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Abstract：The potential utilization of shallow geothermal resources in Dandong City was evaluated. Dandong city ground temperature can be calculated area of 427. 5km^2，200m to shallow and 100m in shallow，respectively，274. 1409 ×1012kJ／℃ and 138. 8809 ×10^{12} kJ ／℃. According to 1kg standard coal heat equivalent of 29260kJ calculation，200m to shallow and 100m shallow geothermal heat capacity were equivalent to 9. 36914 million t standard coal and 4. 7464 million t standard coal. Dandong city area within the groundwater source heat pump system suitable area，the more suitable area of 427. 5km^2，can provide the heat transfer power：winter 1. 25 ×10^6 kW，summer 1. 76 × 10^6 kW.
Key words：shallow geothermal power；potential；standard coal；heat transfer power

Abstract：Today enterprises realize the development of globalization，networking，digital information with the rapid development of social science. A large number of important confidential information in enterprises is stored in the network system，and the key protection object of network security gradually transfers to the network. Therefore，when enterprises are done network planning，it is necessary to start from the overall situation of security management of enterprise information to realize the synchronous development of enterprise planning and network security. Making comprehensive analysis of enterprise planning and network security issues and multi angle design. According to the characteristics of the different domain of enterprise network，we make the corresponding security solutions. We fully integrate with the use of transparent encryption，network monitoring，privilege management，access control，security audit and other kinds of means. By combining together what include the personnel，management，auditing and technology，we build a complete three-dimensional system of security network in the internal of enterprise.
Key words：enterprise planning；network security；domain；security solutions

Abstract：The thermodynamic model of thermoelectric generator-driven thermoelectric cooler（ TEG-TEC ）device with Thomson effect is established. Performance of the device is analyzed by applying non-equilibrium thermodynamic theory and numerical calculation method. The influences of Thomson effect on the performance are analyzed by comparing the performance characteristics of models with and without Thomson effect. The results showed that，Thomson effect degrade the performance of TEG-TEC device，and the degradation of performance decreases with the increase of thermoelectric generator heat source temperature and cooling space temperature. Thomson effect decreases the cooling load by 29. 98%，decreases COP by 23. 02%，decreases limit cooling temperature by 11. 35% when hot junction temperature of TEG is 450K，cold junction temperature of TEC is 285K，and ratio of number of thermoelectric elements is 0. 5. In the design of the device，limited-number thermoelectric elements should be more allocated appropriately to TEG when consider Thomson effect. The results can provide some theoretical guidelines for the design of TEG-TEC devices.
Key words：thomson effect；thermoelectric generator；thermoelectric cooler；combined thermoelectric device；performance analysis；non-equilibrium thermodynamics

Abstract：It was set up a thermodynamic model of organic Rankine cycle power system from waste heat from micro-turbine flue gas based on heat source properties and thermodynamic principles in the paper，using cyclopentane as working fluid. And then，it′s finished dynamic simulation and modeling of organic Rankine cycle power generation system using MATLAB／SIMULINK. As shown in the results，it is appropriate that cyclopentane is chosen as working fluid when heat source temperature in the range of 100 to 300℃，and the temperatures of pinch point and exhaust gas are within the reasonable range，according to the requirements of actual working conditions. But，It would be cooled with cooling air，if heat source temperature is higher than 300℃. At the end，the ORC power system can′t run normally，if heat source temperature is lower than 100℃. It can provide an effective guide to the optimization design and experimental research of ORC power system on the basis of the simulation analysis.
Key words：Matlab／Simulink；waste heat from exhaust gas；organic rankine cycle；modeling；dynamic simulation

Abstract：A gas turbine type selection for a heating type 2 ×75MW class gas - steam combined cycle distributed energy station presented. In the area to meet the winter heating，at the same time，carry out proper power generation. According to the designed heating load of the distributed energy station，five kinds of schemes are determined，2 ×6F. 01 、2 ×LM6000，2 ×SGT800. Three selection schemes are preferred by comparison of technical indicators and economic analysis. In view of

the three selection schemes，respectively analyzed the gas price and e-lectricity price to the influence of economy.

