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ITJ

ISSN 1812-5638

INFORMATION TECHNOLOGY JOURNAL

ANSI*net*

Asian Network for Scientific Information
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

Solving Intelligent Technology in Energy Saving and Emission Reduction Application Strategy

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Abstract: Energy conservation and emission reduction in today's global economic and social development is facing an urgent and far-reaching task. From information to intelligent energy-saving Jane is not only realistic choice for energy saving in the information age but also the inevitable trend of development to productive forces intelligence. In this study, the author, taking industry, agriculture, architecture electricity, logistics, transport, urban and services industry for example, pointed out the intelligent technology in the application of energy saving and emission reduction strategies, benefiting the energy research and development in this field.

Key words: Energy conservation and emission reduction, strategy, informatization, intelligent

INTRODUCTION

Today's world, humans into the "information age" Today, information and communication technology (ICT: Information Communication Technology) provide what kind of solution for energy conservation? The ICT industry group Global e-Sustainability Initiative (GeSI) and the Climate Group (TCG)'s completed report "Smart2020: Low carbon economy in the information age" in the year 2008 gives the answer that the key action is the "intelligent" technologies of scientific applications in energy reduction.

FROM INFORMATION TO INTELLIGENTLY RESPOND TO ENERGY SAVING ANDEMISSION REDUCTION

In general, application of information technology, to some extent, has the effect of energy saving. However it also put forward higher requirements for energy saving innovations in information technology. So, domestic and foreign research in the information age's energy saving also choose the intelligent technology.

The reason, first of all, intelligence itself is IT trends. The rapid development of information technology makes the human's ability, scope and quantity to access information rapidly expanding. Develop intelligent systems for these growing information processing, be used, from the traditional to the automation of intelligent automation, information technology and automation technology is the development of the internal demand and

the inevitable trend. Narrow understanding, intelligent technology, artificial intelligence, giving the machine a certain intelligent information processing capacity to a certain extent, substitute the mental. Broad understanding, intelligent system should be composed of people with intelligent machines human intelligent systems, human-machine collaboration can take advantage of the intelligent system 's high intelligence and machine performance, scalability connotation and extension of intellectual labor, in order to achieve intelligent productivity leap. Fundamentally speaking, the information belongs to productive areas of information technology as a historical stage of development, usually appears after industrialization. Despite the rapid development of information technology and promote the use of accelerated economic restructuring, industrial upgrading and industrial structure of high value-added, greatly improving labor productivity but in most cases is still just manual labor amplification, information technology intelligence is in a virtualized , flexible and integrated based on the further development and extension of information technology to promote the development of intelligent, intellectual labor to achieve amplification (Shen *et al.*, 2004). Human and human-computer intelligent machines constitute intelligent system has become one of the basic elements of intelligent productivity, so that the amplified human intelligence to become a direct practical productive forces.

Meanwhile, the information provides the basis for intelligent and premise. Information revolution in human social organization and life change is revolutionary, not

only with all the information technology industry and the energy sector, almost all closely related to human society and has become an indispensable part of life. The energy conservation is a systematic project and an open complex giant system involving economic, social and environmental. Information from a wide range of permeability also makes intelligent information technology become the world's economy one of the series most comprehensive selection to achieve low-carbon development (Wang and Ma, 2005).

INTELLIGENT TECHNOLOGY IN ENERGY SAVING IN THE USE AND DEVELOPMENT OF SPACE

Intelligent technology in energy saving applications, in a nutshell is intelligently aware environment, status and needs, timely and appropriate to demand production, distribution and use of energy, so as to improve energy efficiency and reduce emissions. There has been energy saving potential analysis of the quantitative research at home and abroad mainly on the smart grid, smart buildings, smart logistics, smart motor. In this study, agriculture, transport, urban and services industry perspective, introducing intelligent technology in energy saving in the application and broad space for development.

Smart grid: The power industry is currently the world's leading source of CO₂ emissions in 2002, accounting for 24%. Therefore, the introduction of renewable energy and the development of clean coal power, reduction in power transmission losses, fully optimization in the electricity production, transmission and consumption of the whole process, will help to promote low-carbon electricity, low-carbon energy sources as well as the development of low-carbon economy (Yang *et al.*, 2012). In this process, the smart grid play an important role. Smart Grid can be seen as the information technology, communications technology, computer technology and existing generation, transmission, distribution, electricity infrastructure and the formation of a new highly integrated power grid. It improves the grid efficiency and the ability to energy monitoring and data capture including power plants and transmission and distribution networks. The world's major developed countries have to seize the future development of smart grid to achieve the commanding heights of low-carbon economy as an important strategic measure. The U.S. regards the smart grid development as a national strategy, focused on the development of distribution networks and end-user side and committed to apply communication technology and intelligent control technology to improve network intelligence.

