Nam Ngum 2: Award-Winning Hydroelectric Power Plant in the remote forests of South East Asia

The Nam Ngum 2 Hydroelectric Power Project is located in Lao PDR. The facility holds an installed capacity of 615 megawatts and produces an annual energy of 2220 GWh. The plant has been awarded with the prestigious International Rockfill Award as key milestone project.

BACKGROUND

Laos is known as "the battery of Southeast Asia" and a central source of its hydropower flows from the Nam Ngum River, tributary of the Mekong River which forms in this area the border between Lao PDR and Thailand. It is on this river that the Nam Ngum 1 hydropower plant was established in the 1970s. With rapidly growing energy demands from Thailand, the Nam Ngum 2 Power Company was created by a developer group to implement a further hydropower plant on this river, located just upstream of the existing lake on Nam Ngum 1, capturing a burgeoning energy market in South East Asia. The energy produced in the privately developed Nam Ngum 2 hydropower plant is sold to Thailand.

CHALLENGE

In an inherently complex industry, the Nam Ngum 2 Hydroelectric Power Project had more than its share of issues. Pöyry has been connected with the project since the early 1990s. However, in 1996, with the onset of the Asian financial crisis, plans came to a halt until the region's economic market stabilised. After nearly a decade, efforts were revitalized and work began in earnest in 2005.

SUCCESS FACTORS

The Nam Ngum 2 project wascomplex and took decades to go from initial vision to ultimate construction. Throughout that journey, Pöyry remained a trusted partner of Nam Ngum 2 Power Company. It's this level of dedication—this willingness to stay connected even when the project looked like it would never achieve lift-off—that makes Pöyry different from competitors. And that dedication paid off: Nam Ngum was recognised as one of five dams worldwide to receive the International Milestone Rockfill Dam Project Award.

At that point the Nam Ngum 2 / Pöyry team confronted the next set of challenges: remoteness of the site and unforgiving weather. The site of the facility is surrounded by forests and rugged mountains. There was no infrastructure leading to the proposed site. In fact, all construction plant and equipment and materials had to be ferried across the existing Nam Ngum 1 lake.

To add to the environmental challenges, Laos experiences regular monsoons from June to October making a construction effort the size and scale of Nam Ngum 2 a daunting effort at best.

SOLUTIONS

Pöyry's involvement began in 1995 with a feasibility study and an environmental impact assessment. Thereafter followed the project outline design, and the setting up of the EPC contract documents. Then later on Pöyry served as the Independent Engineer throughout the length of the project implementation phase and as such supervised in close collaboration with the EPC contractor the efforts of a range of contractors and sub-contractors and critically reviewed and approved all designs produced. This included all civil works, electro-mechanical,hydro-mechanical and transmission line works. At its height, the Nam Ngum 2 project had more than 6,000 people on site from the EPC contractor the 6 main sub-contractors and several additional sub-contractors.

BENEFITS

By the end of December 2010, three months ahead of schedule, the plant was ready for operation and power began to be produced at Nam Ngum 2. Since then, the plant has produced energy without significant unplanned outages, even after the region was hit with a major flood six months after launch.

Nam Ngum 2 has been innovative in various fields and has been awarded with the International Milestone Rockfill Dam Project Awards. The aim of the award: promote the development of rockfill dam technology.

The benefit of the power plant is clear for Lao PDR: the country continues to grow its capabilities in the sustainable energy industry, and the facility provides much-needed stable financial income and also jobs for people of the region. Thailand enjoys a long-term and reliable renewable energy source to power its developing economy.

KEY FACTS

- Two diversion tunnels of 12 meters in internal diameter located on the left abutment
- A gated spillway with chute and flip bucket on the right abutment
- A concrete face rockfill dam (CFRD) of 182 m max. height
- A single headrace tunnel with intake facility, located in left abutment
- Steel lined manifold branching into three underground inclined steel lined shafts
- Powerhouse building with 3 power generation units having a total installed capacity of 615 MW
- Main transformers located on the hill side of the powerhouse
- A GIS switchgear integrated into the powerhouse
- A 230 kV / 500 kV transmission line system of 96 km length
- Awarded with the International Milestone Rockfill Dam Project Awards

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