Coal Mining Safety: China's Achilles' Heel

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Tragedy of Necessity?

Coal is a dilemma for China's energy security. On the one hand, coal will be irreplaceable as the primary form of energy driving China's economic juggernaut for the foreseeable future.[1] Despite major growth in the oil industry after the discovery of the Daqing oilfield in 1959, coal has never accounted for less than 70 percent of China's energy resource supply over the past 50 years. Since 2000, coal consumption has increased at an astonishing rate of more than 10 percent annually. It is unlikely that China's coal utilization will drop below 50 percent of China's energy mix before 2050. Furthermore, with limited petroleum resources, China's energy planners have relied heavily on domestically abundant coal to fuel modernization ambitions. Even after decades of intensive development, alternative energy sources (mainly hydro electricity) have never constituted even close to 10 percent of China's primary energy demand.

On the other hand, coal is also fueling a safety (and environmental) crisis in China. Extracting coal from the earth has never been a safe activity, but China's numerous, tragic mining accidents make for a particularly stained history of coal mining. A methane gas explosion in 1942 killed 1,549 miners at the Benxihu mine in Liaoning province; 682 miners died from the 1960

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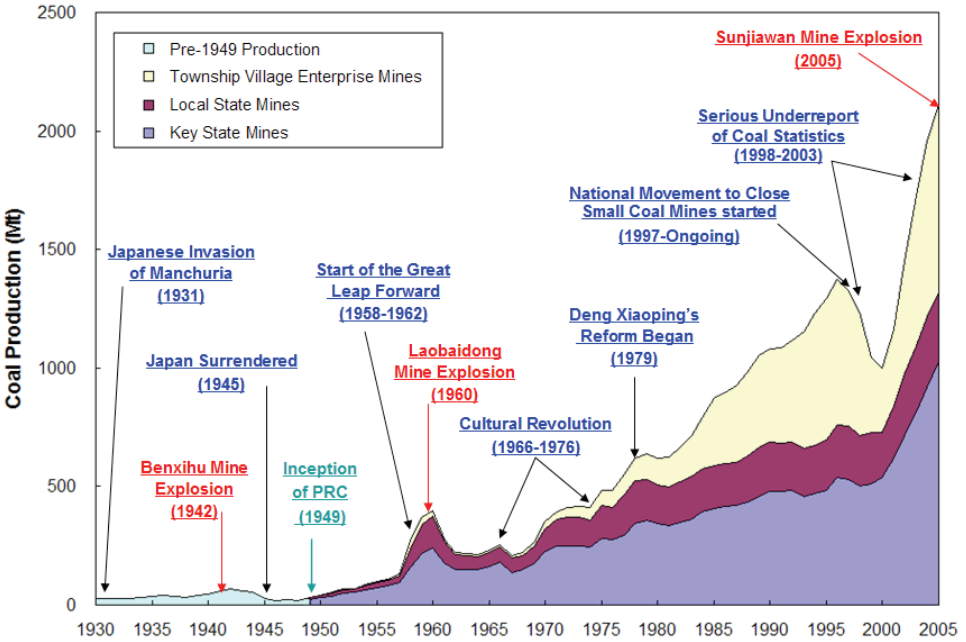
explosion at the Laobaidong mine in Shanxi province; and in 2005, at the Sunjiawan mine in Liaoning province, 214 more perished.[2] The list goes on. Official statistics put the number of coal miners killed by mining accidents since 1949 at more than 250,000.[3] Unofficial numbers are sure to be higher.

More importantly, however, is whether the danger of working in China's coal mines has improved over the years. According to an independent assessment in 2006, China's annual coal mine fatalities during the early 1950s, 1980s and 1990s were estimated to be approximately 70,000, 40,000 and 10,000 deaths respectively.[4] At face value, this would indicate an improving fatality rate, however these figures obscure the fact that it began from a very low point in safety. Secondly, despite a reduction of fatality rates from 22.5 deaths per million metric tons (Mmt) of coal in 1949 to 2.04 in 2006, official annual fatality statistics continue to range from 4,746 to 6,995 deaths per year over the past decade.[5] In other words, China's coal mines remain highly risky working environments.

