Tucuruí Hydropower Complex in Brazil
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Tucuruí Hydropower Complex at a Glance

- The Tucuruí Hydropower Complex is located on the lower Tocantins River in northeastern Brazil.
- 4th largest hydropower complex in the world, based on generation capacity.
- Tucurui has the capacity to generate 70% of all the electric power produced in Northern Brazil.
- The complex was built with the primary goal of producing hydropower and the secondary goal of providing a navigable river route – both combined were hoped to stimulate the local economy.
- Tucuruí is not used as a source of irrigation.
- Eletronorte provided 45.7% of the funding and the rest was from foreign banks and international credit agencies.
Objectives of the Project

- Initially, the objective behind the construction of the hydropower complex was to provide electricity for the town of Belém and the surrounding region.
- This primary focus was later changed to providing power for the electro-metallurgical industry in the region.
- The secondary focus was the installation of two locks to ensure that the river from Belém to Santa Isabel was navigable – mainly for transporting ore and other natural resources.
In total, 12,515 m of dam wall was constructed to form the reservoir.

- Formed by flooding a land area of 2,850 km²
- The reservoir has a total volume of 45.5 km³
- Has a useful reservoir volume of 32 km³
- Tucurui has a maximum spillway capacity of 110,000 m³/s.
- Tucurui has 23 turbines and the capacity to generate a max annual electricity production of 21 TW-hrs = 21 million MW-hrs.
Cost of Construction

- Built in 2 Phases: Nov. '75 – Nov. '84 and June '98 – Dec. '02.
- Total cost, with the interest during construction came to $7.5 billion (with a design estimate of $5.8 billion).
- After factoring in the cost of the power lines necessary to connect Tucuruí to the power grid, the total rises to $8.77 billion.
- In accounting for the IDC, there was a 76.6% cost overrun.
Effects on the Ecosystem

- The neo-tropics of the Amazonia are one of the most richly diverse ecosystems on the planet.
- Studies on the chosen site, prior to construction, showed that the area was home to 294 types of birds, 117 species of mammals and some 300 species of fish – many of which are endangered.
- Studies following the filling of the reservoir found that the quality of water decreased, fish mortality rates increased and mosquito populations exploded.
- The study also showed that substantial amounts of green house gases were being emitted from the reservoir – but still less than diesel, heavy oil and coal burning.
Notable Consequences

- Studies found that numerous impacts on the health of the surrounding populations resulted from the construction.
- During the construction phase, masses of migrant workers settled around the construction site, resulting in a local increase in alcoholism, STD's, and AIDS.
- In 1984, the malaria outbreak peaked at 10,126 cases.
- In 1980, 410% of live births died before completing one year of age.
Benefits of the Project

- Over 90% of the electricity produced in Brazil comes from hydroelectric power, some argue that the national debt would be much higher without this saving on the costs of importing fossil fuels.
- When taking into account all of the monetary costs vs the power generated (US $58), and comparing this to the national average price for energy (US$70), the project is profitable.
- Growth rates for the communities near the dam site were very high during the construction period.
Any Questions?