Needed a correct overall energy strategy

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THE Bangladesh Environment Network (BEN), a global network of pro-environment Bangladeshis, is alarmed by recent news reports indicating that the government is moving toward adoption of a coal policy that was allegedly drafted by a private firm, and geared toward open-pit coal mining.

BEN takes serious exception to this type of coal policy, and the method in which it was formulated, and instead urges the government to entrust a reputed national institution or a committee with the task of preparing the draft, which would then be put for open national discourse before adoption.

BEN is aware that coal can potentially be an important part of Bangladesh's overall energy plan. However, BEN wants to draw attention to the fact that, compared to natural gas, coal is a "dirty" fuel which produces many noxious gases, and, unless appropriate scrubbing technologies are in place, use of coal can cause serious pollution and health hazards.

More importantly, unlike that of gas, extraction and use of coal is fraught with serious dangers and challenges. International experience shows the devastation that open-pit coal mining can cause to the site areas.

Many members of BEN and its energy panel have direct experience of the damage that can be caused, and the enormous sums of money that are now being spent in order to redress some of this damage.

In Bangladesh, coal mining is more hazardous and challenging because of several reasons:

High population density: Nowhere in the world are coalmines operated in such densely populated areas, as they are in Bangladesh. The high density implies that a large number of people will have to be uprooted from their ancestral homesteads and villages, a step that will entail huge human costs. To complicate the problem, Bangladesh hardly has any unpopulated area where the displaced people can be suitably resettled.

High opportunity cost of land: The high density of population is related to the fertile and productive nature of the land, usually producing three crops in a year. Mining will render the area uncultivable, thus entailing very high opportunity costs.

Rivers and underground water table: Bangladesh's ubiquitous river system and underground water table make de-watering of pits, a necessary condition for mining, extremely challenging, and make spillover of the toxic water of the mine onto the neighbouring water and land areas almost inevitable.

To compound the difficulty, intense pumping to de-water the pits makes the neighbouring areas dry, rendering the land unsuitable for cultivation and causing dearth of water necessary for drinking and other household purposes. The adverse consequences of open-pit coal mining will, therefore, not remain limited to the mining area only, and will be felt far and wide.

In view of the above, it is puzzling why the government wants to adopt a coal policy geared toward handing over the coal deposits to foreign companies for extraction and export, in exchange for very little financial gain and huge economic, human, and environmental cost. Instead of the proposed coal policy, BEN has some recommendations:

Concentrate, for now, on gas: To overcome the current power crisis, and to meet the energy demands in the near future, Bangladesh may concentrate on proper use of the country's gas resources. It is a shame that huge amounts of gas from the Titas gas field got burnt, and are still getting burnt, due to lack of proper maintenance of the gas wells.

It is also amazing that, when Bangladesh herself has a desperate need for energy, the government is reportedly considering foreign investment proposals that are, in effect, proposals to export away Bangladesh's gas in embodied form (such as fertiliser in case of Kafco-2 and steel and fertiliser in case of the Tata investment proposal).

In view of the country's limited proven gas reserve, the government should make an unequivocal decision not to entertain any project involving export of gas, either raw or in embodied form. It may also consider terminating Kafco to eliminate the financial hemorrhage that, according to most experts, this project is causing, and to use the saved gas to produce power so desperately needed by the country now.

By ensuring proper use of gas, the country can buy some more time before needing to resort to using coal. Bangladesh should also enhance gas exploration efforts, and develop her own capability for doing so.

Develop national mining capability: Bangladesh may use the time (gained by using gas) to develop technological and manpower capability for mining coal. To this end, Bangladesh may make the best use of the already in operation Boropukuria coal mine to learn about closed pit coal mining in Bangladesh geological settings.

This learning may also help Bangladesh to understand the challenges and consequences involved in open-pit coal mining in the country. Once the requisite capability is developed, Bangladesh will be able to retain and use 100 percent of her coal, rather than giving up most of it to foreign companies as is reportedly envisaged by the draft coal policy.

Develop necessary regulatory framework: Bangladesh may use the time gained (by using gas meanwhile) to prepare in several other ways for coal extraction and use, as and when that becomes necessary in future. One of these concerns development of the appropriate regulatory framework necessary to make coal extraction as little damaging to the area, people, and the environment, as possible. This may require setting up of appropriate national institutions, which may thoroughly study and use international experience relevant for Bangladesh.