Moreover, China's mining accident rates sharply contrast with those of other countries around the world – industrialized and developing nations alike – where mining risks have dropped dramatically. For instance, in the

Coal Production in China, 1930-2005**



United States, the fatality rate per Mmt of coal was a mere .04 in 2006. Even India, a sizable developing country with a notorious coal mining safety record of its own, was able to reduce its rate to just 4 percent of China's in 2006.[6] Viewed against the context of the global death rates from mining accidents, China's mining accidents and deaths remain high. In fact, China still currently accounts for approximately 80 percent of the total deaths in coal mine accidents worldwide.[7]

Given China's reliance on coal *and* the continually growing economy, these alarming statistics do not bode well for the future of coal mining safety in China. Exploring the unique complexities of China's coal mining industry reveals its intractable features as well as plausible measures to ameliorate its worst impact. The issue of safety in Chinese coal mines reflects other socio-economic ills in Chinese society and therefore, a solution must go beyond merely stricter regulations. It will require a fundamentally different way of coal mining in China as well as an improvement in the status of those who work in the mines.

The Stagnant Flow of Information

Despite the bleak picture painted by the statistics above, the reality may be even worse. A chronic lack of accurate information, at many levels, combined with poor statistical measures probably underestimates the severity of coal mining safety challenges in China. Independent experts state that China's actual death tolls are much higher than reported.[8] The discrepancy between reported coal mine deaths and true fatality levels is due in part to the government practice of concealing information about major accidents, a problem that was particularly acute during the first three decades after 1949 (founding of the People's Republic of China [PRC]). For instance, the Chinese government classified the deadly coal mine methane explosion at Laobaidong mine in Shanxi province in 1960, which killed 682 miners, as a 'state secret'. It suppressed the event for more than three decades until it was finally revealed in 1992.[9]

Although the discrepancy between reported coal mine deaths and true fatality levels has been narrowed down in recent years, it has not been eliminated, mainly due to a lack of transparency. This is evidenced by the fact that independent reports continue to be significantly different from official figures.[10] Unofficial data provided by a senior work-safety bureaucrat suggests that as many as 20,000 miners actually die each year. That count does not include the

tens of thousands more miners who die of lung afflictions and other mining-related diseases every year.[11]

A further obstacle to accurate information comes from the mine operators and owners, who routinely falsify death counts in order to avoid mine closures or fines. While Beijing imposes increasingly stringent regulations to counter the widespread corruption in recent years, colliery owners – often in collusion with local officials – withhold fatality figures in mining accidents. For instance, when 81 miners died in Nandang County on July 17, 2001, local officials quickly teamed up with the coal mine owner to cover-up the accident.[12] After the catastrophe was disclosed, it was revealed that the head of Nandang County had received 3.21 million RMB ($412,000 USD) in bribes during the prior two years.

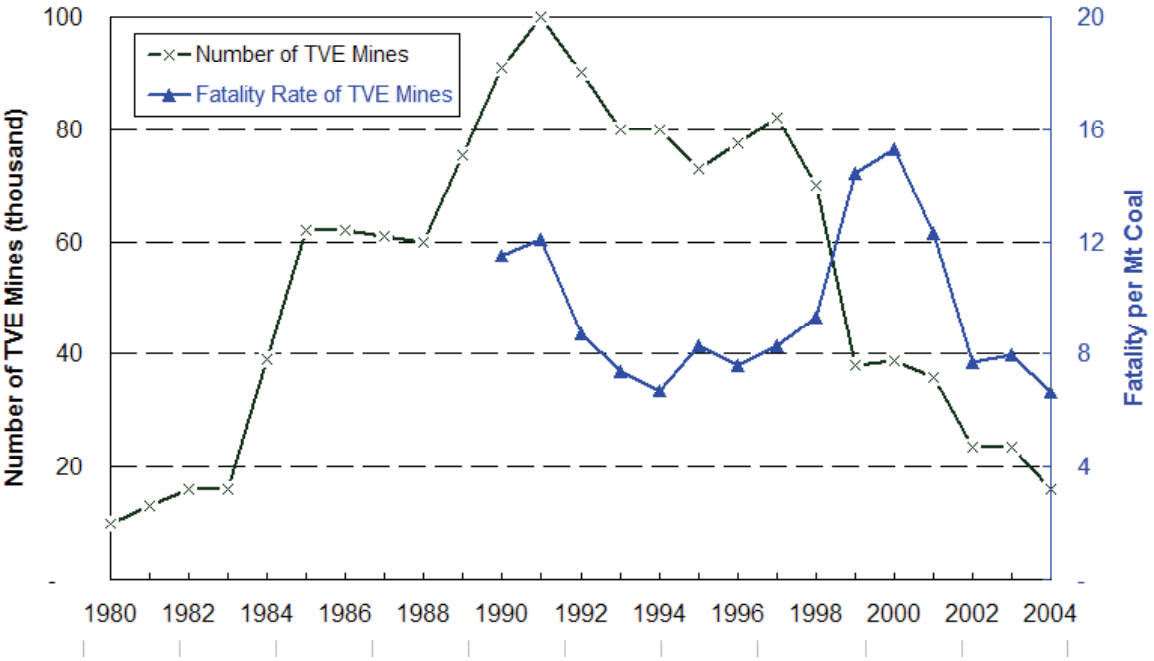
The issue of safety in Chinese coal mines reflects other socioeconomic ills.

