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Economic Cooperation

Policies Analysis for Low Rank Coal Utilization in APEC Economies

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1.1 CHINA COAL UTILIZATION POLICIES

1.1.1 GENERAL

The Twelfth Five-Year Development Plan of Coal Industry and the coal industry policies had been issued by Chinese government. The policies for main coal downstream industries will be discussed in the following paragraph, such as electricity, construction materials, steel, chemical industries and so on.

1.1.2 UTILIZATION POLICIES FOR COAL AND RELAT ED DOWNSTREAM INDUSTRIES

1.1.2.1 Coal Utilization Policies

Layout: Stabilize coal production capacity in East China, strengthen coal producing base construction in middle China with rich water and coal resource，accelerate coal resource exploration and rational development in west China. Increase investment for building thirteen large-scale coal bases(ShenDong, North Shanxi Province, Middle Shanxi Province, East Shanxi Province,, North Shaanxi Province, HuangLong, West Shandong Province, North Anhui Province, Henan Province, Yunnan and Guizhou Province, East InnerMongolia province, East Ningxia province) improve the sustainable and stable supply of coal. Promote coal and coal-bed gas resource

development and effective use of infrastructure. Establish development Intensity according to coal recourse and water recourse and transportation in large-scale coal base by single investor. Encourage to build pithead power station and priority to coal development, electricity integration projects, especially, priority to the development of circular economy and comprehensive utilization of resources. Corresponding capacity of the coal preparation device built with new-built large and medium-sized coal mines. Encourage building group mine coal preparation plant in medium and small-scale coal mines centralized mining area. Coal chemical industry should be rational developed in the rich water and coal resource area. Prohibit developing coal chemical industry in coat net input and water shortage zones. Ban developing coal chemical industry in insufficient environmental capacity. Protectively develop the special and rare kinds of coal and restrictively develop high sulfur, high ash coal resources development.

Effective use and envi ronmental protection: Implement of conservation priority development strategy, accelerate Effective use, and reduce the coal processing and utilization of process energy consumption, improving coal resources recovery rate and utilization efficiency rate. Strengthen energy conservation and energy efficiency management, establish and improve the coal industry energy conservation management, assessment, rewards and punishment system for energy saving and clean production. Encourage the coal production enterprises to develop advanced and applicable technology of saving energy; New-built project must be in accordance with the standard of energy saving design and standard construction. The backward

energy-consuming processes, equipment and products must be eliminated. Promote the use of consistent with national energy efficiency standards, certified energy-saving products. According to the principle of reduction, re-use and resource-oriented, comprehensive development and utilization of coal resources and associated coal wastes is encouraged. to encourage enterprises to use of coal gangue, low calorific value of coal power generation, heating, using coal gangue to produce building materials, reclamation and road construction, and comprehensive utilization of mine water, development of circular economy. Support for coal-bed methane (coal gas) in long distance pipeline construction, encourage coal-bed methane (coal gas), civilian power, the production of chemical products. The coal resources exploitation and utilization must be carried out in accordance with the law of environmental impact assessment, environmental protection facilities with the main project to strictly implement the “three simultaneous” system of construction projects. Coal mining and processing, storage, loading and unloading of pollutants generated in the process must discharge adjusting to standards, prevent secondary pollution. Strengthen coal mine gas utilization and reducing emissions.

1.1.2.2 Coal deep processing industry development policy

Layout and development emphasis: Priority to develop coal deep processing industry in rich coal area, reasonable capacity built in net coal output area, strictly control new-built project in net coal input area. Encourage the development of high-sulfur coal, lignite, with low quality coal as raw materials

of coal deep processing projects; Built coal deep processing base and demonstration base in area fulfilled with whole factors according to large scale, integration, park development mode. Accelerate the elimination of backward production capacity and strictly regulate the development of calcium carbide, coke and other high energy-consuming industries. Strictly control low-level repeat construction such as the coal fertilizer, coal to methanol industry. Steady development of coal, oil, natural gas and other olefin industry, exploration, coal quality and coal electric integration of comprehensive utilization of coal deep processing of new pattern.

Coke industry: Development of coke industry should be in coordinate with iron steel industry. Coke production capacity should be strictly controlled. Strengthen structural adjustment and eliminate backward production capacity. Coking coal resources and iron and steel industry are relatively developed to form a large coke production base. Focus on the development of coking products, strengthen coal tar processing and comprehensive utilization of coke oven gas, improve the utilization rate of resources and reduce environmental pollution.

Calcium carbide industry: Accelerate the elimination of backward production capacity, strictly controlling new aggregates, in adjustment of development of calcium carbide product, according to the requirement of structural adjustment. Replace backward capacity in rich coal and salt resources areas. Encourage the use of coal for producing ethylene ox chlorination process for vinyl chloride production; gradually reduce the proportion of vinyl chloride by calcium carbide

process. Encourage the use of carbide slag to produce cement, waste resource recovery and comprehensive utilization.

Chemical fertilizer: Chemical fertilizer from coal as material is located in rich coal resources area and in grain cotton main producing area, adopting the advanced coal gasification technology, build million tons of fertilizer production base. Eliminate small and medium sized chemical fertilizer production device with environmental pollution and high energy consumption. Fertilizer device in east region is encouraged to produce ammonia with coal as material instead of natural gas.

Other new-type coal chemic al industry: According to industrialization demonstration project of coal to oil, natural gas, olefin, aromatic ether, dim ethyl ether, selectively build in the area with rich coal resources, water resources, ecological environment, and convenient transportation or suitable for pipeline. Encourage to build large-scale coal utilization projects, extension coal deep processing products, produce high added value products in the rich low rank coal regions. Promptly integrate coal chemical industry and power generation, petrochemical, iron and steel, building materials and other industries in appropriate conditions. It is encouraged integration production of a variety of fuel, chemical raw materials, heat and electrical.

