Win

How Public Entrepreneurship Can Transform The Developing World

M. Fouzul Kabir Khan

WIN

Also by M. Fouzul Kabir Khan

Financing Large Projects

(with Robert J. Parra)

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M. FOUZUL KABIR KHAN

To my grandsons
Orion and Emir
for turning the autumn of my life into spring

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PREFACE

The best way to begin reading this book is to understand its main title, "Win"—especially the first letter of the word—W. When we think about "Win," we visualize something like an upward arrow. However, the first letter of win—W tells us that the letter also involves downward arrows. In other words —to win, one must follow the fall-rise-fall-rise sequence. This pattern is true irrespective of whether it is private or public entrepreneurship. When Steve Jobs returned to Apple in 1997, Michael Dell famously trashed the Company. In reply to a question about what he would do with Apple if he were in Steve Jobs' shoes, he replied —'would shut it down and return shareholders' money.' In reality, though, the fall-rise-fall-rise sequence is often more associated with collective endeavors: public entrepreneurship.

No wonder we frequently hear about fascinating stories of individuals and entrepreneurs. That is why Bill Gates, Mark Zuckerberg, Jeff Bezos, Elon Musk, Jack Ma, and Narayana Murthy are household names, and their astonishing accomplishments have inspired millions all across. Indeed, their hard work, creativity, dynamism, and risk-taking qualities are emulated widely by those striving to achieve spectacular success.

By contrast, we do not hear much about accomplishments resulting from collective public efforts. In other words, what we call public entrepreneurship is not something that evokes many positive reactions. Indeed, it is a relatively new addition to our taxonomy. People usually associate the public sector with corruption, lethargy, and inefficiency. Not surprisingly, the term public entrepreneurship itself is frequently regarded as an oxymoron. Despite such perception, however, public entrepreneurship has produced many significant outcomes, such as the Marshall Plan that led to the accelerated recovery of Europe after the Second World War, the space program of NASA in the 1960s, sending people to the Moon, and spearheading subsequent missions to Mars. Furthermore, public entrepreneurs promoted the Oral Rehydration Solution, leading to a remarkable reduction in diarrheal death across the developing world.

What distinguishes private entrepreneurship from the public is that the former focuses on the highly motivated individual(s), innovators,

investors, dare-devil risk-takers, and often reap astronomical personal fortunes. On the other hand, public entrepreneurship comprises a group of people who combine public and private resources to achieve specific social objectives. Their reward is mostly limited to personal satisfaction and sometimes social recognition.

Public entrepreneurship should not be confused with public service. To clarify, public entrepreneurs are not civil servants and hence enjoy more operational freedom. However, the treasury meets their capital requirements, but they have to meet current expenses from normal commercial operations and are expected to provide dividends. It is also different from public-private partnerships in broader applications, stakeholders, and government roles.

Billions of dollars of public resources (from both government and foreign donors) are invested in developing countries by public entrepreneurs to provide energy access, transport network, healthcare, sanitation, education, and environmental protection with varying degrees of success. We have a collective stake in making such efforts successful. Our development narratives are weaved on aggregates such as gross national income per capita, life expectancy, years of schooling, energy consumption per capita, and other indicators. Unfortunately, those indicators are often viewed as misleading and vague and do not provide many clues about how they are achieved.

This book is about the success of one such public entrepreneurship that follows the W pattern mentioned earlier. It narrates Infrastructure Development Company Limited's (IDCOL) journey in Bangladesh and how it struggled in its formative years to meet its mandate of financing medium and large infrastructure projects. However, amid the initial struggles, it found unexpected success through another program—Solar Home System—that helped transform the lives of millions in remote Bangladesh. Nonetheless, this successful program ran into difficulties, casting a shadow over IDCOL's prospects. Thankfully, it bounced back with the success of what it initially set out to accomplish—financing medium and large infrastructure programs.

The book is a product of a first-hand account by the Company's first full-time and long-serving CEO (1998-2007), who oversaw its growth and the difficulties it encountered over nearly ten years and then as a director of the IDCOL Board for two years. His active involvement provided him the ability to see how public entrepreneurship grows through different stages and the problems it encounters along the way from various stakeholders with varying interests and motivations—government, donors, NGOs, and the private sector. In sum, the book may be called *views from*

the trenches, fighting perceptions, let-downs, and facing crises, camaraderie, failures, and success.

The book can be used in business schools as case studies in marketing and finance courses and development economics courses as examples of innovations in delivering public services, challenges of donor relations, and structuring renewable energy programs.