Even the media, which is officially tasked with disseminating information to the public, does not always function the way it is supposed to. Since the inception of the PRC, media in China has long been regarded as the propaganda machine of the state and ruling party.[13] Unsurprisingly, the reporting of major catastrophes was controlled by the government.[14] However, journalists and reporters have become more critical, particularly regarding coal mines, but the focus remains on rescue operations and seldom provides in-depth coverage of collusion between officials and colliery owners. There is even less follow-up on the impact on victims' families.[15] In May 2005, a legislative bill intended to hinder media exposure of such accidents was initiated at the Standing Committee of the National People's Congress. If passed, any reporting on a major emergency event without permission could incur a fine between 50,000 and 100,000 RMB ($6,400 and $12,800 USD).[16] To make matters worse, even the media itself is not immune from the widespread corruption in the coal-mining industry. Some journalists have found the extortion of private mine owners a lucrative business.[17] There is still a long road ahead before the Chinese media can fulfill its role as an independent watchdog for coal mine accidents.

Coal Mining with Chinese Characteristics

Regardless of how much coal mining statistics are underreported or misreported, there is no denying the extreme dangers associated with coal mining in China. Such risks are not new to the industry, but there is a need to understand

Number vs. Fatality Rate of TVE Mines, 1980-2004



why these conditions persist today in China when there are tenable solutions that many other countries have pursued successfully.

Importantly, China remains highly reliant on underground operations as the primary method of coal extraction. In most countries, this form of mining has increasingly given way to surface mining, due to the great advantage the latter has in terms of productivity and safety. The mechanization of underground mining has increased productivity from less than one ton per man-shift in 1900 to six tons per work hour today, however, surface mines can easily have a productivity of three to four times that amount.[18] As a result, the share of coal derived from surface mines in the United States has increased steadily from 25 percent in 1949 to 67 percent in 2005.[19] By contrast, China is the only coal superpower with a minority share of its mining in the form of surface mines (approximately 10 percent).[20] Its productivity reflects this as well. In 2005, China mined 400 tons of coal per employee per year compared with 13,000 tons per employee in Australia.[21]

One reason for why China relies heavily on underground mining is because China's reserves of the lower quality sub-bituminous coal and lignite (more likely to be located in shallow coal seams), remain low. Moreover, as burning lower-quality coal actually requires more advanced technology and

investment, higher quality coals (bituminous and anthracite) continue to be the industry preferences. The private sector in China is resistant to the capital-intensive surface mines, leaving 95 percent of Chinese coal mines to keep their underground operations.[22]

The different mining techniques have had a dramatic impact on mine safety as well. Slope failure, the principle hazard of surface mines, is much easier to control than underground mining dangers, which include gas explosions, flooding and roof collapse. In addition, due to the low productivity of China's coal industry, about 5 million workers are necessary for China's coal-mining industry to meet the growing demand for the resource.[23] The high number of workers often leads to crowded underground mines and explains why accidents in China often have very high fatality rates.

