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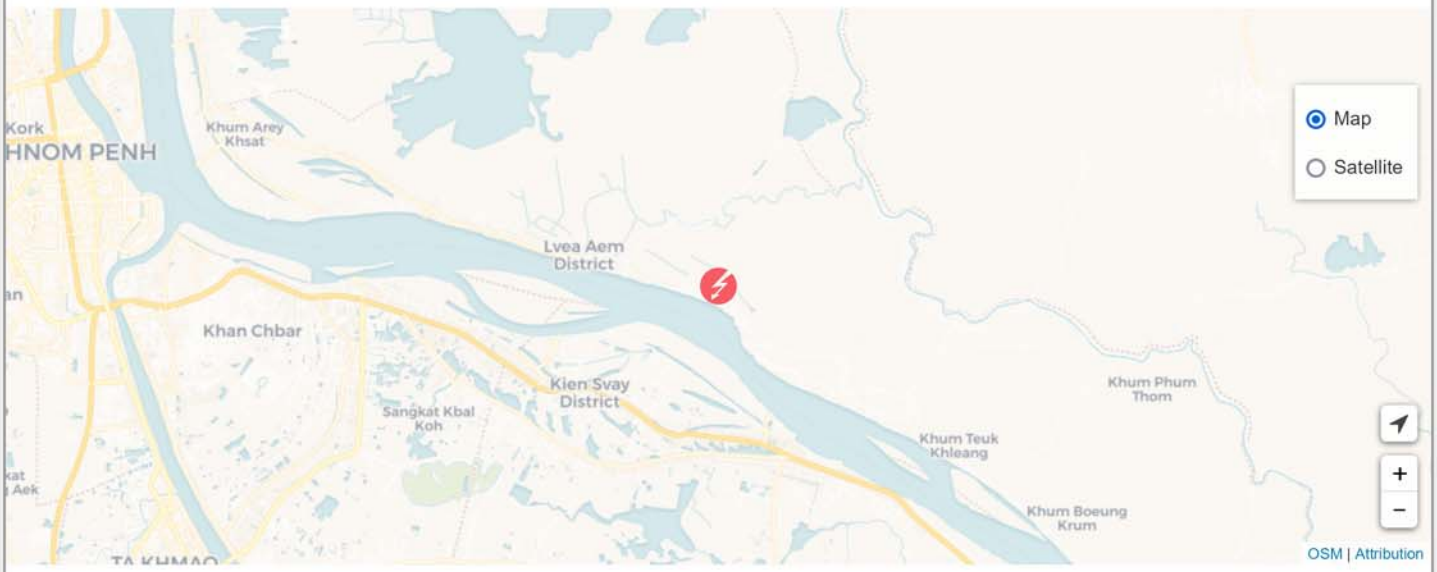

Energy

Kandal Heavy Fuel Oil Power Plant

Lvea Em District, Kandal Province, Cambodia

WRITTEN BY DANIELLE KEETON-OLSEN ON NOVEMBER 24, 2021.

The Kandal Province 400 MW heavy fuel oil power plant was the first power project completed following Cambodia's energy shortages in 2019. Among the spattering of solar farms and large-scale coal power plants commissioned amid Cambodia's drought-induced hydroelectricity shortages, this plant was considered a middle option: it would burn heavy fuel oil at first, with significant greenhouse gas emissions, and switch to cleaner liquefied natural gas (LNG) fuel when the receiving infrastructure was in place. Construction of the plant, owned by Cambodia's national utility, was contracted to two Chinese firms and built on a rapid schedule amid the Covid-19 pandemic.

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Basic Information

Chinese Name: 柬埔寨双燃料发电站
Location: Lvea Em District, Kandal Province, Cambodia
Type of Project: Energy

Project Developer: Électricité du Cambodge
Main Contractors: Engineering, procurement, and construction (EPC) contractors: China Gezhouba Group International Engineering Company Limited and CGGC-UN Power Company Limited (subsidiaries of China Gezhouba Group, itself owned by China Energy Engineering Corporation), and China National Heavy Machinery Corporation (a subsidiary of China National Machinery Industry Corporation, Sinomach). Equipment: Wärtsilä Technology (Finland) and MAN Energy Solutions (Germany). Operation and maintenance: SchneiTec Company Limited (Cambodia).
Known Financiers: Cambodian Government (300 million USD); Électricité du Cambodge (80 million USD).
Cost: 380 million USD
Project Status: Operational

Project Outline

As Phnom Penh endured frequent power outages in 2019—mostly connected to drought-induced low river levels and Cambodia's heavy reliance on hydropower—the government fast-tracked plans to build a heavy fuel oil power plant outside the capital to meet the city's growing energy demand. In 2019, the Council for the Development of Cambodia approved construction of a 400 megawatt (MW) heavy fuel oil plant in Kandal Province's Lvea Em District.

