

## Inside the Incinerator: A Look Into Taipei City's First Waste Facility

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My Journey to the Neihu Incineration Plant



First it was the smell. Then it was the tennis courts. Third, the sudden realization that they were prepared for visitors—really, really prepared for visitors.

It was around 1 o'clock in the afternoon when I arrived at the [Neihu Incineration Plant \(NIP\)](#). Taipei City Government had arranged my



to kill. I couldn't have asked for a better combo.

As we drove to the facility, I remember the air in the area suddenly becoming hazy. A golden hue seemed to weigh down on the sky and press against the buildings; everything appeared to operate in slow motion. The monster whose presence we could all feel—the incinerator.

## THE TOUR

We met with the top two managers of the plant, who, unlike the rest of the workers, did not dress in white lab coats. Everything operated with scientific precision, from regulations on fly-over ash to strict controls on air pollution and worker safety and health.

They led us on an extensive three-hour, behind-the-scenes tour, showing us everything including:

- Inside the beast itself— the Incinerator
- Dumping Grounds— the 9,000m<sup>3</sup> refuse bunker capable of holding 900 tons of waste per day
- Water Source— the wastewater recycling facility
- Green Growth— community garden, where citizens can get free liquid fertilizer and food
- Saving Wildlife— a refuge center, where they save and rehabilitate endangered species

This was, of course, after we had been ushered into a conference room aligned with graphs, timelines, and physical material examples, and watched an introductory film on the history of NIP and its current operations in English. Like I said, they were ready.



Outside the plant: wastewater recycling facility and community garden.

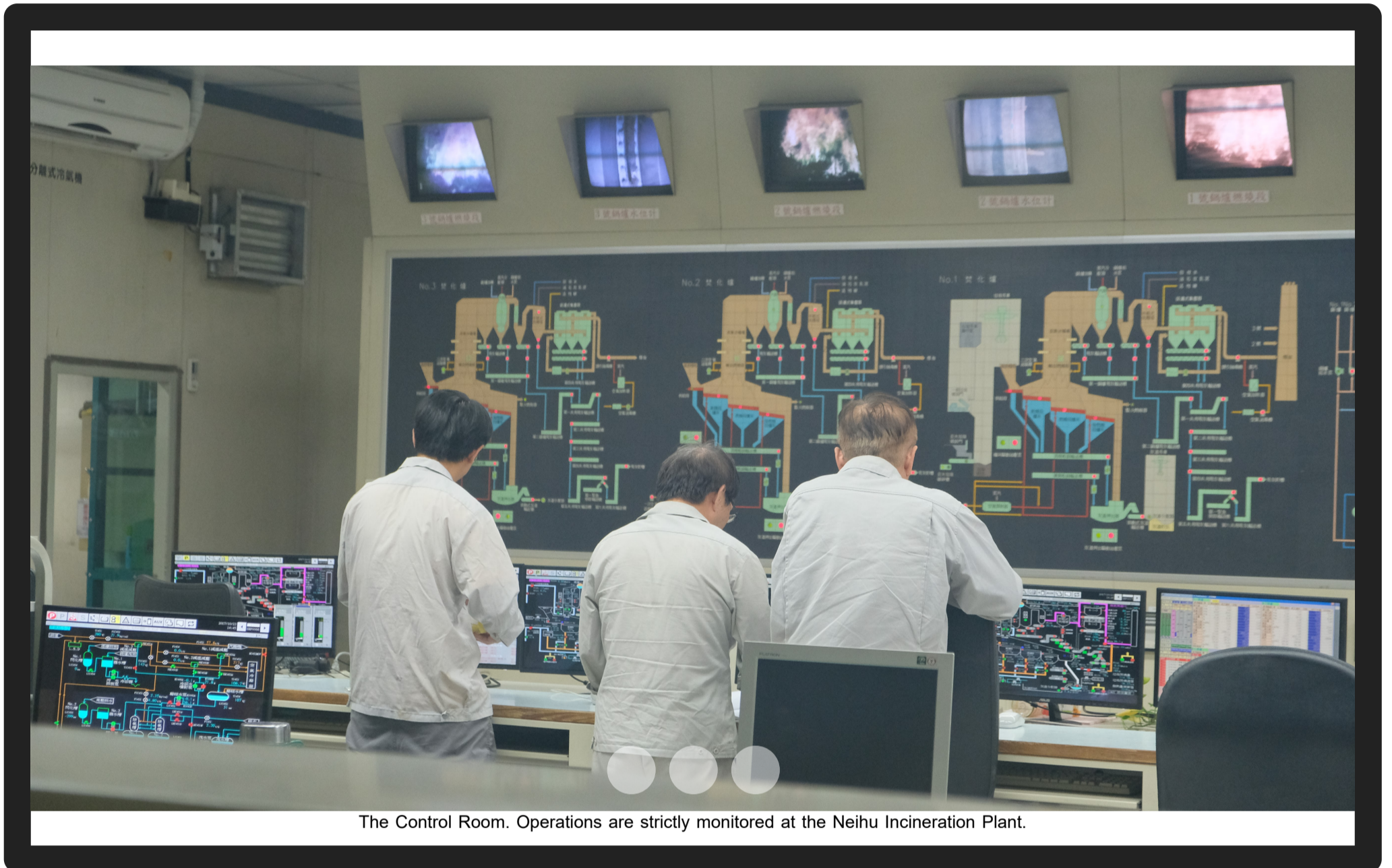
Yet, despite all their organized efforts in running Taiwan's "first large-scale, high-efficiency refuse incinerator," there was one thing they couldn't erase—the smell. A colorless odor wafted down the halls and stuck to the walls; no amount of fresh air from the open windows could combat its thick, pasty presence. I felt myself getting sick. The thought of the smell lodging itself into the workers' clothing passed through my mind—it seemed to be only a matter of time until it permeated through their skin and seeped deep into their hair.