Resource utilization policy: Implement classification of coal resources use and optimize configuration policy. Coking coal is priority used to coal coking industry. Quality and clean coal resources are prioritized for power, civil and

industrial furnace. Low metamorphic bituminous coal, lignite, coal gasification should be used in coal deep processing.

Strengthen utilization of high-sulfur coal and low calorific value coal, extent mine service life, improve the resources supply. Support high sulfur coal as raw materials to develop coal chemical industry, Alleviate the contradiction between supply and demand of high quality coal. Encourage associated resources comprehensive utilization, at the same time. If raw materials sources are sufficient and economic feasible, it is allowed to use overseas coal resources to develop coal deep processing industry in the convenient transportation zone

Coal deep processing industry should be in line with the water resource, it must conform to the national and local water resources utilization policy and planning. Coal deep processing industry development planning and large-scale coal deep processing project should be carried out in water resources demonstration. Strengthen and protect water resources, and prohibit developing coal deep processing project in the drinking water source protection zones. It is prohibited to occupy domestic water, agricultural water and ecological water to develop coal deep processing industry. High water consumption of coal deep processing project is strict controlled in water shortage region.

Strict water license approval management: If the total volume of water has reached or exceeded the control target areas, it is not approved new built projects. Coal deep processing device is encouraged construction of water

saving engineering, through the water replacement way of obtaining water resource; limit of high water consumption technology and equipment applications. Encourage wastewater and air cooling, water-saving technology for coal deep processing projects.

1.1.2.3 Catalogue of guida nce of industrial structural adjustment

Encouraged Category: coal and coal water slurry technology development and application, coal processing and comprehensive utilization of associated resources; coal-bed gas exploration, development, and utilization of coal mine gas drainage and utilization of coal gangue, coal washing coal and other fuels of low calorific value of coal comprehensive utilization, high efficiency washing desulfurization technology development and application of coal preparation technology; development and application of ground subsidence control in coal mine; protection and utilization of water resources; integrated development of coal and electricity; improving recovery rate of resources, technology development and application of coal mining method.

1.1.2.4 The State Council approved development and Refor m Commission and other dep artments on the curb overcap acity in some industries and rep eat construction and guide the healthy development of industry informed opinions

Coal chemical industry: Strictly enforce the policy of coal chemical industry, blind development of coal chemical industry is prohibited. Pure enlarge

capacity coke, calcium carbide project will not be approved in the next three years. Prohibit new built coke and calcium carbide projects which do not meet to the "admittance condition of coking industry 2008 Revision" and "calcium carbide industry access conditions 2007 Revision" project. Comprehensively use of energy saving and environmental protection standard to improve the access threshold, strengthen the clean production audit, the implementation of differential power prices and other means, to accelerate the elimination of backward production capacity. Backward production capacity will be eliminated in access conditions for coke and calcium carbide industry. Encourage the large scale capacity and eliminate small capacity, such as replacement, reduce costs, improve competitiveness is implemented for the synthetic ammonia and methanol. Steadily develop modern coal chemical demonstration project. In principle new built modern coal chemical pilot project will not be arranged any longer in the next three years.

1.1.2.5 The national development and Reform Commission on standardization of coal chem ical industry and orderly development

Strict admittance policies. Suspend the approval of pure enlarge capacity coke, calcium carbide, prohibition of construction projects which do not meet with access conditions of coke, calcium carbide before enacting relevant planning. Accelerate the elimination of backward production capacity of coke, calcium carbide. For synthetic ammonia and methanol; big pressure on the

small, productivity replacement method, improve competitiveness. A scientific, strict access threshold is establishing for coal chemical demonstration project.

Strengthen project approval management. Development and reform departments strictly abide project approval procedures, fatherly strengthen coal chemical industry project management approval, authority approval shall not be delegated. Before the new approved directory published, the following items is prohibited with coal as material, which includes 500kt/a or below olefin project, 1,000kt/a or below methanol project, 1,000kt/a or below dimethyl ether project, 1,000kt/a or blow oil project, 2,000,000kt/a or below cubic meters gas project, 200kt/a or below ethylene glycol coal project. The coal processing and conversion projects above the production capacity are approved by national development and reform commission.

Strengthen resource allocation. Further strengthen coal chemical industry production factors and resources allocation, actively promote regional industrial planning environmental impact assessment and energy saving assessment, and strictly check up environment evaluation and review of energy conservation, for the areas where the total discharge of major pollutants exceed the standard and energy-saving evaluation and review unqualified. New main pollutants of coal chemical projects should be suspended approval. Priority should be given to the life of the masses and the power. It is prohibited the occupation of people, zoology and agricultural water to develop coal chemical industry. If the quantity of water has reached or exceeded the control target areas, new coal chemical projects should be

suspended. Projects that do not conform to the industrial policies and other provisions of coal chemical will not be granted with land, loans, raising funds from capital market financing. It is strictly prohibited financial capital flows to the excess capacity of the coal chemical engineering project.

1.1.2.6 China electric power industry policy

Standard, reasonable, orderly, and effective use of foreign capital to generate electricity is encouraged and supported. Competition will gradually be introduced into power generation field, combining the development of electric power industry with the support of domestic mechanical manufacturing industry development. Support science and technology progress to increase strength of technical reformation of power industry, accelerate the structure adjustment of power source, reasonable configuration resource, raise energy utilization rate, make power industry and economy, society, environment to coordinate development; accelerate reform of countryside electrification and construction of rural electrified wire netting; power industry towards modernization, large power, large sets of direction. At present, a new power station capacity should generally not be less than 300MW in large power grid.