Key words：gas - steam combined cycle；distributed energy station；unit selection；economical analysis

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Economic and environmental benefit analysis of household photovoltaic power generation system in remote pastoral area of inner

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Abstract：The economy of off-grid photovoltaic power generation system is mainly reflected in the contrast between system cost and investment income. Through a remote pastoral area in Inner Mongolia to install a small home off-grid photovoltaic power generation system，monitoring and data collection，The impact of off- grid PV power generation system economy is analyzed from the aspects of investment cost，system benefit and environmental contribution. And in the long run，the reduction of system cost has a great impact on the improvement of its economy. Therefore，we hope to improve the investment income of the off-grid system in the early stage of development through the way of policy subsidy and so on，and provide a positive demonstration role for promoting off-grid photovoltaic power generation system in Inner Mongolia.

Key words：off-grid photovoltaic power generation；calculation and analysis of power generation；cost and benefit calculation and analysis；environmental benefit analysis

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Analysis of energy efficiency and economy of coupling system of water source heat pump and steam turbine

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Abstract：Taking a residential community of one hundred thousand square meters in Shenyang as example. It proposes a coupling system of water source heat pump and steam turbine. It is calculated by the numerical calculation method that the primary energy utilization rate of the coupling system is 1. 07 and the index of heating coal is 6. 72. The results are comparatively analyzed with other heating methods. It turns out that the efficiency of the coupling system is improved and the coal combustion index is reduced. It has the significant advantage of low energy consumption. And although the initial investment of the system is high，the annual operating cost is low. The static analysis method is used to analyze and compare the system economy. We can prove that initial investment can be recovered in the short term. So the coupling system is an economical and energy-saving heating mode.

Key words：coupled system；system efficiency；coal consumption index；initial investment；annual operating cost

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Application of the grey fuzzy comprehensive evaluation method in green transformation of existing campus buildings

LIU Li，ZHANG Yan-tao，BIAN Hua-zhen
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Abstract：Through the analysis of the actual characteristics and problems of the existing campus green building renovation at home and a-broad，combined with the existing relevant standards，to establish the existing campus building green transformation evaluation index system. Using the method of AHP to determine the weight of each evaluation index，and combine the method of fuzzy comprehensive evaluation with gray system theory to establish the gray fuzzy comprehensive e-valuation model of green building renovation scheme，and then，apply-

ing the model to the green building of a teaching building. The gray correlation degree of each scheme is calculated by using the evaluation model and the optimal scheme is determined. The research results show that the objectivity and practicability of the evaluation method，and provides a guarantee for the smooth progress of the green building.

Key words：campus buildings；green transformation；analysis hierarchy process；grey fuzzy comprehensive evaluation method；optimal selection of schemes

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Study on operation optimization strategy of oil field waste heat and geothermal heating system

SHI Jian-hu，WU Dong-xin，XIONG Ke
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Abstract：Establish proper heating system operation optimization strategy is the key to ensure its good operation effect. A oilfield region utilizes sewage waste heat and local geothermal resources as the heating source. Based on the principle of heat conservation，through the a-nalysis of heating system process，and the heat transfer process of plate heat exchanger and heat pump unit，we build the heating system heat transfer calculation model，to simulate heating system actual operation situation. The operating data in 2015 heating season，is used to calculate the effect of mixed sewage temperature and plate heat change coefficient on heating system，finally we put forward appropriate improvement measures to improve heating system efficiency，and save operating cost as much as possible.

Key words：oil field waste heat；geothermal；heating system；heat exchange；operation optimization

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The energy savings calculation and benefit analysis of the pedal power generation device

CHEN Long，YU Jun-jie，WANG Yi-fei，et al
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Abstract：Making use of the electromagnetic induction and cutting power principle，design a simple pedal power generator，the power generated can be used to drive a small electric fan and lighting，and for energy savings were calculated and benefit analysis. To alleviate the increasing scarcity′s energy contradiction between supply and demand，improve the energy structure of human society，further promote green energy，protect the environment，reduce the use of non-renewable resources，it is of great significance.

Key words：pedal power；electromagnetic induction；energy-saving

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Nongyongmai opposition energy-saving switch

WANG Yun，LI Xiao-wei，FANG Dai-bao，et al
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Abstract：As an agricultural country，agriculture plays a very important role in China. In the process of agricultural development，the pulse smoke machine came into being and greatly improved the efficiency of agricultural control. However，the application of pulse smoke machine in agricultural control is short，and there are some defects in the startup and closure. At present，the start-up and shutdown of the pulse smoke machine requires multi-step operation，multi-step cooperation，at the same time，there is a waste，to the user in the use process. In this paper，the study of pulse smoke machine switch is simple and energy-saving purpose.

Key words：pulse smoke machine；agricultural control；one-click switch

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