# BELO MONTE HYDROELECTRIC DAM PROJECT
# FACT SHEET
# May 2011

## KEY FACTS

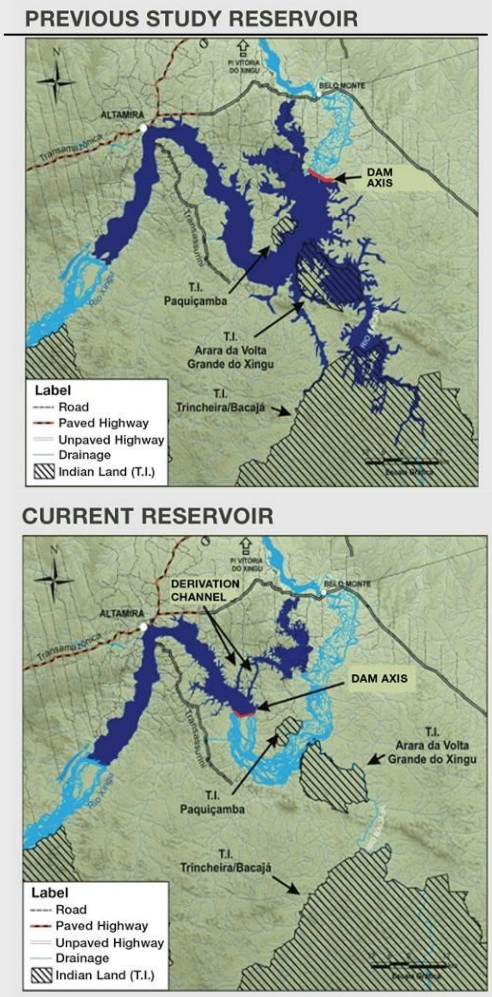
- **National Project.** The Belo Monte hydroelectric dam is a national energy project of the Brazilian federal government that will be located along the Xingu River in Brazil's northern state of Pará. Through this dam, the government will add 11,233 mega-watts (MW) of installed capacity to the national energy grid. With this energy output, Belo Monte will be the second largest hydroelectric dam complex in Brazil, behind the Itaipu bi-national power plant managed by Brazil and Paraguay, which produces 14,000 MW. Belo Monte is expected to begin commercial generation in January 2015, with full-plant automation targeted for January 2019.

- **Public-Private Partnership.** The Belo Monte plant is being constructed by Norte Energia (Nesa), the consortium that won the concession auction in April 2010. Norte Energia is comprised of the Eletrobras Group (with a combined 49.9% stake), and a group of private Brazilian firms.

- **Sustainable Development.** The Belo Monte project is in tune with Brazil's national commitment to ensure the rational use of natural resources, environmental protection and sustainable development. In addition to providing an important new source of electric power to support the country's economic and population growth, the Belo Monte dam will also improve the living conditions of local communities and strengthen environmental protection in the area.

- **Clean Energy.** The decision to use hydroelectric power to expand the national energy grid was guided by Brazil's 2009 commitment to reduce $CO_2$ emissions by 36.1% to 38.9% by 2020. The Belo Monte dam will help to maintain Brazil's current standing as one of the cleanest energy matrixes of all industrialized countries, with 46% of energy coming from renewable sources

**Engineering Feasibility Studies**
Studies from the 80s/90s x Current Studies




Source: ELETROBRAS

**Project Evolution: Increasing Efficiency & Protection**
The current Belo Monte project is significantly different

from the original Kararaô project presented in 1989 (see image above). Today's plan dramatically increases efficiency and social and environmental protection through measures that include reducing the flooded reservoir area from 1,225 $km^2$ to 516 $km^2$. The overall area-to-capacity ratio of the Belo Monte project is 0.05 $km^2$/MW, lower than that of other Brazil-based plants like Serra da Mesa (1.40), Tucuruí (0.29) and Itaipu (0.10). The national average is 0.49 $km^2$ per MW installed.