1.1.2.7 Power industry “Twelfth Five-Year Plan"

Accelerate the construction of large-scale coal and power integration base; carry out western development strategy. Accelerate the construction of coal

and power integration base in rich coal resources regions such as Shanxi, Shaanxi, Inner Mongolia, Ningxia, Xinjiang; encourage cogeneration development, unified planning of high parameter, the environmental protection unit, in line with the national policy of cogeneration project; promote green development, vigorously promote clean coal power generation technology.

develop coal and power integration base focusing on the construction of Shanxi, Northern Shaanxi, East of Zhungeer, Erdos, XilinGol League, Hulun Buir Alliance t alliance, Xilinhe , Baoqing, Hami, Yili, east of zhungeer, Huainan, Bingchang, longnan, Guizhou etc, 16 large coal bases.

By 2015, Chinese coal power installed capacity reached 0.928 billion kilowatts. 0.3 Billion kilowatts will be put into construction during the period of "Twelfth Five-Year", which coal base units accounted for 66%; 0.285 billion kilowatts will be put into operation, which accounted for 53% of coal base unit. In 2020 China's coal power installed capacity reached 1.17 billion kilowatts. During the period of "thirteenth Five-Year", 0.26 billion kilowatts will be put into operation, of which coal base units accounted for 62.7%; 0.265 billion kilowatt will be put into operation, which accounted for 55% of coal base unit.

1.1.2.8 "The 12th Five-Year Development Plan of Coal Industry”

By 2015, apparent effect will be made for the adjustment of the layout of coal and regulate the development order. Production will further concentrate to the large base, big group. Progress will made for modern coal mine construction.

Production safety situation will be improved significantly. The recovery rate of resources will be obviously improved, circular economy park construction obtains significant progress, the mining area ecological environment improved, "going out" enterprises obtain new effect of miners. Living standards have markedly improved, the basic completion of high resource utilization rate, safety has safeguard, economic benefits is good, less environmental pollution and sustainable development of the new coal industry system.

1.1.2.9 The petrochemical and chemical industry during “Twelfth Five-Year " development plan

Break through the existing coal chemical enterprise production management pattern, encourage the petrochemical enterprise and coal, electricity and other enterprises to form alliance, a number of large enterprises as the main body of the "coal heat integration" of industrial cluster and large coal chemical production base will be formed.

Coal-to-oil, coal-to-gas, coal-to-olefins, coal-to-dimethyl ether, coal-to- glycol and other modern coal chemical project must be in accordance with relevant industrial policies and take coal, water resources, ecological environment, transportation, regional economic development and regional carbon dioxide, the main index of pollutant emission reduction energy-saving and comprehensive conditions into account. In Mongolia, Shaanxi, Xinjiang, Guizhou, Ningxia etc, major coal producing provinces, realizing proper layout and adopting the ideology of intensive, the upstream and downstream

integration approach for the construction of modern coal chemical production base and coal heat integration demonstration base. In the remaining provinces, especially for coal loading and balance provinces, the fragile ecological environment area, atmospheric joint control key area, the total discharge of major pollutants exceed the standard and energy-saving evaluation and review unqualified area, where is restricted the development of modern coal chemical industry. New project olefin scale to achieve 500kt/a. During the period of "twelfth five-year", more attentions will be focus on organizing the implementation of coal to olefin upgrading demonstration project.

The fertilizer capacity is controlled below than 77.6 million tons, among which nitrogenous fertilizer and phosphate fertilizer are 51.1 MT/a and 21.5 MT/a, other chemical product gross control effectively, caustic soda, soda ash, methanol, acetylene production are under the control of the 31 MT/a, 30 MT/a, 40 MT/a, 28 MT/a.

1.1.2.10 Chemical fertilizer industry "Twelfth Five-Year" development plan

Technology progress. Actively promote advanced coal gasification and coal based polygeneration technology, advanced coal gasification technology of nitrogenous fertilizer productivity ratio will be increased to 30%, with an annual output of 450000 tons of synthetic ammonia and 800000 tons of urea device realize the independent. Continuously improve the low grade phosphate.

Energy saving and emission reduction: The comprehensive energy consumption of synthetic ammonia to 1350 kilograms of standard coal per ton, with natural gas and coke oven gas, smoke-free lump coal, anthracite as raw materials of synthetic ammonia comprehensive energy consumption per unit of product respectively to 1150 kilograms of standard coal per ton, 1300 kg of standard coal per ton and 1650 kg of standard coal per ton.

1.1.2.11 Construction materials industr y" Twelfth Five-Year “development plan

Stick to structural adjustment. Strictly control of cement, flat glass capacity blind expansion, accelerate the optimization and upgrading of industrial structure, promote merger and reorganization of enterprises, phase out backward and technological progress, and improve industry concentration. Adhere to green development, Strengthen energy conservation and comprehensive utilization of resources, vigorously develop the circular economy, promote clean production, focus on the development of environmental protection, energy saving, security in one of the green construction materials, shifting construction materials industry change to green function. "Twelfth Five-Year" period, construction materials industry increases a value to an average annual growth rate of more than 10%. Accelerate to eliminate backward production capacity of cement, plate glass. Industrial added value of energy consumption and carbon dioxide emissions reduced by 18% ~ 20%, the total discharge of major pollutants reduced by 8%～ 10%,

achieve stable emission standards. Application synergistic disposal, comprehensive, the utilization rate of solid waste is raising more 20 percent more than now.

1.1.2.12 Iron and steel industry Twelfth Five-Year development plan

Eliminate of backward sintering, pellet and coking production process equipment: Indigenous coking (including improved coke oven), single furnace production capacity 75 kt/a following with or without gas, tar and the recovery and utilization of sewage treatment is not up to the requirements of the admittance condition of semi coke (coke) production device, a carbonization chamber height of 4.3 meters (3.8 meters of tamping coke oven) following conventional machine coke oven.

1.1.2.13 Coking industry admittance condition

Conventional machine coke: top charging coke oven carbonization chamber height must be less than 6 meters, the volume is greater than or equal to 38.5m3; tamping coke oven carbonization chamber height must be less than 5.5 meters, the volume of tamping briquettes≥ 35m3, production capacity of 1million tons per year and above.

