MAY 2009

IFC International Finance Corporation
World Bank Group

IFC SmartLessons
real experiences, real development

Ashta Hydropower—Turning a Doubtful Concept into a Technological Trailblazer

ABOUT THE AUTHOR

MARTIN SOBEK
is an Investment Officer in IFC's Infrastructure Advisory Services Department. He has 10 years of international experience in mergers and acquisitions, privatization, and PPP transactions in Europe, North America, and the Middle East.

APPROVING MANAGER
Angelo Dell'Atti, General Manager, Advisory Services – Infrastructure.

The author would like to acknowledge Georgi Petrov and Nikola Mihajlovic for their valuable comments and contributions to this SmartLesson.

The Ashta run-of-river hydropower plant weir. (Photo by Tullio Marrama)

IFC played a key role in helping the Republic of Albania structure and implement its first large public-private partnership (PPP) transaction in the energy sector, which brought a strong and reliable international investor into the country. Verbund, Austria's largest electricity company, won a 35-year concession to build and operate the Ashta plant—the first major hydropower plant built in Albania in 30 years. Verbund will invest more than $220 million in the project, resulting in an expected savings on Albania's electricity imports in excess of $45 million during the first five years of the plant's operation. But the project has not been without its challenges! From design to bidding to contracts, we learned what it means to persevere—as described in the SmartLesson below.

Background

Some 30 years ago, Albania not only satisfied its own domestic electricity needs but also exported its surplus to neighboring countries, but it now experiences frequent power outages that affect the country's economic development and require it to rely on costly energy imports. Albania's power-generation system is based almost entirely on hydroelectric plants, the most important of which exploit the Drin River basin.

In February 2001, Albania's power utility, Korporata Elektroenergjetike Shqiptare, contracted the China Water & Electricity Corporation (CWE) to build a hydropower plant on the lowest reach of the Drin River, at Bushati, on a turnkey basis. The CWE plan featured a diversion weir, a headrace canal, an aboveground powerhouse, and a tailrace channel conveying the turbine-design discharge of 540 cubic meters per second to the Buna river, some 4.5 kilometers downstream of its confluence with the Drin. However, this plan would affect the levels of Lake Shkodra (an important wildlife refuge

shared by Albania and Montenegro), raising environmental and socioeconomic questions as well as riparian-rights issues for the two neighboring countries.

In August 2001, the government suspended the CWE contract for an independent assessment of the plan's technical, environmental, financial, and economic feasibility by the German engineering firm Lahmeyer International (LI). One of LI's suggested approaches envisaged reducing the tailrace channel length so as to discharge the powerhouse outflow back into the Drin River upstream of the Buna confluence, slightly decreasing the available head but eliminating most of the project's adverse environmental and social impacts and avoiding riparian issues.

The LI study took only a few months, but there was no forward movement on the project until the fall of 2006, when the Albanian Ministry of Economy, Trade, and Energy (METE) retained IFC to:

- *Create a legislative framework that would be conducive to PPPs and reflect best international practice;*
- *Help establish a PPP unit within METE; and*
- *Identify, structure, and implement a pilot PPP transaction in the hydropower sector.*

IFC drafted a new Concession Law, adopted in early 2007, and helped establish a PPP unit within METE. Afterward, IFC studied the technical and financial viability of a number of potential hydropower projects, and concluded that a modified version of the original Bushati project, incorporating LI's approach to discharge the powerhouse outflow back into the Drin River upstream of the Buna confluence, offered the best prospect for a pilot PPP project in hydropower. However, there is no such thing as an easy hydropower project.

It took a lot of effort on the IFC side to persuade the government to move from the old design to the new design with a reduced capacity. To avoid confusion with the original CWE plan, the new project was named Ashta, after the village where the powerhouse would be situated under the new project design. In May 2007, the Government approved the new concept as the first pilot PPP transaction to be implemented under the new concession law.

Between July and September 2007, IFC reviewed all previous studies and design work, refined the overall concept, and prepared a baseline design that could be realized on the Ashta site. This baseline design specified some elements of the plan as essential to its viability, leaving sufficient flexibility for private investors to present sound and innovative technical solutions within these clearly defined boundaries. Next came an Environmental, Social, Health, and Safety Screening Study, in line with IFC standards and Equator principles, and several rounds of public consultations with the affected communities.