And yet, given all the inevitable environmental consequences of incineration, I was surprised at the significant effort NIP staff were putting into their local community. Over the course of its 30-year history, the plant's management expanded its operations to include several recycling and community service initiatives:

1. **Public facilities**— tennis courts, heated swimming pool, playground, skating rink, all free for the public to use at their leisure. (A quick note: I didn't see anyone use the facilities while I was there. I was told they were out to lunch)
2. **Bottom ash** remnants from the incineration process are recycled into construction materials. However, there are still concerns that

Public tours of the plant— Elementary school students are among their most-visited patrons. Crayon-colored mountains decorated the plant’s hallways as little “thank-yous” from their visitors. For staff, however, these drawings do more than just add a little light and color into the metallic workplace— they are powerful reminders who they are doing their work for: the next generation.

Dealing with trash is inevitable, and given Taiwan’s small landmass, where **only 20% of the island is inhabitable** and the Taipei City’s density of people per kilometer is 9,956, the incinerator is ultimately placed in someone’s neighborhood. Far from the city center, but close to other residents, NIP stands tall as a marker of urbanization, technological modernization, and an attempt at social reconciliation with its community facilities.



The Control Room. Operations are strictly monitored at the Neihu Incineration Plant.

## NIGHT MARKETS, LARGEST PLASTICS-WASTE GENERATOR

On the list of interesting things thrown away, the manager recounted everything from massive fans completely jamming up his waste chutes, to stacks on stacks of fake RMB, USD, and orange paper money used in Buddhist celebrations, to chunks of building materials.

**BUT HIS BIGGEST PROBLEM—PLASTIC WASTE FROM THE NIGHT MARKETS. “THOSE PLASTICS ARE NOT RECYCLABLE,” HE EXPLAINED, “THE BEST OPTION IS FOR PEOPLE NOT USE PLASTIC IN THE FIRST PLACE.”**

The Neihu Incineration plant is responsible for the collection and incineration of waste from Taipei’s six Northern districts, which includes Shilin (士林夜市), known for Taipei’s largest and most famous night market. Every night, plastic bags, wax bowls, and used chopsticks, as well as municipal (household) garbage, are sent to the facility from thousands of people who flock to these allies to enjoy cheap fried food.

**Plastics covered in food residuals cannot be recycled and therefore, must be burned.** Even if a clean piece of plastic or paper with recycling potential were to be introduced into the waste stream, **once it’s tainted by the other food-residual plastics, it loses its recycling capacity.**

Additionally, most plastics from night markets are made of **‘melamine,’** which cannot be melted and used to create new products, meaning by nature, they are non-recyclable.

Moreover, night markets, unlike other city public spaces, do not have recycling bins; all trash is thrown into large white plastic bags hung loosely on wooden racks at designated areas, usually located at main alleyway junctions or in the middle of long walkways.

(Night markets (known in Chinese as 夜市, *ye shi*) for those of you who have never experienced one, are generally found in bustling, brightly-lit narrow alleyways tucked away from the main road. Some are simply one long alley filled with stands selling food, clothing or arcade games. Others, like Shilin, crisscross through multiple street blocks. There are [31 night markets](#) operating every evening across Taipei. If you compound all the waste generated nightly, it's pretty mind-blowing.)



