

Only one of them suggests that maybe government could consider building an underground system just like in CPH, as he had been to CPH and experienced the convenience. Others suggest changing the bus or they have no idea.

There are 31 people do not mind to share their car with colleagues, if they should share the fuel fee and high-speed way toll. Other 13 said they did not like to share car with colleagues. The bus is slower than car that they do not like by scheduled bus. And the scheduled bus station is not convincing for them.

The number of people by bus is 29 and all of them are the employee in airport, because only the airport has the scheduled bus. The bus station is in Zhengzhou, the distance of 40km to the airport and it spend 1 hour. Thus there are 8 people plan to buy a car, 5 people plan to car polling. All of these 29 people think that the bus should be speed up, every day the commute time at least 2 hours.

From the questionnaire, I found that the problem people face is the bus is too slow, every day, some of them waste time on the way; the price of petrol to increase daily.

Solution

I tried to find put some planning data from internal and external. For example, the external I research Copenhagen, because Xuedian's measure of area (74 square kilometer) is similar with Copenhagen (97 square kilometer¹⁰). The planning of Copenhagen named five fingers; this layout of city is the outside center is like the finger to radial development.¹¹ The whole layout is that five radiations and five ring roads formed the arterial street. But the planning is closely linked with local development. And the type of these two place are big different, CPH is in a developed country, Xuedian is in a developing country. But Internal, because of the different development in different place and the different landform in different area that in China the planning of road traffic is unlike.

Before I find out the way to solve Xuedian's problem, it is better to see now the planning of Xuedian. Combing with Xuedian's planning, I try to find a solution.

Current Xuedian's plan:

In 2005 October, Chinese Communist the sixteen 5 in plenary meeting passes" the Eleven Five Plan" proposal, put forward to want according to" production development, well-off life, rural civilization, clean and tidy town, democratic management " requirement, solid advance construction of socialistic new rural area.¹²

Based on the planning, to break the airport is pure transportation facilities in the traditional sense, will airport area as the town comprehensive transportation hub and the social and economic development, synthesis, pay attention to shaping the airport area efficiency, extroversion, efficient and comprehensive. Vigorously develop modern logistics industry, the export industry, aviation manufacturing industry; the Zhengzhou aviation port area builds convenient traffic, economic prosperity, facilities, beautiful environment of the zoology aviation city. Planning of aviation city, West Jing-Guang Railroad bounded, East, South, north to state the South-to-North Water Transfer Project corridor for the community, they plan that in 2035, the city construction land area of 94.1 square kilometers, the airport core area of 48 square kilometers, the north area of 19.6 square kilometers, the southern area is 26.5 square kilometers.

The town-city is divided into the "one core area and two zone". The "one core" is airport core area. "Two zones" are the airport north of the logistics business district and southern industrial zone.

¹⁰ <http://baike.baidu.com/view/27885.htm>

¹¹ Reference 1 <http://www.libone.com/ebook/T/A2036136.pdf>

¹² <http://baike.baidu.com/view/326969.htm>

The airport core area: Air City Avenue East, Ge, planning on the north side of Dengfeng Airport West - Airport - Shangqiu Expressway to the South and highway 102 north of the region, with a total area of about 48 square kilometers. The area to airport operation function, the main layout of airport flight zone, aircraft repair zone, bonded warehousing area, station business district and integrated transit center.

The northern logistics business district: located in the planning of airport on the north side of Dengfeng - Airport - Shangqiu Expressway to the north of the region, with a total land area of 27.3 square kilometers. The area to the logistics business functions, the main layout of Zhengzhou export processing zone, conference and business district, high-tech industrial zone and development base, ecological and leisure area. Which is divided into the export processing zone, Education Development Zone, high-tech Industrial Development Zone, north of the central business district, the bonded logistics park of 7 functional areas?

The plan to put forward, want to build perfect public facilities, schools, hospitals and other goods are available in all varieties, its specific planning:

Commercial facilities: constructing the District, residential area, residential area level commercial facilities, formed a multi-level center commercial service system. The northern area planning and regional center of trade and Commerce in 1, is located in the air on both sides of the road; residential district business center 4, layout in the southern area of the Xue Zhen independent development zone, high-tech industry development zone, the development of aviation industry zone and southern waterfront residential area.

Educational facilities: planning occupation training base in 1, plan nine years has 12 schools, including North 4, south 8, plan 8 senior middle schools.

Medical facilities: planning the street level 7 medical institutions, of which 3 are north, South 4.