Take into account the possibility of alternative, non-mining methods of coal energy extraction: In considering how to benefit from the coal deposits, Bangladesh also needs to keep the options regarding other superior alternative methods open. Among these are:

(i)Conversion of coal into liquid.
(ii)Coal gasification.
(iii)Coal-bed methane extraction etc.

These may be used either singly or in combination. Some of these methods can provide higher energy efficiency. It may be noted that burning of coal as gas is much better than burning coal directly, because of substantially less CO2 emission. In some of these processes the CO2 stays in liquid form, which can then be captured easily, preventing it from escaping into the atmosphere, and, in this way, CO2 can also be contained.

Assess/develop technologies for pollution free use of coal: Before plunging into coal extraction, Bangladesh also needs to develop familiarity with clean-coal technologies that will be necessary for pollution-free use of coal.

Develop national consensus and win consent of the people to be affected directly:

Most importantly, Bangladesh must develop a national consensus and obtain the consent of the local people who will be uprooted, before contemplating coal extraction, particularly through open-pit coal mining.

The Phulbari uprising of 2006 has shown that it is neither appropriate nor feasible to force coal mining on an unwilling populace. Such efforts also violate the UN recognised basic human rights of the people living in the areas containing the coal deposits.

The people may accept the human costs of being uprooted from ancestral homelands only when they, in addition to being appropriately compensated and resettled, are convinced that their sufferings will serve the greater national interests.

The rest of the nation will also have to be convinced on this point before they can ask the people of the affected areas to sacrifice. Such conviction will not emerge from drafting a coal policy in secrecy, without a proper dialogue with the local community and the nation.

BEN, therefore, urges the government to rethink its course regarding coal. The coal policy cannot be decided in isolation, and with the interests of foreign companies in mind. Instead, it has to be a part of an integrated, long-term, and comprehensive national energy strategy. There are many national energy experts who are willing to lend their expertise to help the government formulate such a strategy.

The energy experts of Bangladeshi diaspora, as assembled in BEN and its energy panel, are willing to lend their cooperation too. The recent energy report prepared by this panel has been an effort in this direction. They are willing to do more. Together, the people of Bangladesh can definitely formulate an energy strategy on their own, to serve the best interests of the nation.

The writers constitute BEN Energy Panel Dr. Ahmed Badruzzaman (expert on petroleum and nuclear energy, Chair of the panel), Dr. Sarwat Chowdhury (expert on traditional and renewable energy), Golam Kabir (expert on gas and petroleum and former official of PetroBangla), Prof. M. Khalequzzman (Professor of Geology, Lock Haven University, and expert on coal), and Dr. Selim Hannan (expert on petroleum and gas). Opinions expressed are their own and do not necessarily reflect that of their employers.

Coal -- the energy resource for 21st century

DR. RAFIQUL ISLAM

WORLD'S population is expected to reach over 8 billion by 2030, from its current level of 6.4 billion and consequently global energy demand will grow by almost 60 percent by 2030 and rise to 16.5 billion tones of oil equivalent per year.

Fossil fuels and in particular coal will meet up this challenge in future. Nuclear energy though provides a significant proportion of energy in some countries, but in general it faces serious public opposition.

Renewable energies are growing fast, but make up only a small part of global energy production -- the International Energy Agency (IEA) predicts that by 2030 only 14 percent of total energy demand will be met from renewable sources. In fact its not wise to depend on a single source of energy.

Coal can play a unique role in meeting the demand for a secure energy supply. Coal is globally most abundant and economical as well of all fossil fuels, which can be used for both power generation and industrial applications.

The production and utilization of coal is based on well-proven and widely used technologies. Coal faces environmental challenges. However, research efforts into improving the efficiency of coal fired electricity generation and technologies for carbon capture and storage offer routes to reduce carbon dioxide emissions. Coal reserves are significantly more abundant and much more widely and evenly dispersed than other fossil fuels.

The top five coal producing countries are: China, US, India, Australia and South Africa. All these countries use their indigenous coal as the primary fuel for electricity generation and all except India have a sizeable coal export market.