The book is not intended to be a prescription for success. However, it is hoped that a dispassionate description, analysis, solution, and the book's appendices could help other public entrepreneurs navigate the challenges they might face in achieving their desired outcomes.

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CHAPTER 1

A HUMBLE BEGINNING

When I want to understand what is happening today or try to decide what will happen tomorrow, I look back.
- Omar Khayyam

In Bangladesh, August is a month that overlaps monsoon and summer; it is also a time when sweltering heat coupled with humidity often makes life unbearable. One day, in August, I traveled to a village in Satkhira in South-Western Bangladesh to see for myself a Solar Home System (SHS) financed by IDCOL. When I reached the place, the sun was blazing down, and earlier in the day, it had rained, and the unpaved rural road was still wet and muddy. I was wearing a pair of sneakers, the bottom of which was covered with mud and hay. After reaching the house, I saw the housewife had just finished paving and painting her yard nicely with liquid mud. Having noticed this, I took off my shoes as the mud and hay mix in the sole would ruin her hard work. My companion, an NGO worker, explained the purpose of our visit, and she came running and said, "You do not have to take off your shoes. We lived in darkness all our life. You brought electricity to my house, and therefore you are an idol to me, and I want to worship you." Overjoyed, she ushered me into her humble tin-roofed, Bamboo-walled home, offering us a green coconut drink.

As we sat down to talk about how the solar system had benefited them, she explained it had extended their working hours and enabled her children to study in the evening with greater ease. Moreover, they were now able to watch television, a coveted source of entertainment. Simultaneously, the lady now felt safer going out to respond to nature's call, and more importantly, it relieved her from the arduous chore of cleaning kerosene lamps every evening. Her family paid for the SHS. We had just made the system available and affordable—only a small contribution—that made a big difference in their lives, I thought.

On our way back, I saw how I spoiled her neatly done yard with my shoes, apologizing for ruining it. "Do not worry, I will redo it happily," she replied enthusiastically.

Born in Sandwip, a remote, nearly inaccessible island in Bangladesh, I have first-hand experience of deprivation due to underdevelopment. I have both been a student and teacher of development economics at home and abroad, but now I could see development manifesting in front of my eyes in a way that my teachers and I could not convey to our students. The woman's story in Satkhira highlights what development can do in real life to the millions of underprivileged: women emancipation, education, healthcare, safety, and opening of a window to the rest of the world. The following is a story of the transformation of millions of lives in remote Bangladesh that also holds hope for others struggling to provide electricity in many countries of Asia and Africa.

It is perhaps noteworthy here that more than a century ago, Dhaka, now the capital of Bangladesh, was a regional backwater in former British India. Yet you may be surprised to learn that despite its backwardness, Dhaka's electrification began as early as 1901, just 13 years after London and 19 years after New York. After Bangladesh emerged as an independent nation on 26 March 1971, its Constitution emphasized, among other things, rural development and agricultural revolution through electrification. To that end, the government created the Bangladesh Rural Electrification Board (BREB) in 1977.

However, in 2002, one hundred one years after Dhaka first got the taste of grid electricity and 25 years after the introduction of a formal rural electrification program, access to power in Bangladesh remained as low as 36%, covering 78% of urban and 24% of the rural population. In addition to the low coverage, the country's electricity situation remained dismal mainly because of insufficient generation and a flawed distribution system, contributing to low per capita consumption. During that period, the electricity generation capacity was only 4,230 MW. Still, in reality, the usable capacity was only 3,218 MW,[1] just 77% actual generation, as a significant number of the power plants were old and worn. Plagued by the low tariff, rampant corruption, and mismanagement, utilities had to be supported through massive subsidies. Against the per capita global consumption (2,433 kWh) and South Asia (373 kWh), Bangladesh's share was a meager 121 kWh, similar to that of Africa.

Electrification Scenarios in Bangladesh and West Bengal, India, in 2013

[1] Pakistan, a country with a similar population and size, had an installed capacity of about 15,000 MW.

Overall, the electricity system in 2002 was fragile due to depleting primary fuel (natural gas) needed to produce power, absence of adequate generation capacity, and weak transmission and distribution network. It had been apparent for many years that an off-grid approach would also be needed to complement the efforts for expanded electricity coverage. For example, the World Bank then estimated that it would take Bangladesh 50 years to reach universal electricity access at the prevailing expansion pace.

