

Research on Characteristic Energy Specialty Curriculum System Suiting Low-Carbon Talent Cultivation

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Abstract. In order to solve the low-carbon economy condition inevitability and urgency of the cultivation of talents and to realize the sustainable development of higher education, research of training mode of higher education research must be conducted; the opportunities and challenges of energy specialty cultivating low-carbon talents are discussed. The importance, difficulty and construction of wide characteristic curriculum system in competition of higher education cultivating talents are expatiated. The attempt and exploration how to establish characteristic curriculum system in thermal energy and power engineering in our university are introduced. The results can be used for reference in Energy professional talent training.

Introduction

The inevitability to produce low -carbon economy and the urgency of cultivating talents under the conditions of the sustainable development are analyzed; the opportunities and challenges of energy specialty cultivating low-carbon talents are discussed. The importance, difficulty and construction of wide characteristic curriculum system in competition of higher education cultivating talents are expatiated. The attempt and exploration how to establish characteristic curriculum system in thermal energy and power engineering in our university are introduced.

Low Carbon Talent Training Strategy

The basis of Human development is energy. There is no doubt that in the current and future quite a long time, global energy still is fossil fuels. Fossil fuels are non-renewable energy, will be less and less with consuming, and the burning of fossil fuels will create serious environmental pollution. With the acceleration of social and economic development and the increasing consumption of energy, the shortage of energy and serious environmental pollution, economic development and the survival of the human will face serious threat [2]. In order to effectively deal with these problems, it is necessary to develop lower carbon economy. Transformation to a low-carbon economic development model has become the trend of world economic development, our country will also be low carbon economy into the overall developing strategy, lead the traditional industry to a low-carbon economy mode, in order to realize the national economic and social sustainable development.

The low carbon economy development mode based on low energy consumption, low pollution, low emission and high performance, high efficiency, high benefit. The development direction is low carbon development, development way is ECER, the development method is carbon neutral technology of green economy [3] [4]. Low carbon economy need to technology innovation, industrial transformation, system innovation and ECER.

Low carbon economy is a new industry revolution is characterized by low carbon energy [5]. Every Human industrial revolution is a historic challenge and opportunity. That we are now facing challenges is still not fully walking out from the traditional society pattern and facing to accelerate modernization requirements. The key is whether we can seize the opportunity, can develop coping strategies, policies

and measures to meet the challenge. To seize opportunities, meet the challenges in the key personnel. So, low-carbon economy and the talent strategy should start from the talent strategy.

Low carbon talent is the primary factor of construction of low-carbon society. From the practice of the international community we can make out that realizing low carbon development cannot leave the innovation of concept, policy and technology, and the innovation requires talents, especially senior specialized talents. The essence of low carbon economy competition is talent competition. Experts predict: on a global scale, who can more fully play to the role of the low carbon talents, who can control the commanding heights of the low carbon economy, who can better develop low carbon economy [6].

Low Carbon Talent Training Opportunities and Challenges

Under the background of low carbon economy, for the great-leap-forward, sustainable development, china needs a large number of talents with the thinking and knowledge structure of low-carbon. College students are educated in low carbon in colleges and universities. It has strategic significance, is effective guarantee for the sustainable development of the economy. The situation is both opportunity and challenge for energy engineering. The opportunity is to need a large number of low carbon economic transformation talents, makes low carbon talents overall lack, opened up a broad employment space for students; Challenge is a low carbon economy needs the diversification of talents and the improvement of choose and employ persons, and the economic transformation and development lag and imbalance. These factors are not conducive to employment.

Not only that, due to the restriction of economic development speed, low-carbon economy transformation also cannot happen overnight, and the imbalance between development of higher education and the social demand will exist for a long time. Predictably, the difficult employment still is one of the outstanding problems of Chinese higher education [7]. Especially, there is a large distance between low carbon thinking training and the low carbon economy requirements for the knowledge structure. That is to say energy engineering still will face the severe test of talents cultivation [8] which is mainly manifested in the following aspects:

(1) The contradiction between the change of the social demand of the low carbon in diversity, rapidity and stability, lag of the talent training in colleges and universities.

(2) The contradiction between the particularity of low carbon social demand for talents and the universality of fostering talents in universities and colleges.