The dominance of township and village enterprise (TVE) collieries has also influenced the nature of China's coal mining industry.[24] TVE coal mines began forming in large numbers with the opening of the economy in 1979. Prior to that time, state coal mines accounted for an overwhelming share of national output. However, a rapid rise in demand for coal dramatically raised their numbers (peaking at 100,000 in 1991) and by 1995, their market share had reached 46 percent. The large amount of TVE mines soon led to problems of regulation, tax evasion, environmental degradation and mounting mining accidents. Despite a decade-long effort by the central government to close them down, thousands continue to operate. [25]

The extreme dangers associated with coal extraction persist in China.

The problem with most TVE mines is their unwillingness (or lack of capital) to invest in proper safety mechanisms. Coupled with poor regulation enforcement, TVEs have created a coal mining industry that constantly operates at a capacity far beyond its safe threshold. In 2004, 19 of the 27 coal producing provinces/regions in China supplied coal at 10 percent over capacity while some of them were working at more than 50 percent over capacity.[26] Even state mines could not observe the safety regulations. Moreover, the misperception of a long-term coal surplus in late 1990s convinced Beijing to compete aggressively with other major coal exporting countries in the international market. As a result, China's coal exports grew from 17 Mmt in 1990 to 94 Mmt in 2003.[27] This not only aggravated the supply and demand balance, but pushed coal output beyond the capacity of China's mines, increasing worker

fatigue, safety violations and equipment failures that have increasingly become a catalyst for deadly accidents. Although TVEs currently produce about one-third of the national coal output, they account for 70 percent of the industry's fatalities.[28]

China's highly undesirable coal mining conditions have also made it nearly impossible for the coal mining industry to attract and retain qualified employees. With the hardships that come with the job and constant negative media exposure, many engineers and technicians in the industry have extremely low morale. This creates a widespread brain drain that results in a shortage of expertise required to raise mine safety standards. To compensate, in as early as 1964, state coal mines in China began short-term contracting with peasants to fill the void of workers for these unwanted jobs by permanent staff.[29] Since then, migrant peasants have gradually become the back bone of the industry. According to an official survey, even China's large state-owned mines have to rely on peasant workers to fill 80 percent of their underground mining positions.[30] This phenomenon has significant consequences for this coal mining working class.

The coal mining industry places little value on the life of a miner.

Voice of the Powerless

The majority of peasants laboring in the coal mines come from poverty-stricken rural regions with large numbers of desperate job seekers. Many coal mining companies take advantage of this vulnerability and push peasant workers to fill the most dangerous underground mining positions without adequate training or equipment. Insufficient safety measures coupled with work fatigue from long shifts increasingly explains many coal mine accidents in China.[31]

It is not surprising then that compensation in the coal mining industry is the second lowest of 49 industries in China.[32] In 2000, the annual average income for employees was 12,000 RMB ($1,500 USD) and 7,200 RMB ($925 USD) in key and local state mines respectively. The annual pay in TVE mines is significantly lower.[33] In some collieries in northwest China, miners were allegedly paid only 1,200 RMB ($155 USD) per year in 2005[34] (compared to the salary of experienced coal miners in the United States who can make more than $100,000 USD per year[35]).

The coal mining industry in China places little value on the life of a miner

– an unfortunate reality with direct consequences for the safety record of many coal mines. Prior to 2004, compensation for the death of a miner ranged from 10,000 to 50,000 RMB ($1,300 - $6,500 USD). This low price tag on human life makes it much easier for coal mine owners to settle privately with the families of victims' in exchange for their silence. Such behavior also reduces the incentive for colliers to improve safety practices and equipment and has also led to an underreporting of deaths in the coal mines.

In 2005, the Shanxi provincial government took the significant step of increasing the amount of compensation to 200,000 RMB ($25,000 USD) per coal mine fatality to redress this problem.[36] An upsurge of positive reaction to the Shanxi government's action from the media soon led to an initiative for other major coal-producing provinces to follow suit.[37] In fact, even this higher level of compensation remains only a small percentage of the industry's gross annual profits, which are at least 50 million RMB ($6.4 million USD) per Mmt of coal produced. Given that the 2005 fatality rate in China was 2.73 miners per Mmt of coal, the penalty imposed by the new regulation represented only 1 percent of the gross profits collected by mine owners. While the benefits of raising the compensation for miner fatalities seems positive on the surface, it has the effect of a 'divide and control' strategy; that is, individual families are bought off and silenced, reducing the impetus for group dissatisfaction and social mobilization. The Shanxi provincial government quickly realized the new regulation was insufficient. Rather than increase the level of compensation to families, officials imposed an additional fine of one million RMB ($128,000 USD) per coal mine fatality, payable to the local government itself.[38] This had the unintended consequence of not only turning coal mine accidents into a lucrative source of revenue for the authorities who collected the fines, but also increased the incentive for mine owners to buy the silence of victims' families.