The Genesis of IDCOL

In the early 1990s, Bangladesh opened its economy aimed at achieving a high and sustainable growth rate.[2] Multiple government initiatives, such as lifting restrictions on foreign investments, tariffs, and trade

[2] This liberalization program covered three significant components: policy reforms, trade liberalization, and tax reform (policy reforms included allowing 100% foreign investment, lowering customs duty, personal and corporate income tax rates and brackets), including introducing the value-added tax (VAT).

liberalization, created a spurt in economic activities, mainly through a robust private sector. However, before long, it became clear that infrastructure development had not been considered a priority in these initiatives, slowing the expected economic growth required to meet an ever-increasing population's needs. Besides the dismal power supply, the country lacked an efficient transportation system for moving people and goods and adequate port facilities. In short, poor infrastructure was stifling economic growth, making exports less competitive and the domestic production of goods disproportionately costly.

In the early and even in the mid-1990s, *infrastructure investment* was globally viewed as a public sector activity.[3] Traditional sources of financing in developing countries–both from the government's resources and foreign assistance–were inadequate to fund the required scale of infrastructure development.[4] According to a 1997 World Bank report, the country would need a minimum of nearly US$1.75 billion annually to promote sustained economic growth in Bangladesh, which was way less than a billion-dollar the government allocated in its Annual Development Plan. The US$750 million deficit was significant, especially for a country that had a GDP of US$ 48.24 billion (US$ 401.50 per capita) at the time.

The budget constraints highlighted the need to bring another key player into the scenario: the private sector. Governments in some developing countries such as China, Pakistan, the Philippines, Sri Lanka, and Indonesia successfully attracted foreign private investments into their power sectors. Emulating their programs, Bangladesh, in 1996, introduced *the Private Sector Power Generation Policy* to boost private participation and financing. The government also sought assistance from the World Bank to create a mechanism that would expand the availability of resources required to reduce the investment gap in electricity generation and other infrastructure projects.

Using its insights and experiences in similar projects in Pakistan and Sri Lanka, the World Bank came up with a new initiative in 1996, the "*Private Sector Infrastructure Development Project (PSIDP).*" The purpose was to develop medium and large infrastructure projects, which the government accepted as a viable option for delivering debt finance and technical assistance. Similar World Bank initiatives had proved effective

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[3] Excepting the United States, private ownership of infrastructure dated back to the 1870s at the end of the Civil War.

[4] Especially considering the massive need for investment in Bangladesh in social sectors required to meet basic human needs such as potable water access, education, health, social security, welfare, and housing.

in Sri Lanka for attracting private investment into a container port development and in Pakistan to develop and implement eight power projects that more than doubled their generation capacity.

Under this project, the World Bank provided a loan of US$225 million, which would be handled by a newly created government-owned institution dedicated to financing privately-owned power generation companies and other types of infrastructure such as toll roads and private ports. Additionally, this new institution would also have US$10 million for technical assistance and training to support capacity building to develop priority projects.

All this was focused on encouraging the private sector to develop, finance, and implement infrastructure in conjunction with the new institution(s). The new institution was designed to enhance any given project's attractiveness to the equity participants (owners) and other lenders. The government and the World Bank decided that this new, yet-to-be-named institution would participate in projects through loans subordinated to the senior lender (usually, a foreign bank). With the fledgling company acting as a safety-net, risks to private investors would be lower. Credit enhancements such as these would make the task easier for attracting foreign lenders and external or domestic investors.

To support infrastructure projects' financing, the government created two institutions: *Infrastructure Investment Facilitation Center (IIFC)* and *Infrastructure Development Company Limited (IDCOL)*. The coordinating institution for infrastructure project development would be IIFC, a core advisory services unit equipped to work with various government agencies to identify desirable projects and validate their commercial feasibility. IDCOL, a non-bank financial institution, would partner with private developers and commercial lenders to mobilize the financing required to implement and operate these projects. The World Bank designed a symbiotic relationship between the two institutions to focus on the functional distinctions between IDCOL and IIFC.

Wholly owned and run by the government, IDCOL began its operations in 1997 with the primary responsibility of financing medium and large infrastructure projects. However, in 2003, another project, unrelated to its principal objective, was added to its portfolio: promoting and financing Solar Home Systems (SHS) in remote areas (detailed in chapter 5).