Semi coke (coke carbonization furnace): vertical retort furnace production capacity of 75kt/a production capacity more, each≥300 kt/a, production capacity of 600kt/a and above.

Heat recovery coke oven: The capacity should be over 400 kt/a. Improve heat recovery coking technology capacity New built heat recovery coke oven project is banned.

Coking production enterprises should reach to coke standard energy consumption per unit product of (GB21342-2008).

Conventional coke (comprehensive energy consumption (kgce/t focal)≤ 165*); heat recovery coke oven (comprehensive energy consumption (kgce/t focal)≤ 165)); char (semi-coke) furnace (comprehensive energy consumption (kgce/t≤ 260 (coke), thermal (heat)≤ 230)).

Conventional coke oven and heat recovery coke oven coal consumption (dry basis) t/t coke oven coal consumption should be less than 1.33, half (dry basis) of less than 1.65 t/t coke.

1.1.3 SUMMARY

China National Development and Reform Commission and National Energy Bureau are responsible for organizing the compilation of “deep processing of coal demonstration project planning " and "deep processing of coal industry development policy", the policy orientation:

Firstly, reasonable development and use coal resources, high efficiency, low emission, clean processing conversion and utilization. Subjects to the sustainable development concept of circular economy, overall planning, rational distribution, scientific guide industrial development, make our economy modern coal chemical industry technology in the forefront of world. The "Twelfth Five-Year" will focus on organizing the implementation of modern coal chemical industry upgrade demonstration project construction.

Secondly, strengthen the coal chemical industry and the national economic and social development planning and related industry convergence plan, fulfilling seriously overall planning of industrial development in the areas of energy conservation, and actively promoting the coal chemical industry and coal, electricity, petroleum and chemical industry development, and striving to make balance between coal supply and demand. Implementing file spirit of NDRC [2011]No.1, strengthen water natural resources and water source protection, strictly control the water shortage regions of high water consumption in the construction of coal chemical projects.

Thirdly, strictly control the coal chemical industry in net coal input area, in coal net output areas scientific planning, orderly development is needed to make a total control. New demonstration project should link with the elimination of backward production capacity of traditional coal chemical combination, as far as possible without adding new coal consumption. Carry out the classification of coal resources use and optimize configuration policy, coking coal including coal, coking coal, lean coal for coking industry is preferred to coke industry.

Fourthly, improve the conversion efficiency. New demonstration project accounting must be including from coal exploit to the terminal using the full cycle of energy conversion efficiency, and with other conversion processing methods for the scientific selection and evaluation, the whole cycle of coal conversion efficiency was significantly higher than that of existing industry level, the coal resources price according to the market price calculation, especially for carbon dioxide emissions and capture should be clear responsibility, new demonstration project should have the ability to substantially reduce carbon dioxide emissions.

Fifthly，strictly industry access standards, ensure the project scientific, efficient, cost-effective. Construction of demonstrative project of petrochemical industry according to the principles of layout, the realization of the park, built in the coal and water resources condition with area; project owner should also have the capital, technology and resource advantages, construction plan and market development program must accomplish resource utilization is reasonable, competition ability is strong, and after full comparison and selection.

Sixthly，the implementation of demonstration projects are mainly for explore and develop the scientific and efficient coal chemical technology, cultivate intellectual property and competition ability of market main body. Therefore, in principle, one enterprise can undertake one demonstration project, conditions for the development of coal chemical industry in the region and demonstration projects have strict limits on the number.

1.2 AUSTRALIA COAL UTILIZATION POLICY

Australia has a three level system of government, which is federal government, state and territory governments and local governments. According to Australian law, mineral resources are owned either by the Australian or State/Territory Governments rather than private individuals. However, none of the three tiers of government engage in commercial exploration and development of mineral and energy resources, and all coal in Australia is marketed by private sector producers or their agents.

During 2011-2012 Australia exported 376.8 million tons of coal, making it the world's largest net exporter of coal. Australia's coal exports are expected to grow strongly to between 527 million tons and 689 million tons per year by the middle of the next decade. Additionally, the Australian coal industry is among the safest and most efficient in the world.

1.2.1 DEVELOPMENT POLICY

Coal fired power generation provides more than 75% of Australia's generating capacity, making it an important part of the Australian economy. Through the 2011 Clean Energy Future Plan, the Australian Government is committed to reducing greenhouse gas emissions by 5% from 2000 levels by 2020 irrespective of actions by other economies. The Government has also committed to a long term target to reduce Australia's carbon pollution by 80% below 2000 levels by 2050. The main instrument through which the Australian Government

will bring about these reductions is through the carbon pricing mechanism, which commenced on 1 July 2012. The carbon price requires facilities in Australia emitting over 25,000 tonnes of carbon dioxide equivalent per year to report on, and pay a price for, their carbon pollution. The price is fixed for the first three years, starting at $23 AUD a tonne in 2012-2013 before transitioning to a flexible price set by the market from 1 July 2015.

Complementing the carbon price, the Government has committed up to $17 billion AUD over the next decade to support more innovation and deployment of clean energy and energy efficiency, including for technology research and development, demonstration and commercialisation. As a part of the Clean Energy Future Plan the Government has also established a $1.3 billion AUD Coal Sector Assistance Package. The package aims to support Australia's coal mining sector by providing targeted assistance to Australia's gaseous coal mines as well as providing support for the development of coal mining abatement technologies.

Modeling produced by the Australian Bureau of Resources and Energy Economics suggests that by 2035 unabated coal fired power plants will account for 32% of electricity generation in Australia and this will further decrease to 1% in 2050, while at the same time, carbon capture and storage (CCS) equipped coal fired power plants are expected to account for 16% of Australia's electricity generation in 2050.

