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SEVEN SISTERS: ACCELERATING SOLAR POWER INVESTMENTS

In the face of high and volatile fossil fuel prices the government of Jordan launched an aggressive national strategy to increase production of privately financed, commercial scale renewable energy. This pivot was initially met with skepticism from developers and financiers. Yet by aggregating seven small, individual solar power projects into a single, standardized financing structure—the Seven Sisters—the country was able spread costs, shorten timelines, and ultimately attract the necessary financing and developers to make the effort a reality.

The Hashemite Kingdom of Jordan, dependent on fossil-fuel imports to meet its energy needs, faced severe energy shortages and rising costs due to disturbances related to the Egyptian political transition that began in 2011. This led to the long-term disruption of Jordan's natural gas supply from Egypt, which had provided cheap fuel for 80 percent of the country's power generation. The increased costs of expensive diesel substitutes led to significant losses for the national distributor and single buyer, NEPCO, as costs were not proportionally passed-through to end-user tariffs.

Looking to reduce its dependence on imports, the government reinvigorated its renewable energy program to promote Jordan's enormous solar and wind potential, ease budgetary pressure, and help meet the expected 8 percent annual growth in energy consumption.

In the early 2000s the Jordanian government twice attempted to pre-package and tender wind farm sites. Its well-regarded independent power plant tender model, however, proved overly rigid and slow, and in 2010 the government shifted to a direct proposal scheme. This allowed it to outline goals and basic structure, while giving developers the freedom to choose sites, technology, and certain specifications.

The shift to direct proposals increased flexibility in identifying and developing better suited sites using the most advanced technology. In turn, this reduced the government's burden, allowing it to process projects more quickly. Freed to their own initiative, developers began to submit proposals for multiple wind and solar projects across the country.

The 117 megawatt Tafilah wind farm became the first project under this new regime as well as the first privately financed, commercial scale renewables project ever implemented in Jordan. As such, Tafilah served as a model to further refine and optimize the new proposal process and regulatory regime. IFC served in multiple roles for the project, and through this process IFC and NEPCO strengthened their relationship, allowing them to engage constructively to implement the regulatory and legal reforms necessary to ensure best practices and the overall bankability of the structure.

Following Tafilah, the government launched the wider renewable program, focusing first on solar photovoltaics. Such projects employ relatively simple technology and fast construction times and thus were fast-tracked in the first round and offered a fixed feed-in tariff basis set at an attractive 16.9 US cents per kilowatt hour to encourage participation. Twelve direct proposals totaling 201MW were eventually approved. Together, this amounted to the largest solar photovoltaic initiative in the region at the time.

Many Small Projects

From the outset, due to the projects' many shared similarities and the complexity of negotiating so many proposals simultaneously, IFC encouraged the developers to act in unison through a local industry association. That way IFC could provide consistent, free advice to all participants during the formative negotiations that eventually defined the final power purchase agreement and other supporting agreements with the government.

In the context of project finance, the twelve projects were small, generally ranging from 10 to 20MW installations. As a result,

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each would have struggled to bear the high transaction costs and long timelines involved in finalizing such complex deals. Financing would have been hard to attract and overly expensive, as lenders are typically less interested in such small ticket sizes.

Furthermore, the project sponsor groups represented various consortiums of local companies with firms from around the world that were either new to the industry or region, or otherwise lacked international project finance experience. This inexperience was compounded by financier skepticism of the government's commitment to renewables generally and to the twelve small projects specifically, which together represented a small proportion of Jordan's generating capacity.

Initially, project development proceeded haltingly as each developer dealt with these challenges. However, through its relationships with all relevant parties—the government, NEPCO, the developers, and regional and international financiers—IFC developed a proposal to unify as many of the twelve similar projects that were willing under the umbrella of a common financing program, with IFC acting as the common mandated lead arranger to simplify the process.

The logic was straightforward even if the details were not: Aggregating the individual projects into one simplified, standardized financing structure made the projects more attractive in syndication, shared their common costs, leveraged efficiencies of scale, and strengthened their negotiating position. This innovative structure was well received, as seven of the twelve projects developers agreed to buy in to the standardized structure, with each project getting equal terms and benefits.