Under these conditions, the plight of mine workers in China seems bleak. They are the most vulnerable group in society and lack the means to advocate for safe work conditions, income levels, adequate training, or other job-related issues.[39] Unionizing and public expression of discontent is met by fierce repression by mine operators, local governments or both.[40] As a result, there is a grave imbalance in the power between those who own or operate China's coal mines and those who work in them. Therefore, it is the responsibility of the government to enact fundamental reform of the coal mining industry to redress these contradictions.

Failure to Reform

Many government attempts to bring China's vast and atomized coal industry to heel have proved unsuccessful. Indeed, it may be an impossible task as the country's demand for coal grows ever higher along with the industry's power and vested interests.

Most important among the measures to reign in the power of the coal industry's leaders has been to eliminate the endemic corruption throughout the industry. As Beijing becomes less and less tolerant with coal mining related corruption, provincial governments are taking more action. A notable example of this occurred in 2006 when seven director-level officials at various coal mine safety administrations in Shanxi, China's largest coal producing province, were prosecuted for coal mine-related corruption.[41] However, there remains many places in China where "the mountains are high, and the emperor is far away." That is, China's historic and chronic difficulty of compelling local officials to obey central policies remains as real as ever. Even capital punishment is often an insufficient deterrent to greedy officials as the gains at stake are huge. On Aug. 26, 2005, Beijing launched a drive to cleanse the coal mining industry of shareholding by officials (widespread amongst TVEs), requiring all government employees and heads of state enterprises to withdraw their personal 'investment' in collieries.[42] However, the new anticorruption campaign immediately bogged down at the local level, when officials in some coal-producing regions refused to withdraw their investment and some even threatened (privately) to resign; others simply transferred their shares to relatives and friends.

The sharp contrast between Beijing's increasingly stringent punitive measures and the rampant corruption at local levels suggests that the perceived probability of being caught in a coal mining corruption related accident is still too low. Given the degree of collusion between local officials and colliery owners, bringing corruption to light is particularly challenging and would necessitate that the central government use its own State Administration for Worker Safety (SAWS) to directly investigate deadly coal mine accidents. The heavy work load for SAWS officials, however, inevitably limits their ability to operate at strategic and managerial levels.

Establishing a stable regulatory framework for safety standard setting and enforcement is also imperative, though the government has yet to be completely successful in this endeavor. From the inception of the PRC, coal mine safety regulations have been subject to turbulent government restructuring,

leaving it largely ineffective.[43] A pre-1999 safety inspection system for coal mining was flawed due to a lack of proper national integration, partial coverage (only state mines) and a lack of independence from the coal production administration it was designed to oversee. The State Council fixed some of these deficiencies with the creation of two agencies, the State Administration of Coal Mine Safety (SACMS) in 1999 and SAWS in 2001.[44] However, the constant flux of bureaucratic reorganization continued to impair their inspection work. An acute shortage of inspectors has also left the agencies ineffective. The number of coal mine inspectors in China is wholly inadequate for the task thought the government is expanding the inspection force. Furthermore, the majority of inspectors are employees of state mines, creating a clear conflict of interest.[45]

Beyond administrative limitations, however, an over-simplification of the problem solving associated with the coal mining industry has led to counter-productive government responses. SAWS has recently banned all 'greenfield' coal mines with capacity of less than 300,000 tons per annum (for the *11th Five Year Plan, 2006-2010*), and a plan to shut down all small collieries with annual output less than 30,000 tons by the end of 2007.[46] However, not all small coal mines are operating dangerously. Closing coal mines solely based on capacity unfairly shuts down those small coal mines that strive to meet safety requirements. It is important for the government to maintain a healthy presence of licensed small TVE mines to induce competition in the coal mining industry and attract long-term investment from the private sector.