Australia's coal industry is strongly regulated, involving all levels of government and covering a wide range of areas including environmental

performance, planning, land use, occupational health and safety and impacts on local communities. The Australian coal industry is committed to ensuring the responsible, long-term development of Australia's coal resources in a manner that is accepted and supported by the Australian community.

1.2.2 MINERAL RESOURCES TAX

In Australia, the Commonwealth and state and territory governments generally own mineral resources and impose charges on minerals extraction to ensure that the community receives a benefit from their development. The Mineral Resource Rent Tax (MRRT) was introduced by the Australian Government on 1 July 2012 and with it a taxation rate of 30% on company profits was applied to companies mining iron ore and coal in Australia. The MRRT is a profits based tax and only companies with profits above $75 million AUD will incur a MRRT liab.

1.3 RUSSIA COAL UTILIZATION POLICY

According to the Russian coal industry development planning, in 2020 the Russian coal production will reach 4.08 tons, in 2030 is expected to reach 5.145 tons. Russian government encourages development and utilization of coal resources, welcomes foreign investment in Russian coal mine.

Russian government approved the implementation of "Russian energy strategy before 2030". Main task in coal industry is put forward as following:① to complete the whole coal industry structure transformation, to ensure the organization from the planned economy to market economy under the loss of

profit;②Cut off the excess and no prospects of the enterprise, achieve the new coal production efficiency, to reduce coal production cost, improve labor productivity and reduce the production of accident;③rely mainly on its own assets and borrowing resources (about 1/3 of total investment) development sector enterprises, the economy will no longer support coal industry;④ in the Kuzbass and prospects of development of Coal Basin coal recovery to introduce new technology and production capacity; ⑤during the last 5 year, annual coal production capacity will exceed 80 million tons, annual coal capacity to more than 40 million tons; ⑥increase coal processing production of coal preparation plant, increased to 0.127 billion tons; ⑦to continue to expand the export of coal. By 2030, the Russian coal export will increase 60. 70 ~97.5 million tons than 0.1 billion tons present foundation.

Russia coal industry mainly focus on exports, according to Russia coal industry develop plan before 2030, increase coal export amount to 0.125 billion tons. It is not guarantee the sustainable development of coal industry. Russia coal industry needs to enter into new-brand, taking innovation as the foundation stage of development. If coal is not deeply processed, the problem between the modernization of coal mining enterprise and utilization of coal resources in the backward technology will not be solved. The main purpose of deep processing is to promote the consumption of coal in the producing area and moderate to create added value.

In the Kasbahs coal mine Russia has implemented first project. It is predicted that, 500 tons of hot coal deep processing production of semi coke by an

innovative combination of coal technology will be put into operation with an open-pit coal mine by 2015.

Emissions in 2007 decreased 34% compared in 1990. Therefore, Carbon dioxide emissions may be increased 9% in 2020, but still meet to emission reduction targets.

1.4 AMERICA COAL UTILIZATION POLICY

1.4.1 AMERICA ADJUSTMENT OF ENERGY POLICY

In March 30, 2011, American president Obama gave speech on energy security. Energy policies should be adjusted in the situation of oil prices rising for dependence on imported oil, planned to cut 1/3 oil imports in the next ten years. American energy group has two main characteristics: the one is development of offshore oil and development of energy efficiency technologies to meet the domestic energy demand; the other is strengthening nuclear energy, wind energy and solar energy and other clean energy development and utilization, improving the energy use efficiency, to achieve energy saving and emission reduction, reducing dependence on oil.

1.4.2 KEY TECHNOLOGY TO BOOST THE ENERGY PRODUCTION

United States raw material with coal power plant construction development with advanced coal gasification technology is very rapid. The advanced technology investment is larger, but reducing pollution and producing cost.

Coal gasification technology especially "integrated gasification combined cycle" (IGCC) technology will certainly be applied widely in the future. American coal industry has strong technical force, high level of mechanization, high production efficiency, less pollution. The United States government values the technical innovation of coal industry, especially the green technology with a large number of scientific research investments. The federal government has not only established such as the environmental protection agency, the department of energy management mechanism, and promulgated the "federal mining safety and health law", "pneumoconiosis allowance of open pit mining management and restoration of law", "Clean Air Act" and a series of laws, but also adjusts the several research center management system, to promote green technology innovation plays an important role.

1.4.3 ENERGY MANAGEMENT-- SERIES OF LA WS AND REGULATIONS

①The United States Department of energy development strategy of the sources of energy, to the laws and regulations, technology, training, standardizes enterprise behavior.

② “Land leasing method “and” amendment " successfully manage resources.

③“The coal mine health and Safety Act " was implemented in 1969 and “mine health and Safety Act " was implemented in1977, which promoted coal industry safety condition.

③ "Clean Air Act " was implemented in July 2011, and revised in 1977 and 1990, which promoted coal utilization and energy saving.

④ Government oriented enterprises active development mechanism, enterprises to invest in the development of clean coal technology as 2/3. Increased production of coal mine workers decline, decline in the number of coal mine safety situation, a fundamental turn for the better

1.4.4 ENERGY POLICIES ADJUSTMENT WI TH EVIRONMENTAL CHANGE

" National Energy Policy Act " was issued in 2005, main contents include: If the United States does not reduce from foreign oil dependence, expansion of alternative energy development, American economic and social security cannot be guaranteed and energy saving. In the next ten years, the United States government provides a $14.6 billion tax credit to the American energy companies, in order to encourage oil, natural gas, coal gas and electricity enterprises to adopt energy saving, clean energy saving measures; To encourage the construction of more power plants, oil refineries, pipelines and nuclear reactor; promotion of clean and efficient energy technologies.

1.4.5 PROMOTION CLEAN COAL TECHNOLOGY POLICY MEASURES

In order to more environmentally friendly (reduce greenhouse gas emissions), more efficient use of the rich reserves of coal resources, since 2001, Bush government had invested $2.2 billion used for advanced clean coal technology from the development stage to the demonstration stage and the stage of market economy to advance.