Intelligent building: Architectural Practice is the second largest energy consumption industry which is after the Industry in the world, in 2002, the building emissions was accounted for 8% of the world. Intelligent building is a comprehensive concept which is considered as a platform, to make the building equipment automatic, communications automatic, office automatic and on the basis of the system integration and service management to optimize combination, forming an efficient, comfortable and convenient organic whole. According to statistics, in the developed countries, the building energy consumption accounts for the total energy consumption of 30~ 40% (Hao and Xu, 2011). In the energy consumption of buildings constitute, heating, air conditioning and ventilation equipment energy consumption accounted for about 65% which is a large energy consumption; Living hot water energy consumption accounted for 15%; Lighting, elevator and TV energy consumption accounted for 14%; Cooking energy consumption accounted for 6%. The energy-saving technical measures of Intelligent building was mainly on the intelligent control of power facilities in the past and now into the fine "comprehensive energy management, energy saving control", on the premise of meeting the requirements of users for the environment, from building design, construction and operation of multiple links such as improving the efficiency of energy use. Just for the United States, the commercial building industry can be nearly 30% lower in energy costs per year. In terms of the word, intelligent building can reduce carbon emissions 1.68 billion t by 2020.

Smart motor intelligent control, industrial process: Industrial activity is one of the most major contributing factor to global emissions, in 2002 which accounting for 23% of the total emissions. Industrial activity consumes nearly half of the global power output and industrial motor consumes most of these (65%) and the proportion in the residential electricity as much as a quarter. In terms of conversion of electrical energy into mechanical energy, most of the motor have the low efficiency, a large amount of energy lost in the form of heat and failed to transform into useful mechanical energy. According to the "energy intelligence enterprise project", the size appropriate, effective improvement can be equipped with electronic variable speed drive and gear motor, conveyor belt, bearings and lubricants only to 40% of the energy consumption standard motor. Motor installation in our country is about 750 million kW, the total power adopts the intelligent technology is to improve the motor system efficiency by 20% which can reduce electricity installed around 150 million kW, the equivalent of seven more than the capacity of the Three Gorges Project (Dai *et al.*, 2010).

Intelligent logistics: Logistics and transport is a huge and growing source of greenhouse gas emissions, accounting for 14% of global emissions. The World Bank estimates that China's social logistics costs equivalent to 18% of GDP while the United States had less than 10% of the last century. However with the economic development, the development of the logistics industry is also very rapid. Intelligent Logistics, based on the Internet, deepen the application of networking technology, the use of advanced information collection, information processing, information flow, information management, intelligent analysis technology, intelligent completion transportation, warehousing, distribution, packaging, handling and many other aspects and can make real-time feedback flow state and strengthen liquidity monitoring so that goods can be delivered quickly and efficiently from suppliers who need to maximize profits for the supplier to provide the demand side with the most efficient service, greatly reducing the consumption of the natural resources and social resources (Zeng and Ming, 2011). Logistics emissions are mainly from transportation and storage. The use of intelligent technology to optimize the logistics can reduce global 16% of transportation emissions and 27% of the storage emissions.

Precise agriculture: The rapid development of things such as information technology and artificial intelligence techniques had promoted the born of a novel idea to agricultural production and management, resulting in the implementation of location management on crops, according to the actual need for such precision variable investment management thinking and thus made the precision agriculture concept. Precision agriculture is a space-based information management and variance analysis, management strategies and modern agriculture technology system of agricultural operations. It is based on soil fertility and crop conditions spatial differences, adjusting the crop inputs, crop on cropland and quantitative real-time diagnostics to fully understand the spatial variability of field productivity on the basis of a balanced soil fertility, increase production as the goal, implementation of the localization and quantification of the precise field management, to achieve efficient use of various types of agricultural resources and improve the environment of the sustainable development goals. It is estimated that in Beijing Daxing District to promote the production base of precision agriculture technology, fertilizer utilization rate increased more than 10%, water 15%, saving 20 to 30% of the drug. Caiyu cut flower production base in the town reduced the crop diseases that occurs discomfort due to temperature, humidity and pests and flowers achieve export quality ratio increased by 20%.