Culture and entertainment facilities: the northern area relies on the Zhengzhou - Airport Express railway exhibition center in the town air, six road to the south, boat Town Road East of planning of 1 large exhibition center; motion along City Road and relying on the Zhengzhou - Airport Express Railway Air City Center Station Layout library, theater, cultural and recreational facilities; Mengzhuang Township independent set various cultural facilities. The southern area along the airport road on the south side of the layout, library, museum and other cultural and recreational facilities; Xue shop Township independent set all kinds of cultural facilities.

Sports facilities: the combination of green space system planning of comprehensive stadium 3, wherein the North 1, south of the 2 department.

Social welfare and security facilities: in the south, north two kilometer respectively provided a social welfare institute.

According to the planning, the future of aviation city will be River riparian green, city park, Sports Park, community park phase permeability, formation of distinct ecological green space system. To achieve average per capita planning at the end of park green area of 8 square meters, green coverage rate of more than 40%.¹³

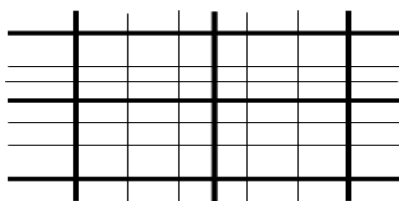
My solution:

My solution has three parts, planning for Xuedian, public traffic system, the environmental awareness of people in Xuedian.

Rural urban integration is the inevitable trend of the development of metropolitan suburb, Xuedian has a good economic development foundation, has formed the characteristic industry system, food and electronic industries system already has a certain scale, is the future of Xuedian economic development foundation. With the development, the planning for Xuedian is more and more important, thereinto, the traffic planning is critical.

City traffic network structure is mainly composed of a path is formed, at present commonly used road system can be summarized into six types: grid type (also called chessboard), banded, radial, radial loop type, free type, mixed type. First is the basic type, mixed type road system is composed of several basic types of assembly.¹⁴

1. Grid type



Advantages: the accessibility of equalization, order and good sense of direction, easy to distinguish, order and good sense of direction, easy to distinguish, network reliability, it is conducive to the land classification and building layout.

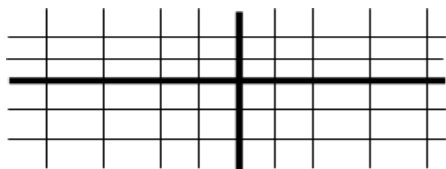
¹³ <http://henan.people.com.cn/news/2008/09/10/322588.html>

¹⁴ Reference2 <http://www.libone.com/ebook/T/A2036136.pdf>

Disadvantages: the network space is simple in form, the diagonal direction traffic linear coefficient.

In China, Beijing, Xi'an city urban road network under this from.

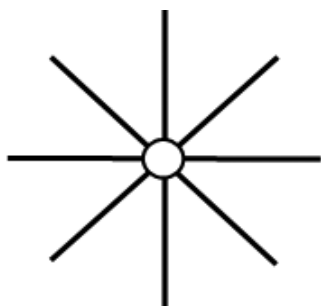
2. Banded



Traffic network from can make the urban layout of the land use along the transport axis extending in a direction closer to nature, to the terrain, water condition adaptability.

The city of Lanzhou in China, the city traffic due to the Yellow River and North and South Mountain, its structure is a typical banded structure.

3. Radial



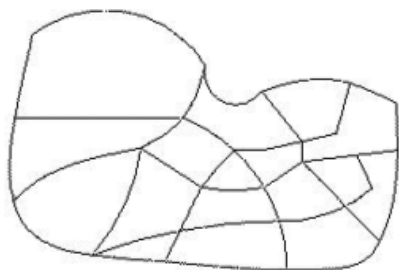
Radial transport network are often used to connect to the main city and satellite city.

4. Radial loop type



Urban traffic network is composed of an annular skeleton and radiation transport line assembly.