1.4.5.1 Research and development (R&D)

By the "Coal Research Program" (CRI) support department of energy, National Energy Technology Laboratory (NETL) for clean coal technology research and development, such as: the development of innovative technology to control the pollution, coal gasification technology, advanced combustion system, steam and carbon capture sequestration technology etc.

1.4.5.2 Demonstration

"Clean coal power generation plan" (CCPI) mainly supports the enterprises and government to establish partnership, builds model of clean coal power plants with the market prospect of the advanced technology demonstration.

1.4.5.3 Commercialization

By the preferential tax policies, and demonstration feasible advanced technology for large scale commercial promotion, furthermore, tax subsidies

new technologies of production cost becomes competitive. The tax preferential policy support project will be beneficial to build the first zero emissions power plant "future generation".

The goal of Clean coal project is to make full use of technical progress, improve efficiency, reduce cost, reduce emissions; efficiency of coal power generation has increased from 5% in 1900 to the current 35%; recent pulverized coal technology make the efficiency can reach above 40%, IGCC technology will make it possible to achieve 55% efficiency; since 1990 the United States to implement " Clean Air Act " since, coal increased 30%, while the unit electricity price reduced 20%; advanced coal technology can significantly reduce emissions. The past 30 years, sulfur dioxide emissions reduced by 68%, nitrogen oxide emissions reduced by 46%.

1.4.6 PREFERENTIAL TAX POLICIES ENCOURAGING ENTERPRISES TO ADOPT ADVANCED CLEAN CO AL TECHNOLOGY

Tax preference is the United States government incentive enterprise development, demonstration, the use of advanced discharge energy technology is one of the important policy measures. According to the energy policy act of 2005 by "1307", the United States government give a total of $1.65 billion in tax incentives to clean coal project, including: the $0.8 billion tax credit for integrated gasification combined cycle (IGCC) power generation project. This amount will be substantially evenly distributed by using bituminous coal, bituminous coal and lignite power of the IGCC project; $500

million in tax concessions given in addition to IGCC items other than innovation advanced coal power generation technology; $350 million in tax credits given for power generation using coal gasification technology, the coal gasification technology is not used for power generation, but for the production of chemical products.

The advanced coal technology is unable to carry out large-scale promotion because of the high cost, system integration and reliability, therefore, the energy department accelerate the technology application and promotion by giving preferential tax policies to reduce overall costs.

1.5 INDONESIA COAL UTILIZATION POLICY

1.5.1 MINERAL AND COAL MINING METHOD

In 2009, Indonesian promulgated and implemented "law of mineral and coal" and subsequently were promulgated the implementation of the relevant government regulations, which was engaged in coal exploration and development activities of the most important laws and regulations. The foreign holding mineral rights was not prohibited, but the act only on the exploitation of mineral resources to do the principles, relevant implementing rules and supporting measures had not been announced.

Because of their lack of funds, the Indonesian general for foreign investment in mineral areas support active attitude, but also set some limits. Especially with the Indonesian two 10GW power project will be built for power generation,

priority is given coal production to give to meet the domestic demand, and consider export.

1.5.2 INDONESIA MINING INDUSTRY MANAGEMENT SYSTEM

Indonesian mineral development and implementation of classification management, mineral resources law will be divided into A, B, C three categories. A strategy for the minerals, including oil, natural gas, coal, uranium, nickel, cobalt, radioactive mineral of tin. These 7 kinds of mineral products can only be managed by the economy. Foreign Company as a government agency or state company contractor, with congressional approval may also be provided according to the contract involved in strategic mineral exploration and development activities. In 1999 No.22 adopted by the method, the mining management framework will produce major change. The central government's power will be a large number of decentralization. The local government will be in mining activity management having greater power.

1.5.3 NEW ENVIRONMENTAL POLICY

Indonesian new environmental policy intends to end the deforestation, and is currently being undertaken to mine area and the jungle reserves classification. Indonesian President Susilo in Norway, Oslo organized by the international weather jungle Congress said it would "maintain" tropical rain forest. A two-year ban would effectively end open pit mining.

1.5.4 EXPORT TARIFFS ON COAL

Indonesia coal exports had been subject to 5% coal export tax from December 25 in 2005, the tax increase 50% in 2013, support for the deep processing of coal industry development.

1.5.5 COAL PRICE POLICY

In July 2011, Indonesian government put forward that after September, Indonesian will prohibit enterprises to lower than the prices set by the sale of coal. In august 2011，Indonesian enacted the provisions of the international market interest rates as the coal price benchmark.

1.5.6 POLICY TREND

In future, Indonesian coal industry policy will be reflected in the management, development, utilization and development.

Management policy: The coal is as national strategy resource reconfiguration. Efficiently manage coal resources.

Development policy: Create a better investment environment in the coal industry. Establish and improve the mechanism of supervision and management.

Utilization policy: Improve coal application: Improve coal as to meet domestic demand function.

Development policy: accelerate the development of coal industry, provide raw material for its derivative industry.

LOW RANK COAL UTILIZATION POLICIES IN APEC ECONOMIES

2.1 CHINA LOW RANK COAL UTILIZATION POLICY

National development and Reform Commission issued the "Twelfth Five-Year period of coal deep processing demonstration project Plan" for coal efficient and clean utilization, which supported for 15 large coal deep processing demonstration projects as a new demonstration content lignite.

