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METROPOLIS

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FEATURE

Power struggle

After a string of safety scandals, Tokyo's major energy supplier may not have enough juice to meet demand this summer. Matt Wilce reports on the very likely possibility of the city's first blackout in 16 years.

July 1977, New York City—The slow hum of air conditioning suddenly grinds to silence and the entire city is engulfed in darkness. The sound of breaking glass shatters the quiet and chaos consumes the streets. Lightning has struck the power lines that feed the city and for the next 25 hours, New York's 8 million inhabitants are stranded in gridlock, stalled subway cars and foreboding darkness. Fast forward ten years to another blazing July afternoon, this time in Tokyo. Across the metropolis roasting residents crank up their air conditioners as power sources struggle to meet the demand. Then lightning strikes. The grid collapses and 3 million homes and businesses witness the lights go out in Tokyo. The three-hour blackout was the last time Tokyo Electric Power Company (Tepco), which supplies 33 percent of Japan's energy needs, couldn't fulfill the capital's hunger for power. This summer could be the next and this time it could get a whole lot worse.

In the dark

With only two of its 17 nuclear reactors back in operation following a series of embarrassing leaks and coverups, Tepco has estimated a power deficit of up to 7,500 megawatts in the event of "extremely hot" weather. Unlike 16 years ago, blackouts are likely to last longer than a few hours and even with normal temperatures the company is predicting a power shortfall of 4,000MW in July and August—1,000MW more than the company's back-up capacity. The highest demand predicted is 64,500MW, with Tepco only able to supply 57,000MW.

The steamy summer months are the company's greatest concern, with demand expected to peak during the daytime on weekdays from early July to early September, the only exception being the August O-Bon holidays. And while Tepco has restarted thermal power plants—which provide about 2,200MW in summer—and procured power supply from other companies, the outlook remains unpredictable at best.

"We cannot tell if a power shortage will occur or not. It will depend on lots of unforeseeable events such as temperature and other factors," says Takuya Kurimura, a research associate in the planning department of the Japan Electric Power Information Center.

Tepco's stance is equally vague. "If the worst should happen and an electricity shortage takes place, it will likely take place in the mid-afternoon when consumption of electricity is highest, between 1-3pm," says a customer service representative. "A shortage of electricity does not mean that the entire Kanto plain and Tokyo area will suffer a shortage, only portions of it will, though we cannot say where exactly yet."

Such uncertainty makes it hard to predict what effect a blackout could have on everyday life. Most trains will continue to run because JR generates 80 percent of its own power—they have even agreed to sell

some surplus to Tepco. Hospitals will switch to emergency generators should their main electricity source be cut. Some large building complexes, such as Roppongi Hills, that have their own generators will also likely remain unaffected.

As for the rest of the city, the jury's out. Apart from the lack of cool air, TV or light, one of the most significant risks of the power outages, and associated energy spikes, is the effect it can have on computers and other electronic appliances. "Computers and computer devices [e.g., printers and modems] are especially sensitive to power cuts. Any power cut can have an immediate or long-term effect on the computer and its data," says Horace White, president and CEO of online education firm Harmani. "The power supply is the most vital part of a computer, without power going through it correctly, a computer is just a futile box of plastic, wires and metal." White suggests using a surge protector to minimize the risk of your hard drive getting fried in a blackout (see sidebar, p 9, for other tips).

Running on empty

So, why is the world's largest private electric utility, which had revenues of ¥4,919.1 billion last year, unable to meet demand this summer? Many have pointed to the company and its industry's reliance on nuclear power, which accounts for 44 percent of Tepco's normal total output, as well as sloppy safety standards.

Japan's focus on nuclear power was spurred by the 1973 oil shock, and by fiscal 2000 such power accounted for 34 percent of the national electricity supply, according to the Ministry of Economy, Trade and Industry (METI). Surprisingly, it's not the country's frequent earthquakes that have led to leaks and safety scares. Rather, a complacent industry and lax approach to regulation have allowed accidents such as the uncontrolled nuclear reaction that occurred in 1999 at Tokaimura when two workers mixed uranium in buckets. The resulting leak led to their deaths and exposed another 439 to radiation. It also brought down Tepco's president, two executives and one other employee.

But the Tokaimura incident was just the tip of the iceberg. In 2002, the industrial giant admitted to manipulating safety checks at the Fukushima No. 1 plant reactors by tinkering with pressure gauges before inspectors arrived. Commissioned in 1971, the No. 1 plant is Japan's third-oldest reactor still in use. Further revelations included covering up cracks in reactors and admissions that staff had routinely doctored safety reports since the 1980s.

"The incident was safety related but the real issue is the defect in the regulation, reporting and auditing by the company itself and by regulators. Even the public already understand that point, according to opinion surveys," says Shunsuke Kondo, director of the Research Center for Nuclear Science and Technology at The University of Tokyo. In response to the revelations, METI issued a statement saying the Nuclear and Industrial Safety Agency would send special supervisors to nuclear power facilities upon restarting to ensure procedures are followed.

But they won't be the only ones watching. Tokyo Gov. Shintaro Ishihara, whose administration is Tepco's fifth-largest shareholder, says, "These electricity shortage problems originated from the shutdown of nuclear reactors due to Tepco's concealment of operational problems. I would like for Tepco and Japan to do everything in their power to restore a relationship of trust with the locals, in an effort to reactivate [the generators]."