The world currently consumes over 5500 million tones of coal for use in power generation, steel production, cement manufacture, as a chemical feedstock and as a liquid fuel (IEA, 2005a).

Where there is a forecast of depletion in the supply of oil and gas in next 50 years coal may serve the purpose for next 150 years or more and by then new and renewable sources of energy will find wide market.

Coal can be converted to liquid and gaseous fuels to substitute for oil and ultimately to less depend on imported oil -- South Africa has a well-established coal-to-liquids industry, and China is currently adopting this technology.

China wants to cut down its oil import dependence by building a commercial scale direct coal liquefaction plant in Inner Mongolia, which will produce around 50,000 barrels a day of finished gasoline and diesel fuel.

Overall costs for coal-based power stations are usually lower than from other sources and utilization of coal for electricity generation should be a key choice. At present almost 40 percent of global electricity generation is based on coal (IEA, 2005b). The generation technologies are well established.

Not only the developing nations but developed nations also face power crisis and the solutions for that has been recognized as utilisation of more coal in power plants.

Renewable energy can reduce dependency on finite energy sources and remove some of the risk on oil import dependence.

Hydropower provides many countries with a substantial amount of their electricity needs; however, when weather conditions deviate from normal, severe problems such as the blackouts experienced in Brazil and New Zealand can occur.

New Zealand's crises in 1998, 2001 and 2003 occurred as a result of an over dependency on a single energy source -- hydro power. There has been now a four-fold increase in coal fired electricity generation (IEA, 2005b).

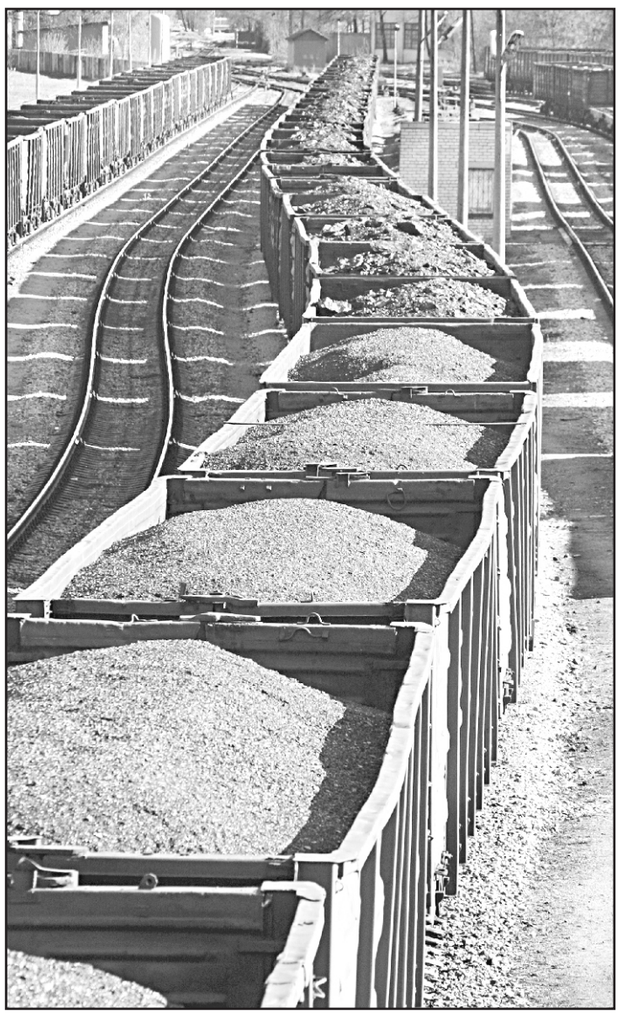
In California due to severe energy crisis in 2000-2001 a 1300-mile transmission system to generate 12000 MW of electricity -- 6000 MW from coal fired gasification (IGCC) plants and 6000 MW from wind power -- has been in plan.

In September 2003 Italy suffered a nationwide blackout, which had an impact on its total population of 57 million people. Much of Italy's electricity is imported. The bulk of Italy's own generation is from oil-fired power stations.

Due to the increasing cost of oil and a need for new and diversified power generation, many of these stations are being converted to gas or coal fired plants. Enel, Italy's largest generator, aims to double its coal fired capacity to over 10,000 MW, or 50 percent of its generating portfolio. The Italian government has also eased regulations on building new power plants and sought to encourage greater investment in the electricity sector.