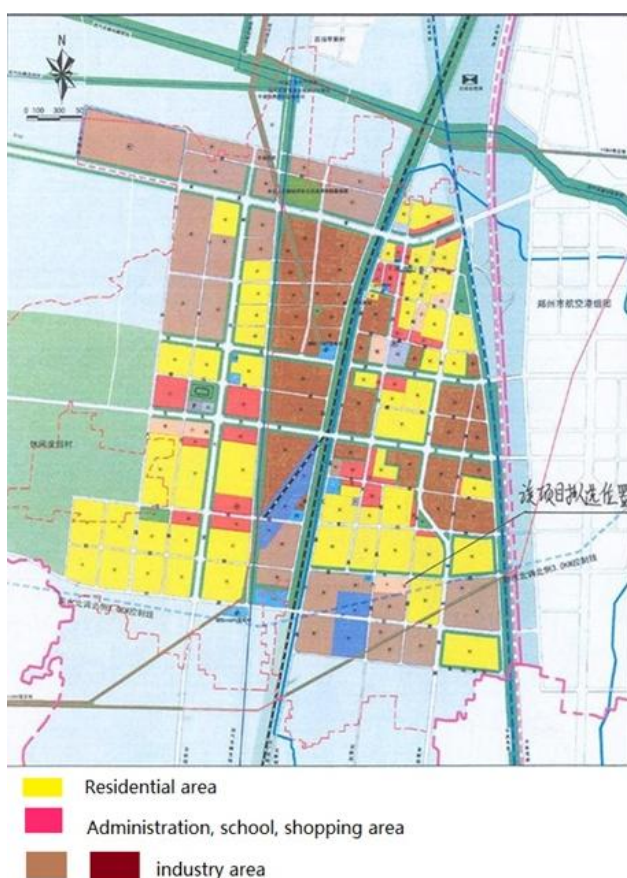
5. Free type



Advantages: better meet the terrain, river and other constrains.

Disadvantages: no order, difference in difference, at the same time road intersection form deformity intersection.

By comparing these types of traffic and combine Xuedian's condition, the best one is the grid type. Because Xuedian is a town, complex planning is not suitable for it. In the grid type, Main avenues are arranged in big grids followed by smaller road in higher intensity. The utility model has the advantages of simple shape is the neighborhood, convenient construction layout, all intersections are from the two roads intersect and form, will not cause the traffic pressure. And this pattern is easier to plan the different function are. According to the planning of Xuedian, they also do like this.



When plan the planning for road system, it should be make a distinction between the important reads and the lesser roads have a clear division that to build up a high-efficiency and logical traffic system.¹⁵ In this planning, it is easier to see the main road clearly, they cut Xuedian to be several part, then to plan the functions logical. From the picture, we could see that the residential area will put in around the industry area that people work in the industry, every day when they go to work could just use bicycle or electric-bicycle.

¹⁵ Reference 3 <http://www.chinautc.com/tmagazine/pdf/2005-3/49-52.pdf>

After the planning for Xuedian, developing public system should be kept up. In Xuedian, because now the public traffic system is in the start step. Every day few frequencies of buses work in there. According the condition, Xuedian is an industrial town, the flow of population time to focus on work that combine with the planning picture to developing reasonable route, due to increase in frequency, especially, at the rush hour.

The establishment of the mode of transportation is mainly dependent on the city population size and density, land use scale and density, economic development level.¹⁶ Population size is relatively large, relatively high population density of the city or region emphasizes the development of public transport (including transit, bus rapid transit, and vice versa), stresses including car, individual traffic. City land relatively small size of the city, residents travel a shorter distance, suitable for the development of bicycles, buses and other transportation mode; city land use scale is relatively large, trip distance long city suitable for the development of rail transit, car and other rapid transit mode. Economic development level is relatively low in the city will generally choose to ordinary bicycle main bus rapid transit, supplemented by pavement rapid public traffic mode, individual motorized transport in a motorcycle is a choice. Traffic mode is determined by the general level of the social and economic development, traffic mode competition and decision, and transportation policy, policy guidance also will affect the choice of mode of transportation, therefore, according to the city government special condition chooses appropriate traffic development mode.

Road system and traffic mode also exists between certain relations, road system and traffic mode and the relationship between the road infrastructure supply level to reflect, in which the road area ratio is an important index. Road supply level is relatively high, i.e. Road area rate is relatively high in the area, the road system provides a better service, for buses, cars and other types of ground transportation to provide a good service, make traffic mode emphasizes all types of ground transportation options. As Losangeles developed highway, the main road system to guide its developed car traffic mode, the United States and other small and medium-sized city has a highly developed transportation system, travel mode is dominant to car. Paris City, central London, Tokyo, New York, Manhattan by CBD road capacity limits, traffic pattern rail-based public transport oriented.¹⁷

The best traffic system for Xuedian is bus. It is a town; the bus could suffice most people to work. But with the global energy shortage, deterioration of the ecological environment, regular bus energy consumption and pollutant emissions has been paid more and more attention. In this case I want to reduce the CO² emission in Xuedian

¹⁶ <http://www.douban.com/group/topic/4457438/>

¹⁷ <http://www.douban.com/group/topic/4457438/>

that I suggest to use the hybrid electric bus in this area. Compared with the traditional bus, hybrid bus costs far less than the fuel cell bus; reduce fuel consumption and pollution emissions, without the need to add new facilities. The Gas and electric blend bus is a new pattern; it uses the gas as the energy and combined with electromotor to work together. Compare with the normal bus, the percentage of save petrol is more than 30%; reduce the emission load of CO² more than 30%.¹⁸

The last is improving environmental awareness of people in Xuedian.