## HISTORY AND POLICY

**Reduce** is the first “R” of Taiwan’s Environmental Protection Administration’s (EPA) [Zero Waste Policy](#), a shift in focus from “[end-of-pipe treatment to source reduction and resource re-utilization](#).” (In case you’re curious, the Rs strategy includes: reduction, recovery, reuse, recycling, repair and redesign.)

While current government efforts focus on “reducing at the source,” a policy aimed at reducing food waste by encouraging people to buy what they need and no more, NIP staff see “reduce” in a slightly different way—not use. To many people who operate in this field, recycling is a post-consumption last measure; the secret is just not to buy it.

But of course, with urbanization comes increased convenience, and with single-use goods comes the underlying linear philosophy of [take-make-dispose](#). How did incineration come to be the main method of Taiwan’s garbage disposal?

IN 1985, TAIPEI CITY GOVERNMENT’S BUREAU OF ENVIRONMENTAL PROTECTION INITIATED A 10-YEAR PROJECT TO MANAGE THE [CITY’S GROWING GARBAGE DISPOSAL](#). **PRIOR TO 1984, “[MOST PEOPLE IN TAIWAN DUMPED THEIR GARBAGE RANDOMLY AT DIFFERENT PLACES](#),” WHICH ULTIMATELY LED TO MASS PROTESTS AND GROWING HEALTH CONCERNS.**

To effectively manage the disposal of waste, the federal government formulated the “Municipal Waste Disposal Plan” in 1984 that focused on landfills. But as land space is limited in Taiwan, soon the landfills were filled, and local people led numerous protests against the harmful health effects of living near the makeshift trash dumps. The government turned to incineration to solve the waste issue. Now, **more than 96 percent of the trash is treated by incineration**, according to the EPA’s Department of Waste Management. A reduction in overall waste consumption has also led to the “powering off” of one of Taipei’s 3 incinerators every month.

While 36 incinerators were initially planned to be constructed (one per county), community protests, led by [Taiwan’s Anti-Incinerator Alliance \(TAIA\)](#), curbed the number at 24. TAIA, [Taiwan Watch Institute](#) and the [Homemakers United Foundation](#) were some of the key groups instrumental in shaping Taiwan’s notable recycling programs and Zero Waste Policy.

# Introduction

## Taiwan is known for its scarce land and natural resources

Population: 23 millions

Area: 36,000 km<sup>2</sup> (90% of Holland)

Population density: 624 person/km<sup>2</sup>  
(Urbanization : 78%)  
(Taipei City : 9,956 person/km<sup>2</sup>)