In Bangladesh the only commercial energy resource that mainly supports power generation in the country at present is natural gas. About 70 percent of power generation depends on natural gas.

As per the forecast of Petrobangla, the total remaining gas reserve would meet the country's projected energy demand upto 2015. So discovery of additional gas fields or alternative sources of fuel could meet up this challenge. Coal discoveries of the north-western part of the country, with its total estimated mineable reserves of 1400 Mt (which is approximately 37 Tcf of natural gas in terms of heat value) seemed to have solved this problem.



Considering that many countries in the world have between 40 percent to 60 percent of their electricity generation using coal, Government of Bangladesh should take prompt action for a rapid increase in generation of coal fired electricity, which will ultimately have the effect of enhancing the energy security of the country.

Future power plants in the country may be set up on dual fuel system using coal and gas for the sake of better energy security. This would save and conserve Bangladesh's reserve of natural gas, and prevent the dependence on oil import for power generation.

Coal production should be at such a rate that its availability in the country for a period of at least 50 years can be confirmed.

China, manufacture small-scale power plants in the range 3 to 5 MW operating on coal, and these technologies can also be promoted in our country for electricity supply in remote and rural areas.

It is important to understand the environmental impacts of mining, processing, and utilization of coal.

The choice of mining method is largely determined by the geology of the coal deposit. Underground mining currently accounts for about 60 percent of world coal production, although surface mining is more common in several important coal producing countries like in Australia where it accounts for about 80 percent, in the US 67 percent. In India also surface mining is given importance. Surface mining or opencast mining is only economic when coal seam is near the surface.

Opencast mines damage a large land surface area, displace people from their ancestral homesteads and cause agricultural losses. But the method is cost effective, recovery is high around 90 percent, comparatively better in safety aspects and is considered to be a modern method.

Surface mining requires large areas of land to be temporarily disturbed. This raises a number of environmental challenges, including soil erosion, dust, noise and water pollution, and impacts on local biodiversity. But modern technology considerably reduces these problems. The idea is to select proper technology.

Mine subsidence can be a problem with underground coal mining, whereby the ground level lowers as a result of coal having been mined beneath. Steps are taken in modern mining operations to minimise these impacts. Good planning and environmental management minimises the impact of mining on the environment and helps to preserve biodiversity. Computer simulations can be undertaken to model impacts on the local environment. The findings are then reviewed as part of the process leading to the award of a mining permit by the relevant government authorities.

Whether coal is to be extracted by Opencast or by Underground methods of mining the selected method is to acknowledge the need to reduce environmental impact and to provide security of supply, deliver environmental and social goals and promote competitive energy markets.

Environmental issues related to coal processing include water quality issues such as acidic drainage, slurry impoundment discharges, physical disturbances, and gob fires.

The environmental impacts of coal use, mostly for electric power, include harmful emissions and solid waste disposal. Emissions of concern include sulfur and nitrogen oxides that lead to acid rain; particulate matter that causes haze; mercury and its health impacts; and carbon dioxide as greenhouse gas and its potential to change climate.

Methane (CH4) is a gas formed as part of the process of coal formation. It is released from the coal seam during mining operations. Methane is a potent greenhouse gas. Methane from coal seams can be utilised rather than released to the atmosphere.

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Renewable energy deserves proper attention

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ENERGY is one of the most important ingredients for development. There are two major sources of energy, finite i.e., fossil fuel like gas, coal, oil etc. and renewable i.e. solar, wind, biomass, hydro, geo-thermal, tidal, etc. Finite or commercial sources have limited reserves and will be exhausted in the near future. If it is not explored or used, it will remain as fixed deposit for our next generation. Renewable energy reserves are unlimited or infinite. But if it is not used today, it will not be available tomorrow. With this realisation, it is getting increasing attention all over the world.