(3) The contradiction between the discipline and cross of jobs and the technicality of talent training in universities and colleges.

For energy engineering talents training, it is very important to determine and position accurately for talent training goal [9]. On this basis, through establishing the corresponding characteristic curriculum system to realize the training goal, we can seize the opportunities brought about by the low carbon economy, and deal with the challenge faced by the low carbon talent training, so as to improve the competitiveness of the talent training.

Competitive Characteristics Curriculum System of Low Carbon Talent Cultivating

Establishing distinctive curriculum system is the guarantee to achieve the target of talent cultivation in Energy professional [10].

This curriculum system should have the following characteristics:

(1) With a wide professional caliber to increase the students' extensive adaptability;

(2) With distinct characteristics in order to enhance the competitiveness of the talent training;

(3) With the low carbon concept and knowledge structure in order to meet the demand of low carbon economy.

Wide professional caliber also should be kept separately, according to the school's own characteristics and advantages for positioning.

For high level key universities, training professional caliber can be wider. Their wide caliber

professional education in undergraduate can not only lay a good foundation for the students to enter the stage of postgraduate, but also opened up a wide range of employment channels for their students because of the advantage of their reputation.

For the general level institutions, their personnel training caliber should be smaller. At the same time of develop appropriate professional caliber, the main consideration should be Professional counterparts, to strengthen the application of specialized knowledge education, so as to make the graduates adapt quickly employment work.

Based on the above considerations, we construct the curriculum system in the professional of energy and power engineering in our school.

Broadening Caliber and Insisting Features Simultaneously, Established a Professional Platform to Meet the Demand of Low Carbon Talent Training. In order to effectively broaden the professional caliber, we must build up the course system covering major professional related content. On the subject setting, different schools, according to their own history, special features and the actual situation, should establish corresponding course system to reflect their own characteristics and advantages of professional platform courses system; In the selection of content, it is unable to be built into the simple "collage" of the original several professional related content, it is necessary to have a qualitative leap, so as to be able to broaden the professional caliber, and be different with other colleges and universities. and its own characteristics can be reflected, to be able to closely link social needs and stand in the forefront of the low carbon economy development.

According to the requirement, we have established our school integration platform course system of energy and power engineering:

Basis for Energy and Dynamic Machine: The course of basis for energy and power machinery is an overview of the each major professional directions, it is the basis of the expansion of professional knowledge. Through learning the course, students can understand the typical energy power machine, and can grasp the basic working principle of the equipment and major components to lay the foundation for the follow-up professional basic courses, professional courses, professional platform courses and professional elective course.

Test for energy and power engineering: The course content has been extended to the test for energy and power engineering. The task of the course is to make students understand and master the principle and method of test of various parameters of energy and power engineering. Through learning the course, students, can master the principle and the measurement method of the temperature, flow, liquid level, flue gas composition, calorific value, velocity and stress, etc. It can lay the foundation for learning the follow professional courses, in order to provide knowledge support for jobs.

Energy Saving and Environmental Protection: Development of low-carbon economy, the implementation of ECER is a significant long-term and arduous feature. As the students of energy and power engineering should walk in the forefront of ECER. The course of energy saving and environmental protection is a course with distinct characteristics in our school. It is not a "Assorted cold dish" from the "energy saving" and "environmental protection". it takes the energy utilization as the main line, unifies energy saving and environmental protection, in order to establish double consciousness and related knowledge structure of energy saving and environmental protection in the minds of the students, for them to do a low carbon economy field work to lay the foundation.

Strength analysis of pressure vessel: Boilers and pressure vessels are widely used in various fields of energy utilization and environmental protection. Its strength analysis and design is very important to realize the unification of security and economy. In many colleges and universities, the strength design of the boiler is often set up. Our school put the boiler and pressure vessel together and included the content of the strength analysis. It can fully enable students to understand and master the principle and method of strength analysis and design. In the horizontal direction, contents of each energy professional direction in the pressure vessel strength design are unified; in the longitudinal direction, stress analysis, strength analysis and strength design are unified; This is of great significance to develop a low carbon talents with extensive knowledge and to increase their professional adaptability.