The company started with a nominal paid-up capital of less than US$2,000 in 1997, but by 2020, its capital, equity and reserves rose to US$110 million, a 55,000-fold increase.[5] The number of personnel

[5] For simplicity, an average exchange rate of one US dollar = 78 Bangladeshi takas is used throughout the book.

increased from only five in 1998 to 403 in 2020. Over this period, IDCOL paid out a total of about US$90 million in cash dividends and bonus shares to its shareholders, more than 20-times the invested capital of US$4.5 million.[6] By 2020, it had disbursed US$1.68 billion in loans, of which US$640 million went to renewable energy and US$520 million to conventional electricity generation projects with a total capacity of almost 2,600 MW. Besides, IDCOL has also invested US$523 million in other medium and large infrastructure projects such as land-ports, telecommunications, and LNG terminals. It has leveraged financing of infrastructure projects worth US$3.5 billion, including renewable energy in the form of equity contribution, debt financing from other banks, grants, and loans from various development partners.

To date, IDCOL's most successful project had been the development of a Solar Home Systems (SHS) program in 2003. The project was initiated by the World Bank's Rural Electrification and Renewable Energy Development Program (REREDP). Other multilateral and bilateral development partners such as the Asian Development Bank, Islamic Development Bank, KfW (Germany), and Japan International Cooperation Agency (JICA) came forward to support it later. This program is now cited as the most successful SHS program globally by the World Bank and the Asian Development Bank. Over 15 years (2003-2018), it has provided off-grid electricity access to approximately 18 million people (12% of the population) by 2018, with the installation of 4.13 million SHSs in remote, rural areas. Before IDCOL, 8,000 SHSs had been installed in Bangladesh by the private sector, NGOs, and microfinance institutions. Indeed, as indicated by the data provided above on equity growth, dividend earnings, and market expansion, IDCOL's performances are significant by the yardsticks of public sector accomplishment and comparable to private sector performance.

IDCOL initially struggled but eventually flourished in the unlikeliest of circumstances. An objective appraisal of IDCOL's success will be incomplete without acknowledging some essential facts:

- IDCOL flourished despite operating amidst a deep-seated culture of inefficiency and public trust abuse widely believed to be expected in the region.

[6] As discussed in chapter 3, additional equity contributions of US$ 4.5 million were made by the government in 2003.

- It worked seamlessly with NGOs, private businesses, and academic institutions, although government-owned institutions, both globally and in Bangladesh, are often wary of working with such partners.
- It contributed to increasing access to basic electricity in Bangladesh's remote rural areas, a social function that is rarely performed by financial institutions anywhere in the world.
- While other institutions look for donors to support their programs, all the donors active in Bangladesh were keen to join IDCOL's SHS program to get a piece of the proverbial cake.
- It has evolved into a permanent agency in Bangladesh even though it was designed to have a finite life as a donor-funded project facilitator. The initial closing dates for large and medium infrastructure financing and renewable energy financing projects were scheduled to be in 2003 and 2006, respectively. However, since the institution is still successfully serving useful social functions, IDCOL continues to operate today.

IDCOL, for all its financial needs, had to rely on both the World Bank and the government, two bureaucratic behemoths. This reliance could have stymied IDCOL's operations. Fortunately, though, it did not happen as IDCOL has been allowed to operate independently and, more importantly, because it has delivered results despite being a public institution. It was made possible by its exemplary collaborative efforts consisting of NGOs, microfinance institutions, academic institutions, and private businesses.

The story of IDCOL is a story of public entrepreneurship, about how a nascent government-owned financial institution in a developing country promoted private sector infrastructure financing and renewable energy. A journey that began as far back as 1997 and continues to this very day. This book attempts to record the progress made so far and highlight the struggles the institution experienced during its fledgling years, the success soon after, and the challenges in maintaining a high standard of operation over a sustained period.

This book is the story of the people and events that have led to this outcome.

CHAPTER 2

TREADING A NEW PATH

Two roads diverged in a wood, and I–
I took the one less traveled by,
And that has made all the difference.
-Robert Frost

Before I joined IDCOL, a senior bureaucrat in the Economic Relations Division acted as the part-time chief executive of the Company. When IDCOL advertised a vacancy in *The Economist* for the CEO position in January 1998, I applied. The Company also created a search committee (the equivalent of a headhunting company in the private sphere) to conduct a fair and transparent recruitment process. I had been fortunate to have been selected from among many well-qualified candidates from different parts of the world.

As I look back, I must confess that I was not very confident about my candidature. After all, as a career civil servant, I had no training in private finance nor any experience to speak of in this area. Until then, my only relevant professional experience comprised nothing more than preparing a financial appraisal for Jamuna Multipurpose Bridge. It was a billion-dollar donor-funded public sector project that connected the economically depressed northern part of Bangladesh with the capital Dhaka.