The IFC proposal—affectionately dubbed the **Seven Sisters**—financed seven projects in Round 1 with a total capacity of 102 MW in three locations across Jordan. That included five side-by-side solar plants in Ma'an executed by different sponsor groups formed from across the globe.

Seven Sisters Solar Projects

Project Name	Site	MWp
Adenium 1	Ma'an	11.0
Adenium 2	Ma'an	11.0
Adenium 3	Ma'an	11.0
Arabia One	Ma'an	11.5
Falcon Ma'an	Ma'an	23.1
Jordan Solar One	Mafraq	24.0
Shamsuna	Aqaba	10.1

MWp refers to the solar power capacity at peak generation in direct current

For IFC to act as the coordinator and intermediary between the five developers and the government and financiers, a high level of trust among the developers was necessary. That entailed common project documents, no-frills financing with each party receiving the same terms, and rapid timelines with a single window for negotiations with financiers. Yet by adopting a one-size-fits-all, fast-tracked structure, the Seven Sisters developers addressed their most pressing challenge—reducing prohibitively high individual transaction costs exacerbated by long timelines. It allowed them to share costs and resources such as administrative overhead, legal fees, sector experts, and even site security. As a result, project costs were ultimately more proportionate to project size.

By acting collectively, the group was also able to better negotiate terms with external partners. IFC played an intermediary role between the developers and NEPCO, helping to standardize the language on common issues such as the construction of a new sub-station for the grouping of five plants in Ma'an and ensuring that the power purchase agreements allowed for bankable projects and future syndication.

Soliciting financing as a group secured more competitive terms than any individual project could have achieved. Furthermore, if twelve projects had competed for funds, lenders could have "cherry picked" the best and largest, while taking more time so that all projects would have incurred higher costs.

Easing Lenders' Concerns

Lenders were also able to price for larger volumes and spread internal costs across a larger portfolio of assets. IFC's imprimatur eased lenders' concerns about the developers' inexperience and their lack of previous working relationships. In addition to financing, collective negotiation allowed the developers to receive better pricing from their suppliers.

As mandated lead arranger, IFC ultimately provided $91.5 million in senior loans, sub-debt, and interest rate swaps while successfully syndicating an additional $115 million from six regional and developmental banks. Tenors were 17 years, seven years longer than available locally. Some of the projects' international developers insured their equity investments against perceived political risks with political risk insurance from the Multilateral Investment Guarantee Agency.

In line with the objectives of speed and simplicity, the projects were appraised, approved, syndicated, and signed within four months of the mandate. All of the Seven Sisters projects entered into their power purchase agreements with NEPCO in March 2014, mandated IFC by May 2014, and completed finance by

October 2014. Depending on size and location, the individual projects were commissioned between February and September 2016.

As mentioned above, the Jordanian government's several false starts created some initial skepticism about its commitment to aggressively develop its renewable energy sector through the launch of a direct proposal program. While Tafilah's success under this model was indeed a turning point that set the stage for the launch of the program on a mass scale, it had also been a single project large enough to stand on its own merits and absorb the requisite time and development costs.

It took the successful, innovative implementation of the Seven Sisters projects, together with the other Round 1 photovoltaic projects, however, to put an end to such skepticism. This demonstration proved the commitment of both the Jordanian government and the financing community to the implementation of an industrial scale renewables program accessible to developers of all size.

Jordan has already reaped the fruits of its efforts. In 2015, due to the unprecedented investment demand for renewables generated from Round 1's success, rather than offering a pre-determined feed-in tariff, the government instead opted to tender the four planned 50MW Round 2 projects on a competitively bid tariff basis—thereby benefiting end consumers.

Not only did the government receive a record number of proposals, they were also priced with some of the most globally

A Seven Sisters photovoltaic solar power project in Jordan

competitive tariffs then offered, ranging from 6 to 7 US cents per kilowatt-hour. Those tariffs were significantly below Jordan's cheapest sources of power generation at the time.

Round 2 has already seen the extension of the Seven Sisters standardized financing program to an eighth sister that, at 50MW, will be larger than its predecessors. It is evidence of the efficacy and benefits of standardized model, even as project sizes increase.

The success of solar photovoltaic and project standardization in Jordan's Seven Sisters together demonstrate how renewables can provide a sustainable and affordable energy supply for the region going forward. ■

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