"The 12th Five-Year Development Plan of Coal Industry":Accelerate exploration in lignite resources region in the East Mongolia and large coal base in Xinjiang area. Large and medium-sized coal mines should be supported the construction of coal preparation plant. Encourage coal preparation plant in concentrated small mining area. Internationally advanced level coal preparation plant should be built in large-scale coal base. Existing coal preparation plant should adopt advanced technology and equipment to reform. The promotion of advanced production technology and application of enhancing coal, lignite quality improvement technology R&D and demonstration, improve coal product quality and the use of technical equipment standard, improve the coking coal, pulverized coal product quality and use efficiency, raise dynamical coal preparation proportion. Steadily promote the construction of demonstrative project of deep processing of coal. In Inner Mongolia, Shaanxi, Shanxi, Yunnan, Guizhou, Xinjiang, choice appropriate coal type to support for large enterprises to develop coal oil, coal and natural gas, coal to olefins, ethylene glycol coal upgrade demonstration project in rich water resources area. Accelerate advanced technology industry application. Continuous innovation and improvement of technology, improve

energy conversion efficiency, reduce the consumption of water and coal, reduce production cost, and enhance competition ability. Support for carbon dioxide capture, utilization and storage technology research and demonstration.

"Deep processing of coal industry development policy": Strictly control coal net input area project. Encourage the development of high-sulfur coal, lignite, with low quality coal as raw materials of coal deep processing project. Low rank coal classification and conversion technology is used key demonstration in qualified conditions region (single series of production capacity of 1,000,000 tons and above for the low quality coal upgrading (pyrolysis) technology, including drying, pyrolysis, coal tar processing complete sets of technology). Low rank coal upgrading energy efficiency must meet to the demand of 75%, advanced ratio 85%; fresh water consumption requirement is 0.15t/t feeding coal, advanced consumption of 0.13t/ feed coal.

Coal resources are prioritized for power, civil and industrial furnace; low metamorphic bituminous coal, lignite, coal gasification and has good performance of coal used in preference to the deep processing of coal.

Carry out lignite resources survey and evaluation, preparation of lignite drying and upgrading development planning. The drying lignite upgrading technology is in the development of low carbon economy, coal clean and efficient use of planning. Develop drying lignite upgrading technology and build lignite drying quality demonstration project.

Increase technical research and development investment, choice the appropriate technology. Develop with independent intellectual property rights of lignite drying Quality-upgrading technology. The lignite drying Quality-upgrading technology development and industrialization is put into national development plan of science and technology as a scientific and

technological research demonstration project. On the basis of introduction of foreign advanced technology, pay attention to digestion and absorption and re creation, focus on cultivating the ability of independent innovation. The new technology provides the necessary test cost, in the pilot, demonstration of the results, further promotion.

Abide to preferential tax policies and encourage enterprises to adopt drying lignite upgrading technology. The related technology research and development, equipment manufacturing, should be given appropriate preferential tax.

2.2 AUSTRALIA LOW RANK COAL UTILIZATION POLICY

Lignite is clean, low volatility and low sulfur advantages, but at the same time, the existence of high humidity, low burning point and CO2 emissions of big disadvantage, is the leading cause of global warming is one of the important factors. However, in the current energy shortage situation, the economic value of lignite and related processing production technology again is also the world energy crisis.

2.2.1 LIGNITE COAL IS AN IMPORTANT PART OF AUSTRALIAN POWER ENERGY

Lignite power is important to the Australian economy and more particularly to the Victorian economy and has had a traditionally low cost of fuel underpinning the utilisation of this valuable resource. The Victorian brown coal electricity direct cost of is very competitive with most other forms of electricity generation and this has been true for almost 100 years. In the past this has meant that generation from lignite has been often cheaper than Australian black coal power generation cost and 1/3 to 1/4, 1/6 to 1/7 of natural gas, The reason is

that Victorian Lignite Coal, due to coal thickness, from 60-300 meters, coal seam overburden layer only 5-10 meters, can be used for large-scale open cut mining.

2.2.2 LIGNITE COAL PROCESSING TECHNOLOGY IS ONE OF AUSTRALIA'S KEY ENERGY DEVELOPMENT AND RESEARCH TOPIC

Lignite of high moisture content (ranging from 55-70% and most typically around 62%), with a low ash melting point (approximately 1250 degrees c) and easy slag, provide a significant percentage of the Australian base load generation. However lignite-fired power generates a significant level of CO2, a key greenhouse gas emission and these power stations have so far failed to thoroughly solve the problem.

In early 1993, Australia established a specialized research institution CRC for clean energy from lignite. This was a key research and development centre of low rank coal power generation technology and new technology. This institution worked in order to solve low rank coal combustion and serious air pollution problems and the body had more than 100 scientists.

The Commonwealth Scientific and Industrial Research Organization (CSIRO) the Universities in Victoria, Australia and the large power plants have maintained long-term academic and technical research and development. It is one of the objectives of these institutions to improve the efficiency of brown coal, pulverised fuel (pf) and traditional powder coal combustion technology. This is a challenge in power generation technology of lignite due to the moisture extraction process, making brown coal station power capital costs more than black coal costs. Although in Victoria the potential to include low emission technology for three large power plants have not been widely used, but the depth of lignite processing technology being studied, demonstrates its

potential economic value. The impacts of mining has been one of the International Energy Agency (IEA) and other energy organizations main concerns.

One of the world's largest proposed lignite coal gasification techniques proposed for Victoria in Australia using clean energy is the HRL -- integrated drying, gasification combined cycle (IDGCC) 600MW Australia drying power plant EPC project, at the same time the application of synthetic gas and natural gas (NG). This project opened the world's first step in integrated drying and gasification with a low emission patented technology (integrated drying lignite gasification technology) with the use of synthetic gas. It comprises of lignite drying, gasification, clean combustion propulsion gas turbine power generation, and then in the heat recovery process by the process of waste heat boiler will take steam energy into the steam turbine. The factory mainly contains: integrated drying gasification system, synthesis gas purification system, combined cycle power generation. Is divided into three stages: the first stage is based on the 2 SGT52000E (LC) gas turbine combined cycle power generation system supporting gas steam; second stage prop up with a SGT52000E (LC) gas turbine capacity matching integrated drying gasification and purification system; third stage prop up with another SGT52000E (LC) gas turbine matching integrated drying and purification system. After the project is completed, annual electrical output of about 4 Gigawatt hours green and clean power. This project is not yet economic in the Australian electricity market and is being considered for future application along with a number of other innovative technologies.