Intelligent transportation: According to the International Energy Agency (IEA) 2007, 11 on the 7th of the "World Energy Outlook", in 2004, transportation energy consumption 1.969 billion t of oil equivalent for the world's energy consumption is 1/4; transport share of global greenhouse gas emissions by about 14% (Zhu, 2001). In all both to ensure existing vehicles and transportation but also to ease the traffic congestion problem approach, aimed at using modern technology to improve traffic conditions to achieve "protect the safety, improve efficiency, improve the environment, energy conservation," the purpose of the concept of intelligent transportation fore. Intelligent Transportation is a modern electronic information technology -based transportation -oriented automated service systems. Its overall goal is to improve the road network utilization and energy savings, the prominent characteristics is information collection, processing and dissemination, exchange, analysis, using the main line, the diversity of participants for the transportation service. Intelligent Transport Systems will be on the road, the vehicle and the driver fast communication link is established between, the traditional mode of transport to become more intelligent, more secure, energy-saving, high efficiency. For example, the Beijing Sino-Japanese cooperation in energy saving intelligent traffic information system demonstration project through Dynamic Route Guidance System (DRGS) and eco-driving assistance systems (EMS), path planning and driving behavior to provide prompt information to disperse traffic flow, ease congestion, change the driver's driving behavior to achieve fuel consumption and reduce carbon dioxide emissions reduction. In Japan, according to the Japanese side effects related experiments conducted projections, project implementation the user can reduce fuel consumption of about 18%.

Intelligent lighting: According to the statistics, 20% of global electricity is used in lighting industry. Especially in urban pedestrian staircase inside the building, corridors, halls, underground parking and other public areas, due to the lack of natural light, requires 24 h continuous lighting, not only power consumption, high maintenance costs but also the traditional lamp life is short, pollution (Liu, 2009). Intelligent lighting system according to different regions of the different functional requirements of the day at different times, in different natural illumination or different scenes case, by considering and analyzing lighting is closely related to the time, place, ambient illumination and other factors scenes control method lighting-demand dynamic intelligent management, control lighting in different circumstances to achieve diverse lighting scenarios, thereby improving the quality of lighting while the best energy-saving effect. According to the Hebei Education Department building after the application of

comparative test statistics show that: More than 500 pieces of traditional use intelligent LED lighting fixtures, the annual electricity savings of 132, 000 kWh.

On-demand service in cloud computing: Cloud computing is based on virtualization technology, according to the need to pay for business model it is elastic extension, dynamic allocation and resource sharing. With the characteristic of the new network computing model. In this mode, software, hardware, platforms and other IT resources will be used as the infrastructure, in the form of services provided to the user. Its biggest advantage is could be rational allocation of computing resources and improve the utilization of computing resources, reduce the cost of users and promote energy conservation and emissions reduction. A study of Accenture and sustainable development consultancy, W S P carried out that by comparing the enterprise server hosting and internal configuration IT infrastructure, points out that the enterprise can save up to 30 ~ 90%.

CONCLUSION

To sum up, the energy conservation and emissions reduction of the information age to the information technology is both challenge and opportunity. Information technology products and services to its energy intensity and carbon intensity is relatively low its application in other areas of the economy and energy conservation and emissions reduction potential is obvious and great. The spread of information technology permeability also makes information technology become the global economy to achieve low carbon development series one of the most comprehensive choice. From information to intelligence information age is not only realistic choice for energy saving but also the inevitable trend of development of productive forces intelligence.

Most developed countries are in the process of industrialization after the completion of the development phase into the information but we are in the industrialized countries with the integration of information technology development. From information to intelligence to deal with the practical needs of energy conservation can be said

that all countries face in today's society is another industrial revolution. Typically, the new system uses high-yield solutions are more cost-effective than the old system. China good grasp of the information age if energy saving-intelligent revolutionary opportunities, will be able to exploit its advantage, so that the "smart age" walks in the forefront of the world.

ACKNOWLEDGMENT

This study reported here was financially supported by the fund of The Education Department of Henan Province (Project number: 12A56002).

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