Closing mines without careful consideration has other negative consequences. Following the 2005 Daxing mine accident that killed 123 miners in Guangdong, the local government temporarily shut down all collieries within the mine's geographic vicinity.[47] Putting underground mines out of commission in this way, however, often leads to an accumulation of methane, increasing the chances of explosion once they are put back to operation.[48] Moreover, fearing negative impact on the performance review of provincial cadres, the Guangdong government eventually closed all collieries across the province permanently. This decision deeply impacted the interests of all stakeholders in Guangdong's coal mining industry, especially the colliery owners and thousands of migrant peasant workers.

Perhaps more destructive than a miscalculated government strategy is the failure of government regulations to be implemented in practice. After

decade-long efforts by the central government to close many small and TVE collieries, thousands still continued to operate in China. Persistent government pressures have lowered the reported number of these mines, however, illegal mining operations have become rampant across the country.[49] In January 2006, SAWS reported that they had shut down 10,669 illegal coal mines.[50] Given the magnitude of illegal operations, the number of unlicensed mines left unscathed is certainly significant though largely unknown and thus beyond the purview of regulatory oversight.

To make matters worse, the lack of investment in safety measures has become a chronic issue for China's coal mining industry. According to SAWS, 45 key state mines alone had under-invested 16.4 billion RMB ($2.1 billion USD) on safety projects and equipment in 2003.[51] Even more problematic, about one-third of all coal produced in China for 2003 came from collieries lacking measures to ensure safe operations. Despite the central government's repeated pledges to solve the issue, safety measures for China's coal mines were still under-invested by at least 68.9 billion RMB ($8.8 billion USD) in 2006.[52]

A failure to sufficiently fund other aspects of the coal mining industry also contributes to unsafe mining conditions. While state coal mines accelerate mechanizing operations under the *11th FYP*,[53] TVE mines continue to rely on traditional underground mining techniques with low productivity and unsafe conditions.[54] In addition, a dearth of investment in the development of surface mining perpetuates the shortcomings of low productivity, over-crowded conditions, and the major safety risks associated with underground operations.

A Way Out?

The policy endeavors by Beijing reveal its firm commitment to improve coal mine safety, reduce the fatality rates of coal mining accidents, and end the collusion between TVE mines and government officials. However, unless the government undertakes more aggressive, effective and comprehensive measures, the contradictions and challenges inherent in China's complex coal mining industry will continue to haunt China for years to come.

Fundamentally, solving the coal industry's problems will require appropriate statistical measures and accurate information. To this end, the use of intensity-based measures standards for safety improvement must be adjusted to include quantity-based safety targets. The former, while important, is merely a measure

of fatalities relative to coal production and thus an abstract statistic. A reduction in this rate may be offset by higher absolute numbers as a result of increased production levels. Thus, with a rising demand for coal, China could experience the paradoxical situation of lowering its intensity-based fatality rates while increasing actual deaths – a situation that could have significant social, economic and political impact. By using quantity-based standards, on the other hand, the industry is forced to reduce absolute numbers of coal mining injuries and deaths. This also places greater emphasis on the individuals and their tragedy and loss resulting from coal mining accidents. China's high fatality rate leaves plenty of room for safety improvements. Aggressive quantity-based targets are achievable if supplemented with effective enforcement. For example, the Shanxi province recently put limits on the number of miners allowed to work underground, based on the design capacities of each colliery.[55] Such initiatives can be executed at the local level, but should be encouraged by the central government and disseminated to other coal producing regions.

Gathering and publicizing accurate information is also basic to any solution for coal mining safety. Rather than restricting the media, as the government has been inclined to do in recent years, more freedom and flexibility should be allowed for in-depth media coverage not only on collusion between officials and colliery owners, but also on the impact on individual victims and their families. Moreover, the government needs to acknowledge the crucial role that non governmental organizations (NGOs) have played for similar problems in many other countries.[56] The scope of China's coal mining safety issue is probably too vast for the government to tackle alone. NGOs can fill in an important gap at the local level where specific knowledge of the stakeholders and their interests is crucial. However, given the current political context in China, such measures may not be achievable in the near future.

The question that remains is how to balance the powers and interests of the state versus society.

In addition, the government must focus on adequate mine capacity in order to meet both the national coal demand as well as ensure safe working conditions. For this to happen, investment in mining technology, safety equipment and adequate enforcement of safety measures are all imperative. Sufficient funding to ensure appropriate safety measures for Chinese coal en-

terprises has been chronically neglected. While SAWS needs to continuously improve the enforcement of safety measures, the central government should also provide more financial assistance to help the coal mining industry meet safety requirements.