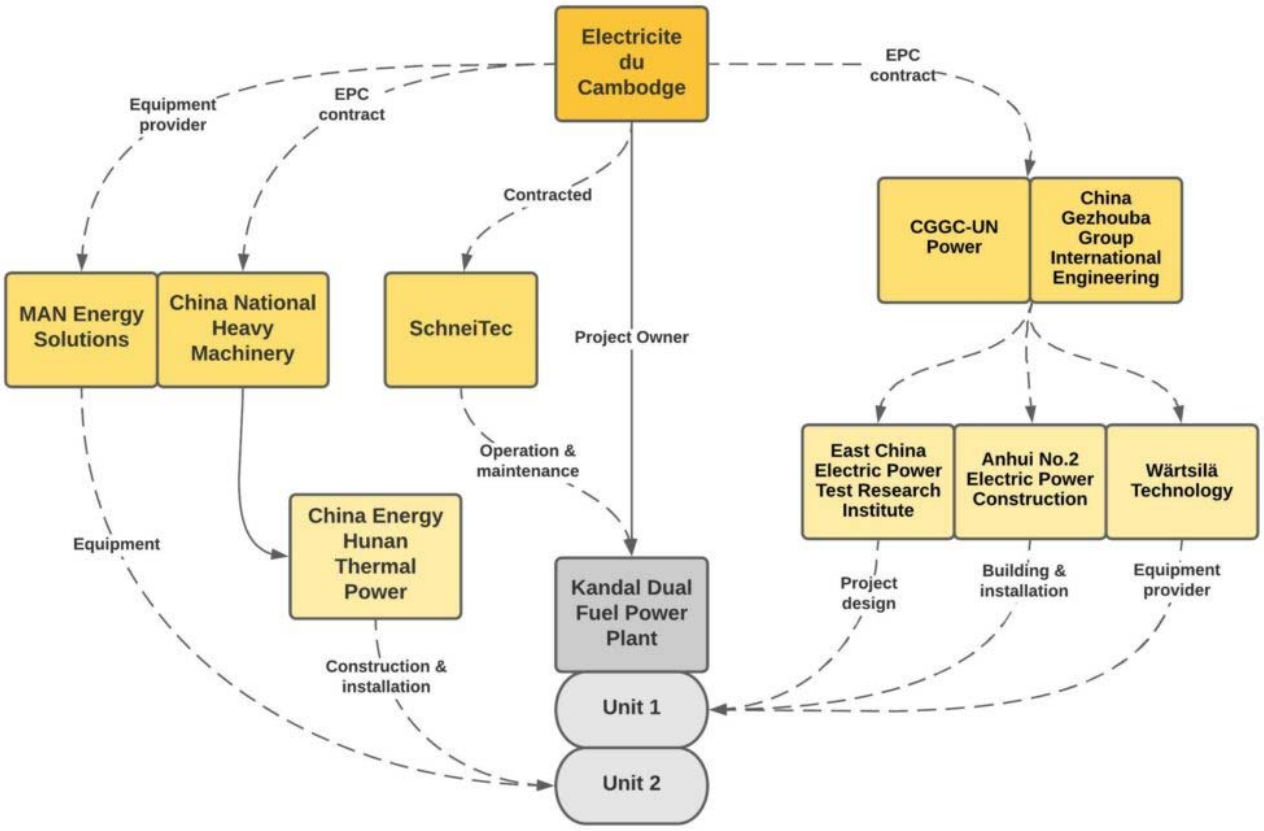
Satellite image of power plant, June 2021. Source: Google Earth.

The plant is owned by Cambodia's state utility, Électricité du Cambodge (EDC), and is operated and maintained by local company Schneitec Company Limited. The final cost of

the plant was 380 million USD, with 300 million USD coming from the Cambodian Government and the remaining 80 million USD from EDC. Construction of the two units was contracted to two Chinese firms. In 2019, EDC signed an engineering, procurement, and construction (EPC) contract for the first unit with a consortium of China Gezhouba Group International Engineering Company Limited and CGGC-UN Power Company Limited, both of which are subsidiaries of the state-owned China Gezhouba Group. Gezhouba Group is itself a member of China Energy Engineering Corporation (CEEC). Project design was subcontracted to East China Electric Power Test Research Institute Company Limited and building and installation to Anhui No. 2 Electric Power Construction Company Limited—both subsidiaries of CEEC. CGGC-UN Power placed a contract in June 2019 for 12 dual-fuel engines with total capacity of 200 MW with Finnish Wärtsilä Technology, which has supplied 22 engines to seven power plants in Cambodia since 1993.