One day, I received a call from the Chairman of IDCOL, who also happened to be the top official at the Economic Relations Division, asking me to see him. During the meeting, much to my surprise and considerable delight, he congratulated me on being selected as the first full-time CEO of IDCOL. After we exchanged a few pleasantries and thoughts about the new job, he asked me if I could give him a draft of my appointment letter as IDCOL CEO.[1] Looking back, I now realize that this was my final test before being offered the job. By being asked to prepare my appointment

[1] The government had no previous experience in making such offers

letter, I was asked to elaborate on how I would define my duties and what was expected from the new organization.

I did not have a clear idea about the format of the appointment letter of the CEO of a private firm. Therefore, I contacted my friend at a multinational company in Bangladesh and asked if he could help. He sent me a copy of a CEO's appointment letter from his organization (after deleting all confidential information). Based on this copy, I prepared a draft of my appointment letter and subsequently delivered it to the Chairman. Interestingly, before I had the appointment letter in hand, I received a call from a journalist at *The Daily Star*, a local newspaper. I knew him professionally. He asked me over the phone,

"Have you been selected as the CEO of IDCOL?"

I said, "yes."

He continued, "Look! We have received some allegations against you. Someone sent us an anonymous letter and requested us to publish a news story based on that."

"What kind of allegations?" I asked him in bewilderment.

He answered, "It says that your political ideology is opposed to the present ruling party's."

"Okay," I paused a little bit, "what are you going to do then?"

We will not publish it as the letter did not provide any verifiable evidence supporting the allegations. But mind you! They must have sent the letter to other newspapers and influential people as well."

He was right. A few months later, I met the top civil servant at the human resources ministry, who had also received similar complaints. He also did not pay any heed to it.

In Bangladesh, and perhaps in many countries where politics is often contentious and divisive, it is not uncommon for vested interests groups to lobby for putting their people in positions of power and influence to gain undue advantages. That is what happened in my case, as some people had attempted to derail my appointment. It was not a propitious start, and I often wonder, even long after my retirement, how things could have turned out both for IDCOL and me if they had rejected my appointment based on such allegations.[2]

Starting from Scratch

[2] This episode may seem trivial, but around the same time, a ministerial committee recommended me for an appointment as Commercial Counselor at Bangladesh Embassy in Washington DC. My detractors succeeded in torpedoing the appointment by influencing the authorities. I have no regrets about that.

Before I joined IDCOL in 1998, the institution existed only on paper. My first job was to hire the necessary human resources, find an office space, and procure furniture and other stuff needed to get going. Shortly afterward, we found an office space in the 20-storied Islamic Development Bank (IDB) Building (IDB Bhaban) at Agargaon in Dhaka. It is an impressive architectural structure, jointly owned by the government and IDB-Bangladesh Islamic Solidarity Educational Waqf. We liked the place and quickly signed the lease agreement despite it being a little costlier. With no time to waste in the cumbersome procurement process needed for any government purchase, I brought some chairs from my home. I borrowed a discarded computer and a dot-matrix printer from the World Bank Dhaka office so that we could immediately hit the ground.

Initially, we were only three people at the office and could hear each other's voices reverberate around the rooms, as the vast space making our conversations quite eerie and difficult. I had no workforce to go through a formal procurement process. As we needed to start the real work urgently, we bought furniture from the Bangladesh Forest and Industrial Development Corporation, a government-owned furniture manufacturing company, avoiding the mandatory, exhaustive, and time-consuming tendering process.

After about three months, I met a delegation from the World Bank. Its leader informed me that IDCOL had been modeled after a similar Bank-supported project named *Private Sector Infrastructure Fund (PSIF)* in Pakistan. Out of curiosity, I asked how that institution was doing.

"Not very well, unfortunately. The PSIF CEO is in jail on corruption charges," he said.

"Oh, no! I interjected. It is not so comforting to hear that my counterpart has been incarcerated!" Frankly, I felt somewhat relieved that I would not face any such charges because we leased a property owned jointly by the government and a multilateral bank and purchased furniture from a government organization, meeting the legal requirement.

During our meeting, he told me, "Look, you are going to work with some of the finest lawyers, economists, engineers, and other professionals working in the field of infrastructure financing. So, you must maintain high standards of efficiency at IDCOL." He assured me that the Bank would provide the necessary technical assistance to IDCOL.