According to the questionnaire survey results, Most of the people do not mind sharing cars with their colleagues (which is known as carpooling). It can encourage employees to and from their own lives near the car colleague's carpool.

Along with the improvement of living standard, more and more people tend to buy a car. To the people who want to buy a car, the government could encourage them with the small displacement automobile or replacement for alcohol gasoline. Now in China a lot of cities' governments are supporting to use the ethanol gasoline for vehicles.¹⁹

The bus lines leaving the airport go towards various directions, but mostly to Zhengzhou and every half hour.²⁰ Another proposal could be cancelling the internal bus lines, instead, encouraging employees to use the public bus lines. Because the station in Zhengzhou is near the centre of City, the public traffic is very convenience. At the same time, the airport could pay the tickets for the employees who take the bus.

For those locale people who live close to the factories and drive motorbikes to work daily, a suggestion could be replacing their motorbikes with electric vehicles. In this way they only need to go home every night and charge. There is no need for using fuel. To improve environmental awareness of people, besides the government implements the encouraging policy, they should also publicize the fundamentality for protect environment to excite attention of public.

¹⁸ <http://baike.baidu.com/view/3235873.html>

¹⁹ <http://news.sina.com.cn/o/2005-11-26/06577544399s.shtml>

<http://news.qq.com/a/20070926/002571.htm>

²⁰ <http://www.zzairport.com/trafficGuide.php?t=cn&id=1> bus schedule

Conclusion:

The transport in Xuedian today is very busy, because of the industry and airport that lager amount of people in this area every day. The transport in this area is busy, messy and has development potential. Because now the function area in Xuedian is too distributed, this is a early problem that time Xuedian just start to development. For that I come up with a planning for Xuedian to make the function area more closely and easier for people daily life.

For the government, along with the financial development, the environmental problems get more and more severe. Even though the government cannot move the focus from developing Xuedian, they have put more and more attention to the protecting the environment. Now the challenge is how to find a balance between these two points. But according “the 12th five years”, the government decided developing and protecting environment at the same time.

The problem people face is far away from home, every day they spend much time on the way. The price of petrol is constantly growing. The public traffic system in Xuedian is behind now. The way to solve these problems are carpooling, develop the public traffic system.

Reference:

1. Zu wu Zheng, Kang Ki, Qian ji Xu, Tian fu Ren, Kun pei Yang, Shen yong Qi ,(1995) Modern city treaffic, p11 China communication Press
2. Zu wu Zheng, Kang Ki, Qian ji Xu, Tian fu Ren, Kun pei Yang, Shen yong Qi ,(1995) Modern city treaffic, p161-170 China communication Press
3. Tan ming Tang, Quan Zhang, (2005) Urban Transport of China, P50The Optimization Foundation of Road Traffic Planning of Small Cities and Towns in China

Appendix 1:

Interview:

1. How is the transportation managed today in Xuedian.
2. Does the government have some plans for next 10 years?
3. The planning of transportation development for next 10 years.
4. The emission load of CO² in past five years.
5. The policy of energy saving and reducing emission
6. Do you think the policy should be improved?
7. The situation of finance in Xuedian?
8. Which one is more important, development or protect environment? When there is a conflict between them, what kind of compromise should be made?

Appendix 2:

Questionnaire

1. How long time you spend on the way to work every day
2. How do you go to work, by scheduled bus or by your own car, or you have another way.(if by bus please turn to second page)
3. Which fuel you use for your car.
4. If you have some new suggestions to change the fuel\ if you consider to change a new fuel.
5. How do you think, if you be an environmentalists
6. Do you consider changing the pattern of transportation?
7. Would you mind to share your car with your colleague?
8. Do you consider to by bus every day?

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1. How long time you use by bus?
 2. Do you consider changing the pattern of transportation?
 3. Do you have some suggestions for bus?
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