THE 1,870 MW GIBE III HYDRO ELECTRIC PROJECT

MARCH 2018
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1. The Project

- Located on the lower reach of the Omo River, in south west of Ethiopia.
- Controls a catchment of 34,000 km² with a yearly inflows of 14 Billions m³ (440 m³/s)
- Creates a reservoir 155 km long (210 km² area).
Contd.

- **Includes:**
  - A 246 m high RCC Dam (6 millions m3) with a gated spillway on top
  - Two 1 km long 11.0 m dia. Waterways with surge shafts and penstocks
  - A left bank open-air powerhouse with 10 Units (1,870 MW installed capacity)
  - Three 1 km long diversion tunnels with cofferdams to protect the construction site against 30 years return period floods
  - Powerhouse connected to the ICS through two 400 kV Transmission Lines.
  - Average annual energy generation of 6,500 GWh.
2. Development Challenges

- The needs in electricity are, as everybody knows, considerable in all Africa (50% electrification rate in 2016 against 81% in the World - 600 millions inhabitants without access to electricity).
- Situation has considerably improved in Ethiopia (Electrification rate grew from 17% a few years ago up to 54% in 2016). The objective is to achieve a 90% rate in 2020. Still some 45 millions people without access to electricity.
- The Government of Ethiopia under its latest Growth and Transformation Plan (GTP) invasions transitioning from a developing country to a middle income country by 2025. Ethiopia’s ability to achieve this ambitious goal in such key sectors as agriculture and industry is significantly constrained by current challenges in the energy demand. To overcome these challenges, building mega hydroelectric power projects becomes crucial. One of them is Gibe III Hydroelectric power project.
3. Delivery Challenge

- At the start of the implementation of Gibe III HEP, we have faced different challenges.
  - One of the major challenge was the change in design of the dam.
  - Previously the dam was impervious-faced rock fill with the height of 246m and technically sound to implement.
  - However, related to project insurance, international insurance companies (due to the nature the dam. i.e with this exceptional height for rock fill dam with upstream asphalt faced, and the weather condition of the area) refused to insure the project.
  - Due to this we are obliged to change the type of the dam in to Roller Compacted Concrete (RCC) Dam and the scope of the project as a whole.
Contd.

Rock fill Dam

Roller Compacted Concrete Dam
After the change of the dam type and scope of work we have faced the following obstacles:

- The change in cost and time for completion of the project.
- Lack of Low heat Cement required for the RCC Dam, in the country.
- Shortage of skilled man power in RCC Dam Construction.
- Increased Foundation Works for RCC Dam.
- Shifting of Water Intakes, due to unforeseen geological conditions.
- Need of steel lining of Waterways partially.
- Change of Powerhouse location.
- Etc.
4. Solutions

- To overcome the increased cost and time for completion;
- The opportunistic combination of a strong political willingness, a clear vision and awareness of the needs of the people, the resources of the Country and the Early Involvement of a Strategic Partner at its own risks.
- The government also decided to finance the Civil part of the project by itself and the Electromechanical and Hydraulic Steel Structure works are awarded to the Chinese Contractor. i.e. the loan is obtained from the Chinese Government.
- To overcome the lack of low heat cement, many efforts have been done and finally one of cement factory in country is succeeded to produce this special cement with the support of European Experts of the field.
In conclusion, all obstacles have been managed and finally the project started power generation in November 2015.
Thank you