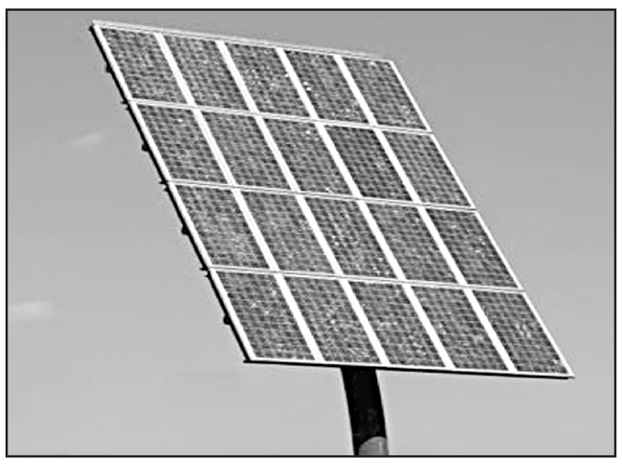
Global investment in renewable energy set a new record of $30 billion in 2004, according to a report released by the Renewable Energy Policy Network for the 21st Century (REN21) in 2005. Renewable sources such as wind, solar, hydropower, biomass and geothermal provide more energy than ever before and amount to 17 per cent of the global primary energy supply. In addition to 720 gigawatts of large hydropower, technologies such as wind, solar, biomass, and small hydropower, sometimes referred to as "new renewables", now provide 160 gigawatts of electricity generating capacity, about 4 per cent of the world total, the report finds.

The report finds that government support for renewable energy is growing rapidly. At least 48 countries, including 14 developing countries now have some type of renewable energy promotion policy. Most targets are for shares of electricity production, typically 5-30 percent, by the 2010-2012 timeframe. The report mentioned that, an estimated US $500 million goes to developing countries each year as development assistance for renewable energy projects, training, and market support, with the German Development Finance Group (KfW), the World Bank Group, and the Global Environment Facility (GEF) providing the majority of these funds, and dozens of other donors and programmes providing the rest.

India could realise the importance of renewable energy technologies 30 years back. They started working on renewable energy technologies in late 1970s. Recognising the importance of renewable sources of energy Commission for Additional Sources of Energy (CASE) was set up in 1981 with the objectives to develop and demonstrate Renewable Energy Technologies (RETs). Subsequently, in 1982, the Department for Non-conventional Sources of Energy (DNSE) was created, which was later upgraded to the Ministry of Non-conventional Energy Sources (MNES) in 1992.

In order to overcome financial and technical barriers on the way to wide dissemination of the RETs, Indian Renewable Energy Development Agency Limited (IREDA) was established in March 1987 as a public sector enterprise. As a result, India has become the fourth renewable energy producing country. From wind alone, they are harnessing about 5000 MW electricity. There are now about 4 million biogas plants.

China is also playing a pioneering role in the field of renewable energy. The state leaders are committed and have paid great attention to promote renewable energy technologies to meet rural energy supplies. As early as 1958, Chairman Mao issued directives for the development of renewable energy technologies. In July 1980, Mr. Deng Xiaoping pointed out during his visits in Sichuan that, development of renewable energy technologies could help to solve rural energy problem.



In March 1991, President Jiang Zemin pointed out during his visit in Hunan that RETs could contribute to both farmers' living and environment protection. In 2003, President Hu Jintao visited RET demo-sites in three provinces of Hunan, Jiangxi and Hebei and showed his interest. On September 19, 2002, Premier Wen Jiabao signed a document, saying that development of RETs not only provides living energy but also contributes to ecological environment protection. It is a significant and meaningful public welfare cause.

A favourable policy and legal environment are crucial for the promotion of any technology. The Agricultural Law (1993), Energy Saving Law (1997) and Renewable Energy Law (2005) have all emphasised the importance of rural energy security. Rural energy development has also been included into the 21st Century Agenda of China and Mid-term and Long-term National Social and Economic Development Plan. All these legislations have provided a long and stable policy supportive mechanism and policy guidance for the rural energy development. Based on the above-mentioned laws and policies, MOA issued 2005~2010 Rural Energy Development Plan. It may be mentioned here that, in China there are now 20 million biogas plants. They are conducting international training courses on biogas, solar, wind, micro-hydro etc.

Bangladesh is one of the low energy consuming countries of the world. At present the per capita energy consumption is 220 kgoe. National grid could so far cover only 35 per cent of the total population and only 3 per cent people are enjoying piped gas supply. About 70 per cent people of Bangladesh live in rural areas where the situation is worse. As a result, rural to urban migration is high in Bangladesh. In 1951 only 2.5 per cent people would live in urban areas which now has risen to 30 per cent. The population of Dhaka city was 0.35 million in 1951 and it is now more than 10 million. Dhaka has now become the 8th mega city in the world. According to UN Population Division, Dhaka will be the 2nd mega city in 2015.