## ENVIRONMENTAL LICENSING

Like other large-scale national projects, the Belo Monte project is subject to environmental licensing, which, in this case, is conducted by the Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA). The licenses required include:

The **Provisional license**, which was granted by IBAMA in February 2010 following a review of the project's Environmental Impact Assessment (EIA) and four public hearings. The license lists 40 socio-environmental conditions aimed at preventing, mitigating or offsetting the impacts provided for in the EIA, and include requirements related to:

- Water quality
- Impact on the fauna and flora
- Sanitation
- Impact on the local population
- Financial compensation
- Recovery of degraded areas
- Monitoring social-environmental plans and programs

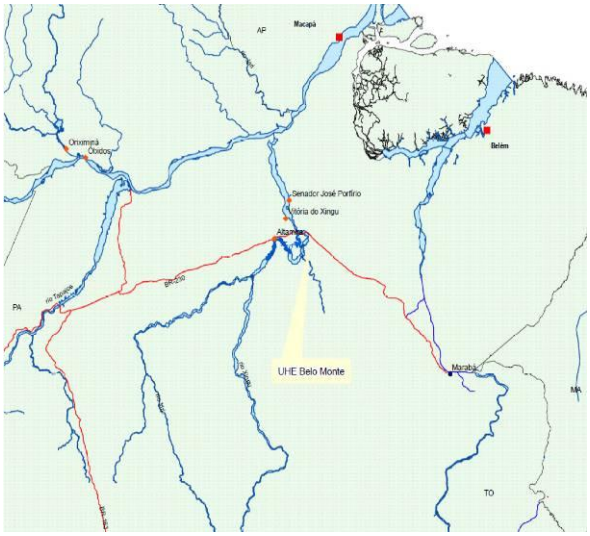
The **Installation license**, which can be issued on a stage-by stage-basis before construction of the project begins. In January 2011, IBAMA issued the installation license for the construction site, including improvements in access roads. The installation license for the dam is currently under analysis.

An **Operations license**, which authorizes reservoir fill-up and the beginning of generation. In order to grant it, IBAMA will verify whether EIA proposals and the conditions of previous licenses have been met as required and within the established timelines.

## RETURN ON INVESTMENT

Brazil's Energy Research Company (EPE) has conducted a cost analysis based on the design submitted by the project developer. This study estimates that the Belo Monte Hydroelectric Plant will require an investment of R$ 20.3 billion (according to December 2008 prices), with R$ 3.3 billion earmarked for the proposed social and environmental programs. This means a total cost index of R$ 1,780/KW, excluding interest accrued during construction. The cost of the power produced, including payment for use of the interconnected transmission system is less than R$ 80/MWh.

## INNOVATIVE APPROACH




The Belo Monte project will use an innovative canal system that reduces the land area required to generate power. The bus and the main spillway will be located on the Pimental site on the bed of the Xingu River, about 40 kilometers from the city of Altamira. The complementary power house will also be installed on the Pimental site. Through channeling, part of the river water will be diverted to the main powerhouse in Belo Monte, forming a reservoir of canals.

To ensure safety conditions, an additional spillway will be built on the Bela Vista site. The layout is complemented by a set of dykes for the lateral closing of low points in the reservoir of canals.

Another important feature of the project is the dry construction of nearly the entire plant. The sites of Belo Monte and Bela Vista, as well as the areas of the side dykes, the diversion canals and the junction canal will only be flooded after the main dam at Pimental has closed. This will take place once all construction works have been completed, so that generation in the main powerhouse can begin.

| | **Main Powerhouse** | **Complementary Powerhouse** |
|---|---|---|
| Maximum normal N.A. | 97 m | 97 m |
| Installed power | 11,000 MW | 233 MW |
| Type of turbine | Francis | Bulbo |
| Nominal net head | 87.5 m | 11.5 m |

## KEY GOVERNMENT AGENCIES

- Ministry of Mines and Energy (MME): http://www.mme.gov.br/
- Brazilian Energy Research Company (EPE): http://www.epe.gov.br/
- Ministry of the Environment (MMA): http://www.mma.gov.br/
- Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA): http://www.ibama.gov.br/