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Decaying Soviet Infrastructure Shows Its Era

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MOSCOW — A devastating breach in Russia's largest hydroelectric dam reminded Russians and foreign investors alike this week of the dangers posed by this country's largely Soviet-era infrastructure.

The failure of the towering Sayano-Shushenskaya dam, which accounts for 15 percent of Russia's hydroelectric power and 2 percent of its overall power, highlighted what a risky investment Russia's infrastructure can be. At the same time, the disaster's immediate effect — a spike in electricity prices in Siberia where the dam is located — showed how infrastructure problems could hamper any Russian economic recovery.

"We need to conduct a thorough check of all strategic and vital parts of the infrastructure and work out a plan for their regular upgrade," Russia's prime minister, Vladimir V. Putin, told a cabinet meeting on Thursday.

Legacy equipment, a blessing for newly privatized companies in the early post-Soviet period, has now become a headache, or worse, for many private Russian companies.

Sayano-Shushenskaya and similar dams built by the Soviet Union's command economy provided copious, cheap hydropower, and many businesses benefited. Rusal, the world's largest aluminum company with many smelters in Siberia, took advantage of bountiful supply and cheap prices as it ramped up operations over the last decade.

Rusal consumed about 70 percent of the Sayano-Shushenskaya dam's output. Rusal's owner, the oligarch Oleg V. Deripaska, once claimed that the Russian aluminum industry would outgrow America's because cheap Siberian electricity provided an unbeatable advantage.

In fact, all of Russia's economy grew on roads, pipelines, electrical transmission towers and other infrastructure built by the Soviets, but idled during the deep post-Soviet recession. This helped facilitate rapid economic growth.

But metal fatigues and snaps, gear teeth chip, grind and stick, oil pipes burst and leak, roads and bridges crack and buckle, and agricultural machinery fails during harvest.

A dearth of capital investment from the late 1980s until around 2005 left Russia with badly decrepit infrastructure. The nadir was probably in 2004, when the state statistics agency calculated that Russian capital equipment was, on average, 21.5 years old — compared with about 10 years in most Western economies, said Yaroslav D. Lissovolik, the chief economist at Deutsche Bank in Moscow.

“To re-equip Russia’s industrial base will take decades, not just two or three years,” Mr. Lissovolik said. “This is a long-term challenge.”

It has been a long-term challenge for a while. Long anticipated, the breakdown of Soviet infrastructure began in earnest this decade.

An electrical transformer built in 1964 caught fire in 2005 outside Moscow, plunging the capital into a blackout that disrupted the stock exchange and banking operations.

Before the financial crisis, the Russian government planned major public sector infrastructure spending, financed with oil windfalls. It also reduced import duties for capital goods to encourage private companies to invest.

The biggest jump came from 2007 to 2008 as companies flush with profits from the global commodity boom went on building and shopping sprees; capital outlays grew sharply to 26 percent of gross domestic product from 11.4 percent, according to Nomura, the investment bank.

Now the bank projects significant losses to the Russian economy as this investment tapers off because of the financial crisis. A decline to 22 percent of gross domestic product over a decade — which is far above the average investment of the last decade of about 12 percent — would cost Russia about half a trillion dollars in economic disruptions, bottlenecks and lost growth, the bank estimated.

The oil slick from the dam breach, for example, killed 400 tons of trout in fish farms down river, ecologists said.

From a distance, the breach looked like a small waterfall at the base of the 800-foot-tall Sayano-Shushenskaya dam spanning the Yenisei River in southern Siberia.

By Thursday evening, 17 employees of the electrical company had been confirmed dead and an additional 58 were missing. Authorities said chances of finding anyone alive were slim.

The force of the flood lifted one 900-ton turbine from its housing and bounced it off the ceiling of the machine room, Russia's chief rescue official said. An oil slick stretched 80 miles down the Yenisei.

Company executives said they were investigating the cause of the breach, and a spokesman said the turbines had been recently inspected and cleared.

But there had been worries just such an accident might occur. Unfortunately for foreign investors, the dam was a major beneficiary of funds they had paid to the Russian government in a wider privatization of the electricity industry last year. That privatization was specifically intended to draw foreign capital to help refurbish Russia's decrepit infrastructure.

To draw investment to the sector, the national electric company, the Unified Energy System, was disbanded last summer after spinning off dozens of subsidiaries and floating their shares on the Russian stock exchange. American hedge funds, European utilities and Russian oligarchs all bought into a chance to own part of the world's fourth-largest electricity market — after the United States, China and Japan.

In the case of natural gas- and coal-powered electrical stations, the investors themselves were expected to pay for modernization. But so dire were the needs of hydroelectric plants that the privatization was structured to shunt proceeds from the actual sales to a majority state-owned company, RusHydro, for repairs. RusHydro's prize asset was the Sayano-Shushenskaya dam.

Thus, even as capital investment atrophied elsewhere in Russia, RusHydro had a capital budget this year of 65 billion rubles, or $2.09 billion.

A commission of engineers will study the cause of the accident to determine whether the money for infrastructure repairs came too late in this instance, or if the immediate cause of the flood was unrelated to aging equipment, the company spokesman, Yevgeny V. Druzyaka, said.

"It is incorrect to say the reason was nobody spent money on repairs," he said.

The machine room of the Sayano-Shushenskaya dam flooded after water burst out of one of 10 chambers for electrical turbines built into the dam decades ago. Aleksandr Toloshinov, a former general director of the dam, told the Interfax news agency that a cover over a turbine compartment had broken. Mr. Druzyaka said the rupture was most likely a result of some other still unidentified failure inside the compartment.

The immediate effect, however, was a spike in electricity prices in Siberia, which will damp recovery for companies in the region that had relied on cheap power, illustrating the long-term costs of Russia's crumbling infrastructure. The accident took offline 6,000 megawatts, or enough electricity to power six million American homes.

Alarmed, Russian President Dmitri A. Medvedev issued a decree on Thursday asking regulators to ensure electricity supplies to industrial users from other power plants and to prevent price increases. However reassuring this may be to the steel and aluminum industries, it also heightens the worries of electricity investors who have feared the government would continue to impose price controls after privatization.

Capping rates at a time when RusHydro will have an expected $1.25 billion repair bill is surely a disincentive for investors. Shares in RusHydro, which trade in Moscow and London, were down 18 percent on Thursday.