Energy imported > 98%

Mineral imported > 80%

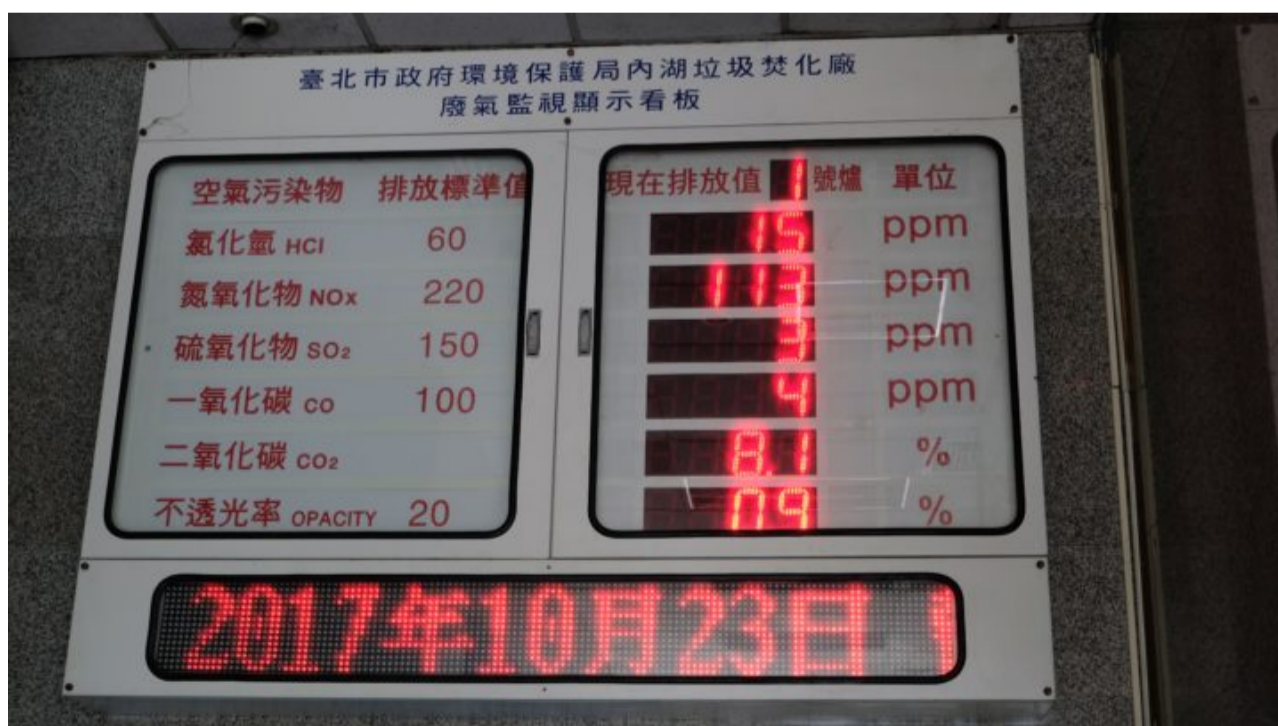
Food imported > 70%

臺灣  
TAIWAN

行政院環境保護署  
Taiwan is a small, densely-populated island. Above is an overview of its energy, mineral and food intakes. 2

## HOT FACTS ABOUT THE NEIHU INCINERATION PLANT

- **Taiwan #1:** The Neihu Incinerator Plant was the “first incinerator to be planned, built and operated” under Taipei City’s plan, with operations in full swing by 1992. (There are currently **24 incinerator plants** in operation across the island, with **3 specifically dedicated to Taipei City’s trash.**)
- **1/10:** Volume of refuse (a.k.a “trash”) is reduced **to one-tenth the original.** Remaining bottom ash (the black sludge-like stuff that remains post-incineration) is disposed to landfill.
- **850 - 1,050°C: Temperature** inside the incinerator is kept constantly within **850~1050 degrees Celsius.**
- **3 days:** The refuse bunker, where trash is first dumped post-collection, can **store up to 3 days of collected garbage** with a 9,000m<sup>3</sup> capacity.
- **100% self-sufficient:** electricity for daily operations comes entirely from the incineration process. Incineration = heat, heat turns steam turbines = generate electricity = self-sufficient NIP.
- **Excess Sold:** Taiwan Power Company and the city government sometimes purchase power from NIP when they run low on energy. Its “waste-to-energy” model takes heat from burning trash and converts it to electricity, where its then released on the island’s grid.”
- **Heated Pool:** Recycled steam also heats a public swimming pool available for local residents.



The Neihu Incineration Plant’s current chemical levels on the day of my visit.



After our encounter, I was left with the impression that these people genuinely care about the environment and their community.

They were the last line of defense in a process of unconscious consumptive destructiveness. Their strict air pollution controls, management of the fly and bottom ash, and attentiveness to the upkeep of the public facilities were all indicators that they too were 環保人 (*huánbǎo rén*), people who cared about and protected the environment.

Given the pollution effects from burning and the dumping of ash post-incineration into landfill, it's easy to believe that people who work in the incineration industry don't care about the environment. But it's a Catch 22—if there's no system, waste just builds up. You run the risk of the spread of more illness and bacteria.

Everyday, millions of people are using and disposing, using and disposing; industry is creating and disposing, creating and disposing. The massive amount of waste generated from market exchanges does not stop. So what do you do? The people who work in this industry are the last line of defense—the forgotten warriors of our consumptive habits.

*Acknowledgements: I would like to thank Taipei City Government for arranging my visit to the Neihu Incineration Plant (NIP), and the NIP managers and staff for their gracious hospitality. I greatly appreciated the amount of time they spent with me and their willingness to answer all of my questions. While I recognize that working in waste management and incineration is inherently a 'dirty industry' due to the nature of trash, I was amazed at how everything operated with scientific precision and fine attention to detail; the seriousness and thoughtful intention behind how every action affected the immediate environment and the staff's quality of life was very apparent and much appreciated. Thank you again for the opportunity!*

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#### MEET THE AUTHOR

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Lillygol Sedaghat is a multi-media environmental journalist and speaker focusing on the intersection among science, systems, and people. Previously, she was a Fulbright-National Geographic Digital Storyteller documenting Taiwan's waste management system, plastics recycling and circular economy initiatives. She is an active contributor to National Geographic's Planet or Plastic? global campaign and creates music videos, info-graphics, and maps to transform people's perceptions of trash from something disposable to something valuable. Lillygol has spoken at UN World Environment Day, Influence Nation Summit DC, and National Geographic on her research. She completed a B.A. in Political Economy from the University of California, Berkeley and was named 5 Under 25: Leaders in U.S.-China Relations.



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