Furthermore, the blanket national movement to close small coal mines based solely on production capacity must end. Such practice will only drive many to operate 'underground' and worsen their unsafe practices. Small coal mines account for about one-third of national coal output while their mining related fatalities make up 74 percent of the national total.[57] Thus, they are crucial both in terms of coal supply and coal mining safety. Illegal mines should be closed, but those working legitimately and struggling to meet better safety standards should be nurtured, invested in and regulated fairly. The government should also provide mechanisms for the private sector to legally enter the coal industry through long-term legal guarantees, ownership rights and access to government funds.

Finally, the industry's appalling track record on safety cannot be ameliorated without greater accountability of an endemically corrupt industry. Beijing has never lacked the political willingness to crack down on corruption in the coal industry. However, past initiatives based on punitive measures alone have clearly proved unsuccessful. Rather, tackling coal mining-related corruption needs to be considered as part of an integrated framework. This will necessarily entail an independent jury, media and public, particularly at the local level, if powerful government officials are to be held to account for their actions.

State-Society Shift

China's coal mining industry and its safety record also raises deeper issues about the nation's modern social, economic and political life. What is the balance between the country's needs for rapid economic growth versus the wellbeing of society? How should the overall progress of the nation be measured against the rights of the citizens that comprise it? Fundamentally, these are the thorny questions behind the relations between state and society and the widening gap between the rich and poor that China must address as it moves relentlessly forward.

In traditional Chinese culture, the value of human life was subsumed under the greater goals of the state (and emperor). The ancient chinese philosopher Mencius (372 – 289 BCE) famously said, "I love Life and I love Rightness. But forced to choose between them, I choose Rightness." During the PRC's early socialist era (1949-1979), individualism was deliberately suppressed by

the state in favor of collectivity. The idea of the time was that the working class should be willing to give up their lives for the great revolution.[58] The bearing of these past attitudes on China's modern society are debatable. However, in the context of coal mining, the high fatality rates of coal miners are often regarded as a necessary sacrifice to achieve social and economic development targets. The value of individual human life for the underprivileged and most vulnerable citizens that labor in the coal mines has undeniably been very low.

However, the very progress that created economic losers has also unleashed social forces that are driving a fundamental transformation of Chinese politics. New powerful actors including poor farmers, the unemployed, dissatisfied consumers, industry associations, labor unions, religious organizations, special-interest groups and separatists have emerged to press for their own interests.[59] This is leading inexorably to a fundamental shift in the balance of power between the Chinese state and society. Power is moving both from the state and its representatives to the society and the individuals that comprise it. Power is also moving from a few ruling elites to diverse social groups including the millions of disadvantaged coal miners who have never had a voice. A 2005 visit by Premier Wen Jiabao to the families of victims from a coal mining accident in Shaanxi province brought him to tears. It was the first time in many years that a high-level communist party leader had expressed such deep sympathy toward a disadvantaged social group. The enacting of the property law in early 2007, despite fierce opposition, shows the Chinese Communist Party's commitment to protecting individual rights.

While sympathy of an official and individual legislation do not confirm a resolution that gives greater power to the individuals or resolve the plight of coal miners, they do indicate that change is in the air. However, the forces resisting that change are also formidable. The intractable problem of corruption within the coal mining industry is the most vivid example of this. The question that remains is how to balance the powers and interests of the state versus society, the few who benefit from economic growth against the many who do not, and, between those who benefit from coal mining and those that risk their lives working in mines. These will be the most pressing challenges for the Chinese government in the years ahead and it is in China's coal mines where the front line of this struggle, and the possible solution, can be found. Maintaining the status quo will not do as the disadvantaged social groups in China, including millions of coal miners, deserve to live with hope for a better tomorrow.

* The views expressed herein are author's own and do not necessarily represent the views of any organization with which author is affiliated.

** The coal statistics in this figure are the original data published by the National Bureau of Statistics. Liu Xueyi and Liu Anhua (2004) estimated that the unreported national coal production were 52, 225, 260, 175 and 173 million T for 1998, 1999, 2000, 20001 and 2002, respectively.

Notes

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