Creating an Island

After this meeting, I was convinced more than ever that my team and I had to ensure a highly efficient and corruption-free environment to meet

up the expectations of the government, the Bank[3], and other stakeholders. Otherwise, IDCOL was doomed to meet the same fate as its peer in Pakistan. Therefore, we resolved to create an environment where efficiency and incorruptibility would be guiding us from the very start. Working toward such a vision seemed utopia at that time but was still worth striving for, considering that the future of IDCOL hinged on it. However, how could we create such an institution?

First, we decided to institutionalize the culture of transparency at IDCOL, as institutional corruption is often embedded in the opaque operational procedures. We also needed to ensure that our island remained unaffected by the pervasive inefficiency and corruption that most institutions suffer from. To do so, we had to ensure that the perennial problems of Bangladeshi politics—the system of patronage and nepotism—would not be allowed in IDCOL. With these thoughts in mind, I proceeded with the recruitment of staff for the budding organization.

Building the Team

The first big challenge was to recruit the right people and placing them in the right positions. We already had a structure for IDCOL, modeled after government organizations that included a private secretary to the CEO and some support staff such as a driver for the Company's transport and a dispatch rider. I revised that structure and instead opted for something that would provide incentives like private businesses to make IDCOL leaner, efficient, and less bureaucratic.

We also decided to appoint all employees of IDCOL on a contractual basis as opposed to tenured appointments that were characteristic of government jobs. Instead, the employees would receive compensation packages like those in the private sector. At the same time, I decided to scrap the private secretary's post because I thought it was redundant in a nascent organization like IDCOL. I submitted a revised proposal, including compensation packages, for the approval of the Board. On the proposed packages, a member of the Board who happened to be the top official of the energy ministry quipped, "Fouzul, your young staff will receive a higher salary than me. Maybe, we should restart our careers at IDCOL!" The revised structure was finally approved mainly because of the recommendation from three top business people on the IDCOL board.[4]

[3] The word ‘Bank,’ beginning with the capital letter B refers to the World Bank throughout the book.

[4] Seven members of the IDCOL Board comprised three Secretaries from the government, three leading business people, and the CEO of IDCOL.

Since formal recruitment would take some time, I recruited an engineer, an accountant, and an office support staff temporarily to facilitate our work. We hired them on the condition that they would eventually have to go through a competitive recruitment process conducted by an independent agency before getting a regular contractual appointment.

During the recruitment process, I faced an absolute dilemma regarding how I can balance efficiency and experience. As we all know, efficiency comes with experience. However, I also knew that if I hired experienced people, there would be a risk that they would bring their baggage from the past: lethargy and inefficiency, not to mention their penchant for corruption. Therefore, I decided to bring in talented fresh graduates, train them, and instill values to compete according to global standards. To ensure a transparent, fully independent recruitment process, we discouraged all forms of canvassing. Occasionally, there were pressures from influential quarters to recruit specific individuals. With the Board's support, I was able to resist such pressures and keep the process clean.

We also outsourced the prospective candidates testing to a renowned academic institution to preserve the examinations' integrity. We tested the candidates on their verbal abilities and proficiency in their respective disciplines. For the interviews, we called all the candidates securing marks above a cutoff point. One such candidate was Rahat Zaman. Rahat had previously taken a course on International Trade and Finance with me at the North-South University in Dhaka.[5] Although I was a member of the interview board, I recused myself from the interview because Rahat was my student. He got selected solely on merit and joined IDCOL as an Investment Officer. A few months later, he told me that he had collected my phone number before the interview but could not muster enough courage to call me. "Glad that you did not," I told him. We selected the top five applicants based on the total scores in written tests and interviews. The two professionals, who were already working for IDCOL, also went through the same recruitment process, as stipulated in their temporary employment contract. The accountant qualified, but unfortunately, the engineer did not. I felt sorry for him because he made useful contributions in the initial days, and I had developed some likings for him. I later thought that he could have been given another opportunity, but the strict, unbiased recruitment process could not be compromised.