Courtesy of Tepco

Falling between the cracks: Tepco's Fukushima No. 1 reactor has a history of safety violations and cover-ups

Low voltage

Although the Kashiwazaki-Kariwa No. 6 reactor was restarted on May 9 and the Kashiwazaki-Kariwa No. 7 on June 18, returning a total of roughly 2,700MW of power to the system, the continued inoperation of the other 15 reactors remains a problem for Tepco. And restarting them is expected to be a slow process.

In the meantime, part of the shortfall will be met by buying surplus power from other parts of the country. But it's not as simple as flipping a switch—Tokyo runs on 50Hz compared to western Japan, which is fed by a 60Hz supply. Tepco says it will buy power from other companies in Honshu and Hokkaido and "utilize frequency converter facilities," although the two existing converters, in Nagano and Shizuoka, can only handle the equivalent output of a single nuclear plant. In theory, if all Japan's plants ran at full capacity and the power was sent to Tokyo, a shortage could be averted. But the reality of the difference in frequency rates makes that impossible. Two hydroelectric plants operated by Kansai Electric Power Company can produce either 50 or 60Hz and since April 1, have switched to supplying 50,000 kilowatts to Tokyo. Tepco will also purchase power from four other utility companies, JR East and other private generators.

"A shortage of electricity does not mean that the entire Kanto plain and Tokyo area will suffer a shortage, only portions of it will, though we cannot say where exactly yet."—Tepco customer service

In other efforts to boost power output, Tepco will re-start oil-fired generators at the Yokosuka Thermal Power Station. The plant's five oil-burning generators were closed several years ago, due to age and the increasing emphasis the government placed on nuclear power generation. The Yokosuka station will run on an "experimental" basis and old employees will return to the plant short term to bolster the 93 who stayed on to operate the station's other two generators.

This shift back to thermal plants has caused a surge in crude oil consumption—according to the Federation of Electric Power Companies (FEPC), Tepco used 77.5 percent of the 3.67 million barrels of crude oil the industry guzzled in April. And the company estimates it will use 2.5 times more oil between April and September this year than last, most of it fueling the temporary operation of previously defunct oil-burning generators and thereby causing concern to environmental groups. "Without using nuclear [power], any advanced countries will not be able to cope with the request to reduce the emission of greenhouse effect gas," says Kondo, making it clear that the switch back to oil is only temporary. →

→Switched on

"Clean your air conditioner's filters" is one of the messages the power brokers hope we'll heed this summer. Tepco's commercials aimed at ordinary consumers encourage energy conservation, the same message that the company is taking to its corporate clients. According to the Central Research Institute of the Electric Power Industry, commercial air-conditioning use peaks between 1-3pm and is many times that of the domestic consumption peak, which occurs after 6pm.

"It works just like private homes. We ask that people cut back on air conditioning, automatic elevators and lighting that's not needed. For big companies, our representatives personally visit the corporations and discuss these matters with the representatives in charge of administration," says Akio Kobayashi from Tepco's main PR office. The company has also launched seminars with corporate clients, one of whom told TV cameras, "As it is already getting hot we don't really have much time to prepare. We'll just have to see what happens."

Cutting domestic and commercial consumption, restarting thermal plants and purchasing surplus power "will cover a part of power supply, but operating eight to 10 nuclear power units will be indispensable to ensure stable power supply," comments Masataka Ambashi from the FEPC public relations office.

This precarious situation is putting everyone from schoolchildren to the city's leader on alert. "In preparation for the unlikely event that a blackout occurs, Tokyo, as a city with many facilities involved in the welfare of the public, such as hospitals, should take all measures to be able to maintain such essential public services," says Gov. Ishihara.

The road back to full power is likely to be as slow as O-Bon traffic, even with the pressure to restart reactors bearing down on local governments. In the meantime, METI officials are also helping Tepco sell the "conserve or bake" message, handing out free plastic fans at Tokyo station. Let's hope we don't need to use them. Ⓜ

Light in the dark

Stay on the bright side by taking these simple steps:

- Check if your building has its own emergency power supply
- Check to see if electric door locks can be opened in the event of a power outage
- Buy candles and battery-operated torches
- Buy a portable gas stove if you have an electric range
- Keep your *keitai* fully charged

Protect your computer equipment with these precautionary measures recommended by Harmani's Horace White:

- Back up your data regularly
- Purchase a surge protector with an indicator light
- Turn the monitor off when leaving the computer on for long periods of time
- Invest in an on-line or off-line UPS (uninterruptible powersupply) system if you own a large business
- Connect large devices (e.g., laser printers) to a separate surge protector or UPS system

Emergency assistance:

- Tepco blackout and account inquiries:
  Central, western and northern Tokyo: 0120-995-006
  Eastern and southern Tokyo: 0120-995-002
  Tama area: 0120-995-662
- Police: 110
- Ambulance: 119
- Fire Department: 03-3212-2323
- Emergency interpretation: 03-5285-8181
- Tokyo Metropolitan Foreign Residents' Advisory Center: 03-03-5320-7744 (9:30am-noon, 1-4pm)