Technology of energy and power machinery: The course integrates the manufacturing process of the boiler, heat exchanger, refrigeration equipment. In the factories, it is common to pay attention to the design work, many colleges and universities often do not pay attention to the setting of the course. However, the process is very important in factories. There is a saying in the factory: a good designer should first be a good technician. Process knowledge is very important for both process and design workers. My school increases efforts for the course, make the course form a large range, covers a number of professional direction, and strive to unique, competitive.

Establish Characteristic Outstanding Professional Direction Course System with Module Type. The establishment of professional direction module strives to meet the needs of low carbon talent training in a certain direction. The curriculum system is connected with each other to form a system and become a perfect the professional module in order to lay the foundation for the cultivation of applied talents. It enables students to systematically master professional knowledge of this specialty, to go to work to get started quickly, to enhance their competitiveness of the job.

The elective courses of relevant field are set up in our university for students to take. Students can be according to their own interests and career planning to take their favorite course. This will not only promote the formation of students' low carbon concept and knowledge structure, but also conducive to the development of students' personality.

Use of the Practical Teaching Assist to Theory Teaching, Making the Curriculum System Complement each other through

In the low-carbon talent cultivation, the enhancement of effect of practical teaching link for the cultivation of the students' ability and quality is very large. In the process of making the teaching plan, it will be very necessary to appropriately increase hours or contents of practice teaching.

For example, we can increase its proportion of the practice teaching link of curriculum design, internship, graduation design and innovation ability training practice, which can increase the depth of the students to understand the knowledge, improve their ability to use knowledge to solve practical problems. This also is helpful for teaching effect of auxiliary professional platform class and related courses, is in full accord with theoretical teaching. The cultivation of the students' practical application ability and innovation ability in the very great degree is closely related to the practical teaching course system equipped. Practical teaching link will play a great and irreplaceable role in the entire personnel talent training of application ability and innovation ability.

Low carbon talents training course system is a complete system. It is the foundation of talents cultivation. The establishment of the course system strives for the survival by the characteristic, for the development by characteristic, to make the courses form a complete system and complement each other.

The starting point of higher school education reform is to achieve the shift from merely imparting knowledge to impart knowledge and increase capacity, improve quality. Basic courses, platform courses, specialized elective course and direction courses is very difficult to form distinctive characteristics. Prominent contradictions is between professional broaden and application increasing. Within the limited class hour, reaching every aspect of a matter to teach is impossible. But this does not mean that quality of teaching can be lower. To solve the problems, first of all, we should make a multi-dimensional integration for content, should make scientific curriculum system, to connect each part in the curriculum system, to link each other, to complement each other.

And the completion of the work itself has considerable difficulty, they still need to study and explore. Therefore, establishment of the characteristic curriculum system with the concept of low carbon can never be isolated, must be matched with other reforms of higher education reform.

Conclusions

If you follow the “checklist” your paper will conform to the requirements of the publisher and facilitate a problem-free publication process. Low carbon concept provides the operational interpretation for

ECER, for development of circular economy, for building a harmonious society, is the comprehensive innovation and practice to build a conservation-minded society, is the way to realize sustainable development of China's economy, is a global revolution Involving a production mode, life style and values. For low carbon talent development problems, there are two contradictions: one aspect is the our talent problem, the unbalance of supply and demand exits, talents in this field dire lack of; Another problem is the low carbon economy is likely to make quite a number of industry shut down and to cause structural unemployment. Overall, realized under the background of popular education and difficult employment, Colleges and universities, especially the general institutions, want to have a place in competition, must establish and improve the curriculum system with distinct features and the curriculum system is propitious to cultivate low carbon talents. This is related to the survival and development of institutions of higher learning. The research and exploration of the course system with distinct features can help to improve the competitiveness of the professional personnel training. Of course, the implementation of the curriculum system is very difficult. How to improve its application effect still needs a lot of research work to do. Our specialty of energy and power engineering has made some beneficial attempt and exploration in this area. We believe that with the deepening of the reform of higher education and scientific operation mechanism, the establishment of perfect characteristic curriculum system must be able to play a tremendous role in the fierce competition in higher education personnel training for achieving the goal of low-carbon talent cultivation.

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