Inside the Gezhouba-built power plant, December 2020. Source: CGGC-UN Power Facebook page.

After discussions in Phnom Penh in May, the state-owned China National Heavy Machinery Corporation (Sinomach-HE) and Germany's MAN Energy Solutions signed a joint contract, in August 2019, to set up another 11 dual-fuel engines for the Kandal plant, adding 200 MW of installed capacity. Sinomach-HE is a subsidiary of state-owned China National Machinery Industry Corporation (Sinomach). Sinomach-HE subcontracted China Energy Hunan Thermal Power, another subsidiary of CEEC, for construction and installation work.



The dual-fuel engine system is intended to support the stability of Cambodia's grid while also responding to the variability of renewable sources like solar and hydropower, which depend heavily on weather conditions. Both the Finnish and the German companies noted that the Cambodian Government required a quick turnaround to complete the project. Construction began in October 2019 with plans to complete the plant by June 2020, but by March 2020, the Covid-19 pandemic had slowed construction, reportedly because technical teams were restricted from travelling to Cambodia from China. Though the project timeline was revised to join the grid by the end of 2020, the Lvea Em plant started generation by January 2021.

Both units started operation using heavy fuel oil but can switch to burning liquefied natural gas (LNG) when the appropriate infrastructure is in place. Cambodia has shown interest in boosting its LNG infrastructure, receiving its first imports of LNG from the state-owned China National Offshore Oil Corporation (CNOOC) in January 2020, which marked Cambodia's first LNG import and China's first export of LNG to Southeast Asia.

Upstream Magazine suggested in July 2021 that CNOOC Gas & Power may be interested in developing Cambodia's LNG infrastructure. However, analyst *IHS Markit* noted that Cambodia would need to rent or purchase floating storage and a regasification unit to make LNG a sustainable fuel source. Therefore, in the immediate future, the plant is likely to continue to run on heavy fuel oil.

Project Impacts

- **Land Acquisition:** The project resulted in some displacement, although affected people were compensated.
- **Pollution:** Residents have expressed concerns that water runoff from the plant is harming their crops.
- **Impact Assessment:** It is unclear whether the project was subject to an environmental impact assessment, and residents were not fully informed about the details of the project before construction.
- **Climate Change:** Althoughless problematic than coal in terms of carbon emissions, heavy fuel oil is a fossil fuel and, as such, the plant further contributes to Cambodia's carbon emissions.

Local farmers' crops alongside the power plant. Photo by the author, 2021.

Worsening drought came to a head in 2019, when low river levels left Cambodia's hydropower dams operating well below capacity. This exposed the country's dependence on hydropower, which in 2019 was providing as much as 50% of the nation's power, and led to lengthy nationwide power cuts. This led to the approval of two new coal plants, in Oddar Meanchey and Koh Kong, and the Kandal heavy fuel oil plant (for more on this, see this essay in *The People's Pulse*). The plant will go some way to alleviate the impacts on the capital should similar weather patterns recur and leave Phnom Penh susceptible to power shortages.

Residents living near the heavy fuel oil plant told reporters for *The Third Pole* that former neighbours were displaced from farmland and homes in Lvea Em District. While they were compensated for their land, the residents said the displaced individuals were initially concerned about the power plant, fearing the pollution it would bring to the area would impact on their daily lives.

Cambodian law requires that power plants are subject to an environmental impact assessment (EIA), which necessitates public consultation, although there is an exemption for anything the government deems an emergency project. It is unclear whether this project was subject to an EIA, but villagers interviewed by *The Third Pole* said that,

although they were informed about the compensation plan for the project, they were not told what the project was.

Though the project has the capacity to burn less emissions-intensive fuels like LNG, the plant is currently burning heavy fuel oil—an energy source considered preferable to coal, but still an emitter of carbon dioxide as well as sulphur dioxide and nitrogen oxide, which are powerful pollutants. Residents told reporters for *The Third Pole* that their papaya crops and other plants were impacted after the power plant began discharging waste water into a small local stream. Reporters observed a runoff drain that was indeed pouring from the plant's gates into the stream, but it was unclear whether it contained any pollutants.

In-Depth Source

Keaton-Olsen, Danielle and Yon Sineat. 2021. 'Cambodia Embraces Dirty Energy Fearing Drought-Driven Shortages.' *The Third Pole*, 24 June. Link.

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Danielle Keeton-Olsen is a freelance journalist based in Phnom Penh, covering environmental, business, and labour issues in Cambodia and beyond. She works as a reporter and editor for the Phnom Penh news outlet VOD English, and additionally contributes reporting to *Mongabay*, *South China Morning Post*, *China Dialogue*, *Al Jazeera*, and others.

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