I must hasten to add, though, that sometimes, we did face some problems that had nothing to do with the candidate's merit despite our best efforts. One such case involved the final selection of a female candidate –

[5] I had obtained permission from the government for this moonlighting to supplement my meager government salary and keep my academic interests alive.

a graduate of the prestigious Institute of Business Administration (IBA) under Dhaka University. She scored the highest marks in the written exam and was called for an interview. However, before her interview, a member of the recruitment committee whispered into my ears that he had reservations about hiring her because she belonged to a faith (Hindu), which is not the dominant religion of Muslim-majority Bangladesh. I told the member of the committee, "Look, Sir; she has been called for this interview for a reason. She scored high marks in the written exam. We should conduct a fair interview, and if she performs well in the viva, we should hire her without any reservation." However, the member was unmoved. I tried not to escalate the situation, but neither would I be a part of this candidate's discriminatory treatment. So, I offered to recuse myself from the interview. I told the recruitment committee and Board chairman, "Let the committee make its decision without me, and I will accept its verdict." However, the Chairman would not accept my recusal. Instead, he told me, "You are the one who will have to work every day with the recruits, not us. We cannot conduct the interviews without you. You have to sit with us." Thus, I was a part of the panel that conducted her interview.

She performed very well and was hired strictly on merit.

In the Crucible

We tried to instill and nurture good work ethics in our employees to propel them to deliver their best. I often told them, "*Once you enter this office, forget about the rest of Bangladesh. The standards we follow here are global.*" People were encouraged to be punctual and leave the office late if required to leave nothing pending for the next day. We shunned mediocrity and strived for excellence in our work.

We followed three principles to get the Company going.[6] We tried to get *disciplined people*—the right people on the bus (and the wrong people off the bus) before figuring out how to move forward. We initiated *disciplined thought* by confronting the brutal facts yet never losing faith. We were not naively hoping that a miracle would happen but faced the harsh reality and moved forward with an unwavering belief that we would prevail—not just survive, as a great entity (detailed in chapter 3). We tried to develop a culture of *disciplined actions*, where people simultaneously had freedom and responsibility, and they did not need to be micro-managed. People were willing to do what was required, had a high degree of self-discipline, believed in what they did, and knew what they

[6] Collins, Jim, *Good to Great-Why some companies make the leap and others don't* (Random House, 2001), page 114

and the Company were about and where they were taking it to. They did not need to be hammered or coaxed daily to deliver their best as they already knew what they were expected to deliver.

All these may have been overwhelming for young professionals and gave them the feeling of being in the crucible! Not surprisingly, once these individuals moved on to other organizations abroad and in Bangladesh, they often credited IDCOL for preparing them to say that no challenges were insurmountable confidently, no deadline unattainable. Many of them have since become highly successful in their careers, becoming CEOs, CFOs, heads of financial institutions, power companies, multilateral institutions, and foreign commercial banks.

Here, I cannot resist telling a young professional's story, Fida Hasan Rana, who set an example of the work ethics and spirit we instilled into our staff. He was one of the first few Investment Officers we hired. In the early days of IDCOL, we all used to visit remote rural areas to examine Solar Home Systems (SHS) installations before the disbursement of grants and loans to the users. On one such trip, Fida went to southern Bangladesh and got hurt in an accident while riding a motorcycle. A doctor treated him at a local hospital, and he was able to move. I came to know about it from our partner organization and called him to say that he should return to Dhaka by plane from Jessore if necessary. Fida was a junior officer and was only entitled to travel by bus or train. I told him I would approve his air-travel, as this was a matter of urgency. Despite my assurance, Fida returned to Dhaka by bus after completing his work, even though he was injured! Fida, and the entire IDCOL staff, did not need to be motivated by someone. Fida believed in the work he was doing, was self-disciplined, and aligned his actions with the Company's work ethics.

On the other hand, there were instances when otherwise talented and high-performing staff members decided to move on or had to leave because they felt it was not the right fit for them. One such example was Shawkat Kamal, a top-employee and an asset to IDCOL. However, around his one-year work-anniversary, he abruptly informed me that he was leaving. I was a bit taken aback as I had noticed no signs of discontent in him, and so, my first thought was that he was perhaps job-hopping. I explained to him that his abrupt job change would look bad on his resume. He, however, assured me that that was not the case. He wanted to pursue a career in teaching. I asked him why he had wasted a year at IDCOL. He said that was because there had been no vacancies at the universities he wanted to teach when he had joined IDCOL. However, later a vacancy had opened up at BRAC University, and he had been accepted to teach as a Lecturer. I congratulated Shawkat on his new job. Shawkat's departure was a loss for IDCOL, but I was still glad that he was moving onto the career he was interested in. In

the long-run, it was good for IDCOL as well, since his place was eventually taken by someone else interested in the career path we had offered. Putting the right people in the right places was vital for IDCOL to succeed.