Gasification for the production of electricity is a long term objective as it is easier to separate the CO2 from the gas stream than it is for conventional power stations. Aiming at the characteristics of lignite integrated drying and gasification plant, integrated design, maximises the energy efficiency;

secondly, to relatively low-grade lignite as fuel, the emissions from the lignite can reach and quality comparable to the environmental emissions from NG, easy expansion for CO2 trapping disposal system, and the CO2 near zero emissions, low carbon economy the long trend of development compatible; once again, take the height of water air cooling techniques, effectively saving water resources; special synthetic gas and natural gas double fuel complementary, effectively solves the problem of IGCC system peak load regulation. The challenge for all lignite energy technologies is to lower the unit cost to make them successful in the market.

2.2.3 AUSTRALIAN AND VICTORI AN GOVERNMENT FOCU S ON ENVIRONMENTAL PROTECTION PROBLEM OF LIGNITE USED

In order to reduce the lignite emissions for CO2, NOX and SOX and discharge and the pollution to the atmospheric environment, the Australian government and the Victorian government has paid great attention to this issue. Australia has signed the "Kyoto Protocol". Victorian lignite power generated greenhouse gas emissions accounts for around 35% of total emissions from electricity generation in Australia.

In 2012, the Australian Government introduced a Carbon Tax that sets a price on a tonne of carbon initially at $23.00 AUD.This fixed price system will be in place until 2015 when the open market will set the price.

Australian carbon emissions account for only 1.5% of total global emissions, but the per capita emissions are close to the highest in the world. The main reason for this is the very high levels of carbon based fuels that are used for the economy electricity generation. Carbon tax liabilities will apply to facilities in Australia emitting over 25,000 tonnes of carbon dioxide equivalent per year .

For activities that have high emissions but are trade exposed – so they are constrained in being able to pass through carbon costs to their customers in global markets - the Australian Government is providing assistance over the first three years of the carbon pricing mechanism. This will initially cover up to 94.5% of carbon emissions, to help these enterprises to adjust.

2.3 RUSSIA LOW RANK COAL UTILIZATION POLICY

The same with Coal utilization policy

2.4AMERICA LOW RANK COAL UTILIZATION POLICY

The same with Coal utilization policy

2.5INDONESIA LOW RANK COAL UTILIZATION POLICY

Since most from low calorific value and high moisture, grade "C, B " sub bituminous coal and a small amount of bituminous composition, "C, B " grade bituminous coal will be the development trend of Indonesian coal mining. Its "A,B" grade bituminous coal is increasingly favored by the international market, the foreign exchange earned to attraction, Indonesia will increase production capacity, remain the world's biggest exporter situation.

"C" bituminous coal storage widely, has been the development of domestic power plant, is required for the maximum size of fuel. Drying and upgrading technology to "C" grade bituminous coal moisture is reduced, calorific value increase, support the traditional power station coal, after the upgrade of the " C " level of bituminous coal and lignite for domestic use, in order to guarantee and support for "A, B " grade coal export growth.

2.5.1 BUSINESS WITH TH E JAPANESE KOBE STEEL COMBINED MODIFICATION OF LOW QUALITY COAL

(LIGNITE)

Corporate Japan Kobe Steel announced in December 3, 2008, the company in Indonesia promoted the "upgrading of lignite" project. Kobe Steel and Indonesia resource investment company and its subsidiary Arutmin Bumi Resources signed a cooperation agreement, in the Satsui coal mining area (South Kalimantan) and built the experimental plant. Purpose is improving lignite quality for using in electric fields.

2.5.2 REGENERATIVE ROTARY BED CARBONIZA TION PYROLYSIS TECHNOLOGY OF LOW QUALITY COAL RESOURCES OF INDONESIA

In 2012 March, Shenwu group and TITAN group developed Indonesian super low grade mineral resources. Shenwu energy-saving emission reduction technology has in the global low grade energy efficient utilization of occupying the commanding elevation influence field. Use of Shenwu group regenerative rotary bed carbonization and pyrolysis technology in treatment of Indonesia lignite resources such as low quality, extraction of Indonesia is badly in need of high additional value of petroleum and natural gas resources; and improve the value of low grade coal, to meet with clean coal chemical industry and power quality raw materials.

2.5.3 MAKE FULL USE OF DOMESTIC ENERGY RESOURCES

Indonesia Investment Coordinating Committee (BKPM) combined with South Africa Sasol company has carried out feasible study of the Indonesian coal oil plant project, to produce high quality ultra clean transportation fuel. It is expected that the factory needs to invest $10 billion investment, 80000 barrels

per day. Using Indonesian rich reserves of coal, reducing dependence on imported fuel, to ensure that the Indonesian energy security. Factory will make full use of domestic heat from these lower levels of brown coal as raw material.

As an important member of the Southeast Asian economies, Indonesia has abundant energy and mineral resources. Indonesia is in industrialized process important level, combined with its rapid expansion of population, the demand for energy is more and more big. Petroleum, natural gas and other crop atrophy of year after year, the Indonesian government had to make a lot of beneficial to the development of domestic energy initiatives, even by administrative means to attract foreign capital and domestic private capital investment and development of domestic rich energy and mineral resources. Although through the above measures attracted many domestic and foreign investors to invest in Indonesia, but due to the government's inconsistency makes a lot of investment is still in wait-and-see for funding. In the future of energy work, the government should strengthen the government's credibility, guide foreign capital investment, especially to rural areas, renewable energy and new energy direction investment.

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