In January 2008, the prequalification phase began, resulting in 12 submissions, 10 of which met the prescribed criteria. Nine international companies took part in a bidders conference in April 2008 and performed extensive technical and legal due diligence. In the following months, the IFC team pre-negotiated the tender documents with potential investors in a transparent and nondiscriminatory manner, incorporating some of their most substantial comments. During this stage, the government's reluctance to assume or share any of the project risks became evident. Besides the hydrological, geological, environmental, and land-acquisition risks typically associated with hydropower developments, Ashta is totally dependent on the water releases from state-owned upstream hydropower plants and subject to a rudimentary regulatory framework (regulations on minimum ecological flows, water off-takes for irrigation, cascade operation rules, potential liabilities associated with existing structures, and so on)—factors that constituted an obstacle to potential participants, several of whom abstained from bidding. Those bidders that did not withdraw expressed concerns with these uncertainties and with the government's reluctance to address them during the discussion phase.

This is a section of the Drin River that will form the intake of the Ashta plant. The three existing Albanian hydro plants located on the Drin have a total installed capacity of 1,350 megawatts, representing 83 percent of the country's total hydro capacity, and accounting for 98 percent of its national energy production. (Photo by Tullio Marrama)

In June 2008, two international investor groups (Verbund of Austria and a consortium of Electrabel of Belgium and Compagnie Nationale du Rhône of France) submitted technical and financial bids. In early July 2008, Verbund was selected as the winning bidder, and the contract was signed two months later.

Lessons Learned

1) Projects require definition—and sometimes redefinition.

Hydropower plans are extremely location- and design-sensitive. Consequently, unless the project to be developed has already been defined to a degree sufficient to estimate with some accuracy its costs—including the expenses required to mitigate its social and environmental

impacts—as well as its predicted benefits, it becomes impossible to consider a PPP approach until its engineering, economic, social, environmental, and other features have been properly established. In the case of Ashta, the concept had already been well studied, but it still was necessary to review previous findings by means of technical due diligence. As a result, IFC proposed a design that avoided the environmental and social flaws of the original Bushati design. We also proposed renaming the project "Ashta" so as to provide it with a new "face" and cut links with the past environmental and social issues. This turned out to be a very good move and a great example of how proper marketing and management of public attitude can play a key role in making a project with a difficult history happen.

2) Something's gotta give…. We have to understand the client's objectives—and help the client understand what is realistic.

Initially, the government wanted the entire output of the new hydropower plant to be subject to an off-take agreement between the future operator and the state-owned generation company. The government also insisted on having the highest possible installed capacity—in the 60–70–megawatt range—at the lowest possible tariff.

The reality in the case of a run-of-river plant, such as Ashta, is that there is usually a tradeoff between the maximum installed capacity and the minimum tariff level, since these plants lack a storage reservoir that would allow regular water releases and ensure optimal energy outputs. In practice, such plants benefit from economies of scale only up to a point: Once the plant reaches the size at which it has the lowest production cost per kilowatt-hour, installing additional capacity simply increases the project cost without achieving correspondingly higher benefits.

The IFC team analyzed various alternatives and explained their advantages and drawbacks to the relevant stakeholders. Our estimates indicated that the lowest production costs per kilowatt-hour would be achieved with an installed capacity of 40–50 megawatts. METE finally agreed to have the off-take price as the most important evaluation criterion, so long as the total installed capacity was not allowed to fall below 40 megawatts. IFC's assumptions turned out to be right, since the winning bid offered the lowest tariff at the installed capacity of 48.2 megawatts.

3) Don't forget about the bidders: Understand their concerns and work with your client to address possible issues.

Being the most downstream plant on the Drin cascade, the Ashta plant is totally dependent on water releases from the plants upstream. So the winning bidder was understandably concerned that the state-owned generation company might retain water in its reservoirs for extended periods and release it at times when it would be most advantageous for energy trading purposes (for example, at peak-power times). Since Ashta has almost no storage, extreme water releases upstream would spill over the weir without producing any electricity—negatively affecting the project's economic performance and potentially causing extensive flooding of neighboring villages.

The IFC team assisted in drafting a Cascade Coordination Agreement between the winning bidder, Verbund, and the state-owned generation company, to ensure fair and transparent rules for cascade regulation and safety management. The agreement provides for regular water releases under normal flow, and sets clear rules for information sharing and crisis management in case of extraordinary events such as floods. Verbund considered this issue a deal breaker and wouldn't have signed without the agreement.

4) It is extremely difficult to pre-negotiate a perfect contract that will fit all possible scenarios.

In IFC Advisory Services, we usually try to pre-negotiate concession contracts with interested investors to the maximum possible extent prior to the bid submission date, so as to ensure transparency and avoid lengthy post-award negotiations (during which the granting authority is in a less favorable bargaining position). All prequalified investors are invited to submit comments to the contractual documents, which are then reviewed and accepted (or rejected) by the client and its advisers. This iterative process is usually done in two rounds, combined with the bidders conference, where such comments are discussed with all prequalified investors in a transparent manner.