In the rural areas the houses are scattered. Neither grid nor piped supply is suitable for those areas. Decentralized supply systems like solar, biogas, wind etc have no alternative. About 90 per cent of the electricity now produced in the country is based on natural gas, which has limited reserves and will be exhausted in the near future. It means, when our gas reserves will be exhausted, there will be no electricity. To face this grave situation, searching alternative sources of energy is of great importance.

Bangladesh has wonderful climate for most of the RETs. It is situated between 20.30 - 26.38 degrees north latitude and 88.04 - 92.44 degrees east longitude which is an ideal location for solar energy utilization. The daily average solar radiation varies between 4 and 6.5 kWh per square meter, which many countries do not have. For biogas, the ideal temperature is around 35 per cent. The temperature in Bangladesh usually varies from 60 to 400. But the inside temperature of a biogas digester remains 220-300, which is very near to the optimum requirement. Raw materials for biogas are easily and cheaply available everywhere. All hazardous materials that pollute environment, spreads bad smell and diseases are the raw materials in a biogas plant.

In Bangladesh, several studies have been carried out to assess wind potential. But these are in a very limited spots, which does not represent the country status. Experts believe that, there is wide scope for wind energy generation in Bangladesh. A countrywide comprehensive survey should be carried out to assess the wind potential. If the potential spots can be identified, the technology is proven and known to many. Wind energy is the most economic and environmentally friendly option of generating electricity. Bangladesh has a coastal belt of about 710 km, which is ideal for wave and tide energy. All these options are decentralised and are suitable for rural areas of Bangladesh, where extension of national grid or pipeline is uneconomic.

Bangladesh declared National Energy Policy in 1995, which includes renewable energy also. In the policy document government decided to establish an authority to deal with the renewable energy issues. In 1997 government has framed a structure of the authority and named it as 'Renewable Energy Development Authority'. Twelve years have passed, the authority could not yet see the light of the day. A "Draft Renewable Energy Policy" has been submitted by the Power Cell of the Ministry of Power, Energy and Mineral Resources (MEMR) which is yet to be approved by the government. At present, there is none to look after renewable energy issues.

Last year, government all on a sudden kept a budget provision of ten million taka for promoting renewable energy technologies. But, there was no attempt from any corner to utilize the money. In the revised budget, the allocation has been dropped without citing any reason. No one was held responsible for that. In the recently declared budget, there is no allocation for renewable energy sector i.e. the issue has permanently been buried. From different experts, organisations, media lots of comments and suggestions on the revised and proposed budget are coming everyday, but none of them raised the issue of renewable energy. This may be due to the fact that, there is none to think of it.

Bangladesh is one the signatories to Millennium Declaration 2000 and committed to ensure access to electricity for all by 2020 and increase its renewable energy share to 10 per cent by the year 2015. The year is not too far. By this time seven years have passed, no notable step has yet been taken except repeating their commitment in different policy documents and public meetings. To remind the governments about their commitment, the international community subsequently arranged two international conferences, one in Bonn in 2004 and the other in Beijing in 2005. Government of Bangladesh participated in both the conferences. The participating countries of the world highlighted their activities, presented documents on their achievements and successes. But, the representatives from Bangladesh were silent observers. They had nothing to present.

The next international conference will be held in Washington DC in March 2008, where the organisers are expecting that, more than 5000 representatives from both government and private sectors of about 150 countries of the world will participate in the conference. This time also, the position of Bangladesh may be ludicrous.

Finally, let us not blame or criticise each other, let us not think of the international community, rather think for a while of our coming days and our next generation. What will happen, when our natural resources are exhausted, when there will be no gas and electricity? If we think with open heart and mind, we must realise that renewable sources of energy are the only way out, which we neglected in the past and are still neglecting, which is wrong.

Conclusion: Government should declare National Renewable Energy Policy and create an organisation to implement the policy to join the race of international community without any lapse of time. It should include the promotion of renewable energy technologies in the priority list of the budget. Government should take short, mid and long term action plan to face ensuing energy crisis.

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