Experiences and Challenges in Developing a Cogeneration IPP

We shall be discussing about experiences gained and challenges faced by Mumias Sugar Company in developing their cogeneration plant. That will most likely be relevant to other companies in the country, which intend to go the same route.

At the onset, it is worth stating that a cane sugar company inevitably is an energy producer, especially where there isn’t other substitute fuel. Substitute fuels like coal are used in places where there is cheap supply, and where the cane husk, bagasse, is used for other purposes like papermaking, cattle feed, etc.

In Kenya, we do not have cheap alternative fuels available to the sugar industry. Bagasse generated is therefore intended solely for consumption in the boiler plant to produce steam that is eventually used to drive steam turbines. A factory like Mumias is sized as much as possible for it to be able to consume all the bagasse it generates.

It is also sized to be able to produce as much electricity as possible for its own use and that of its estates. If that were not the case, then Mumias would for instance be required to import 9.5MW for its own use.

Awareness

- For the majority of Kenyan people, realisation of a sugar company being a power producer came early this century, when following a severe drought in the country that affected power supply, the company was able to provide 2MW to the grid, at quite a good price.
- The agreement was flexible and allowed export of power to be done, when available. Mumias Sugar Company is proud to have contributed to the national effort of getting together with others, especially in times of need.
- Immediately after the drought, there was a change in plan by the power utility company.
- Getting power from Mumias ceased to be attractive, and exports ceased.
Re-awakening

- A year ago, a power supply agreement was reached yet again.
- The company now exports 2MW of power to the grid, but at a much-reduced price.

Challenges and Experience

1. Consultants
- One challenge is selection of consultants. All of a sudden, at the slightest whiff that a project is in the offing, all manner of consultants turn up promising heaven. Those who contacted us included many who had no experience with bagasse-based cogen plants. They did however masquerade as experts.

- Our experience here is that Consultants jump on to any bandwagon and will lead you in a direction favourable to themselves if you are not careful.
- For example, during our feasibility studies, one spoke of getting a new low-pressure boiler, about 30bar(a) pressure, and of converting our largest existing low-pressure boiler to the higher pressure. The report indicated that could be done within the short period we stop for maintenance. It also limited the amount of power that could be exported as a result.
- Converting a boiler within the limited period we shut down is not possible. The consultant was clearly not in tandem with what he was talking about.
- Another case is one where the consultant claimed to have a cogen expert, who had worked on cogen plants. It turned out that he had, but on a normal sugar factory. His claim to fame was that energy produced by that factory was used to power irrigation pumps for the sugar farms.

- Faced with a situation of not getting proper consultants, Mumias Sugar Company went to the Press.
- We went through an elaborate process of selecting a consultant for the project. Those who qualified were vetted until we remained with four.
- On paper, all of them qualified to move to the next stage: Site visits. These revealed something very interesting.
- One of the most highly rated consultants, who had made very good presentations had extremely dilapidated factories. Another, literally did not have a factory to prove his credentials.
- The remaining two consultants qualified fully, with one having executed many projects successfully, and another having done some projects.
- Once the choice of consultant was made, we proceeded onto feasibility studies once again. It is worth mentioning here that not getting a committed and knowledgeable consultant can have serious drawbacks on the project.
2. Feasibility Study

- A proper feasibility study had to be conducted this time round.
- With the exception of the Islands of Mauritius and Reunion, it is probable that we do not have high-pressure bagasse-fired cogencogen plants in Africa. There wasn’t much to go on in the region.
- Our Board of Directors therefore took a daring move to decide to go for this type of cogeneration.

3. IPP or Not

- Setting up a cogencogen plant therefore as an IPP or as an integral part of the main sugar plant is one challenge that faced us.
- Would we separate ownership and set up a different holding company?
- How would the purchase of bagasse and water and sale of power be coordinated?
- Faced with this challenge, our Board decided not to separate ownership of sugar operations from the steam and power plant.
- We had again received a lot of interest from other parties, who wanted us to run the two as separate entities, with penalties flying across both sides. That we opted to run them as one unit is a position we have taken.
- We have also taken the decision that our plant will use renewable energy only, and have not provided facilities for using fossil fuels.

Power Purchase Agreement

- When setting one self up to produce power, like every other product, there must be a market. In our case, we must admit that although this issue kept cropping up especially from the bankers, we knew that we would get very good cooperation from the Ministry of Energy and from KPLC.

Financing

- This is mostly what can make or break the setting up of a cogeneration plant.
- Existing steam boilers and turbines for most sugar factories are of low efficiency. Boilers have been designed mostly with the aim of burning all the bagasse generated and not for extracting maximum energy out of them.
- A lot of investment is therefore called for once one decides to start producing vast amounts of power.
- Like with all large projects, a lot of due diligence is carried out by all prospective financiers before funding can be undertaken.
Power Exports

- From the limited power we export, we have occasionally shut the plant as a result of the export line being affected, we have also many times failed to export power because of problems on the transmission line.
- We have therefore learned that to be an effective power exporter, transmission must be at the higher voltage. We are together with KPLC now working on a 132KV line that will eliminate spurious trips. Inevitably, we are also putting adequate protection at our end to prevent the factory being knocked off in the event of a problem on the export line.

KPLC as a Customer

- For all the time we have exported power to KPLC, they have never failed to pay the cheque. They are a reliable customer. This is credit to them, and it is an answer we have given to our prospective financiers time and again.

Training

- Obviously we do not have the requisite experience in running a cogen plant of the magnitude we are procuring.
- We therefore must plan to train personnel who will be responsible for looking after this plant fully before it is commissioned. Most of the training will be conducted overseas.

Thank you for your attention

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