In the case of Ashta, many investors were reluctant to comment on certain technical aspects of both the concession agreement and the off-take agreement, fearing that they would disclose confidential information. As a result, the contractual documentation was fairly advanced from the commercial point of view, where all investors seemed to be in relative agreement, but was very general from the technical side. Technical language (such as metering, scheduled outages, construction process) was based on the baseline project design that IFC and its consultants prepared for the tender.

The winning bid presented by Verbund included an innovative solution based on the StrafloMatrix™ technology—a new concept for developing hydropower at low-head sites where dams, weirs, or canals already exist. Projects that may not be financially viable, based on conventional turbines and generators, may now be developed using this method. The StrafloMatrix™ design relies on a factory-assembled grid, or matrix, of standardized generating units. Complete modules, including all the associated mechanical and electrical equipment, are shipped to the project site, where they can be readily installed into existing structures with minimal civil works required. The advantages of this concept are its 1) low investment cost, 2) easy and inexpensive maintenance, and 3) shorter construction periods, compared to conventional plants. Since this approach is new and original, we spent considerable time during the final negotiations, reviewing and adjusting the project's technical details and the contractual terms to best reflect the peculiarities of the winning bid.

The principal lesson here is: When drafting and pre-negotiating contractual documents with investors, rather than getting lost in technical minutiae, the team should focus on the main commercial terms of the project, the major risks envisaged, and their allocation, as well as on a set of fair and transparent evaluation criteria. Since you never know exactly what technical solution investors will come along with, a certain degree of contractual flexibility is desirable, provided it's fair to all parties. Details stemming from different technologies can (and in some cases must) be hammered out only after the winning project is known.

5) Technical and financial bids should be evaluated separately, but if the client insists on reviewing them simultaneously, you may have to get creative to maintain objectivity in the process.

When evaluating final bids in an IFC Advisory Services mandate, we prefer to open the technical part of an offer first, to see whether it is complete, compliant with all the essential project requirements, and technically sound. If it is, the technical offer receives a "pass" score, and only then is the bidder's financial offer opened. If a technical offer receives a "fail" score, the corresponding financial offer is not opened, and the entire package is returned to the rejected bidder.

However, Albanian legislation required that both technical and financial offers be opened simultaneously and be evaluated using a predetermined set of weighted criteria in a comprehensive scoring formula.

To avoid subjectivity in the evaluation of the technical criteria, the IFC team recommended a binary approach whenever a simple and transparent grading formula could not be established. For example, an investor could receive either ten points or zero for "environmental and social acceptability of the project." Since such a project feature is either acceptable or not acceptable ("pass or fail"), saying that one offer is "more" acceptable than the other and assigning acceptability grades for it is inherently subjective. (You can't be "partly" married.)

The only financial criterion used was the off-take price per kilowatt-hour of electricity produced, leaving no room for ambiguity. But since the legislation required technical and financial offers to be opened at the same time, the evaluation committee started unintentionally leaning toward the best financial offer from the first moment. The IFC team insisted that the evaluation committee conduct a thorough technical examination of both offers before making any recommendation to the contracting authority. Several independent experts studied both offers in great detail for almost three weeks and, to the great relief of all parties involved, found both offers to be compliant and technically feasible.

6) Important issues not addressed in the early stages of the tender can have a potentially devastating effect later.

During the transaction-structuring phase, our team made a number of recommendations regarding the risk allocation and the necessary changes to the regulatory framework required to make the transaction more attractive. The Government, in an effort to shift project risks to the future concessionaire, initially refused many of these recommendations. Moreover, it also wanted to remove certain events (such as sudden tax increases) from the MAGA (Material Adverse Government Action) clause, putting the overall viability of the deal at stake.

At the same time, certain regulations (minimum ecological flow requirements, irrigation use of water, and so on) required further refinement to comply with commonly accepted standards. IFC warned the client that investors would need clear "rules of the game" for their financial modeling purposes (for example, a 4 percent versus an 11 percent residual flow requirement would have changed the economics of the project completely), but the Government did not focus sufficiently on those concerns in the early stages.

As the tender progressed and the contractual documents were pre-negotiated, most of the prequalified investors raised those same issues. After several rounds of investors' comments, the Ministry agreed to make changes to the contractual documentation (and to refine existing regulations), thus essentially saving the deal. However, delays in addressing these issues in the early stages of the project shifted the timetable and possibly discouraged some investors from bidding.

Final Word: Making Change Happen

The Ashta hydropower plant is a great example of how IFC's involvement can bring about real change by fostering innovative solutions. Our advice, perseverance, and out-of-the-box thinking helped turn an old, environmentally and socially questionable concept into a sustainable project using the latest technology in hydropower generation.