Recruitment of Investment Adviser

We assembled a small group of people from diverse backgrounds to work for a financial institution like IDCOL. I am an economist by training, and my recruits were mostly fresh business graduates without any previous financing experience. Therefore, we needed professional training and learned advice to make IDCOL work as an efficient organization. As per the agreement, the World Bank had agreed to provide technical assistance to IDCOL by recruiting an Investment Advisory (IA) firm to help us in the capacity building during its formative years. An independent search committee was formed with a senior professor of BUET, Bangladesh's top engineering and technology university, as the convener to ensure transparency. He was selected not only for his professional competence but also for his reputation as a person of high integrity.

However, problems ensued after the preliminary vetting of the 38 applications. Some of the interested companies had only sent a *Letter of Interest* without providing adequate details to facilitate the process of shortlisting. We asked these companies to send further details within a specified time-frame if they still wanted to be considered. Finally, four companies were shortlisted, of which three met the required deadline. We received the other proposal from an international firm after the deadline had expired.

The search committee excluded the late submission and proceeded with the evaluation process of the three eligible proposals. However, the firm making delayed submission appealed to the Bank, which instructed us in a rather heavy-handed way to annul the ongoing recruitment process and invite fresh proposals. Those of us involved feared that starting a new process would delay the recruitment. Furthermore, there was the possibility that the convener would quit in protest, objecting to the high-handedness of the Bank, which would lead to the dissolution of the search committee. After some frank discussions, the Bank agreed to let the recruitment process continue on the condition that the Company excluded for late submission would be considered.

Ultimately, PricewaterhouseCoopers Securities (PwCS), which applied on time, was selected as the Investment Adviser, and they were invited to negotiate the contract. During the negotiation process, we discovered that they had also been selected as the top-ranked bidder for Infrastructure Investment Facilitation Center (IIFC) advisory services contract. Selecting

the same Company as the transaction adviser to IIFC and the financing adviser to IDCOL could create conflicts of interest. Therefore, PwCS was asked to choose between these two options. It opted for IDCOL, enabling us to finalize a contract with them.

IDCOL operationalized the contract with PwCS before IIFC was fully organized, thus leading to an abnormal situation. The concept advanced by the World Bank in the two institutions' design was that IIFC would identify and develop projects by working closely with the government and the private sector. IDCOL would then consider financing those projects. The setting up of IIFC was delayed due to procedural reasons. As a result, IDCOL was ahead of it by a year and a half. During this period, IDCOL had to undertake the identification and feasibility checks of projects by themselves or rely on such studies carried out by third-parties. This glitch in project design may have caused some consternation at the Bank at the time. However, the issue did not prove to be much of a hurdle as it transpired.

Course on Project Finance

While the Investment Adviser would help us in the first three years, IDCOL needed to work independently in the long-run. The IA contract provided for both long-term Resident Adviser (RA) and short-term consultants to assist in project appraisals, preparing organizational manuals, and most importantly, in staff training. Robert J. Parra, a veteran of Project Finance,[7] was appointed the first RA. As he is known to the IDCOL staff, Bob turned out to be an excellent trainer and mentor for our young team.

We started with a training course in Project Finance. Since IDCOL had only six people and did not require additional resources to accommodate outsiders, we included trainees from the local banks and financial institutions. The move proved beneficial on two counts: first, IDCOL did not want to finance large projects on its own and had to rely on support from other financial institutions; and second, Bangladeshi financial institutions had a shortage of professionals in Project Finance. We offered the training to outsiders in exchange for a fee, which included some incentives like travel expenses to ensure their attendance. Later, we also started a course on Financial Modeling.

[7] Project Finance transaction involves mobilizing debt, equity, hedges, and a variety of limited guarantees through a newly organized company, partnership, or contractual joint venture (a project vehicle).

In this formative phase, I had some interesting roles to play. First, I was a trainee banker and finance novice, but a few months later, Bob thought I could be a trainer and help him lighten his pressure until we hired the short-term consultants. I was tasked to teach more general topics, while Bob taught specific and technical subjects. Both of these courses are continuing even now. Time and circumstances permitting, I try to take a class or two in these courses even now. In the past 21 years, IDCOL offered various courses: 23 on Project Finance, 19 on Financial Modeling, and two on Financing Power Projects. It has so far trained more than 1,500 professionals in these courses.

A Book is Born

The training program's initial phases produced a positive outcome: Bob and I co-authored a book, *Financing Large Projects,* which came out in 2003 and was later translated into Chinese. We did not plan to write the book, but two separate events led to its birth. One day, I reviewed a report prepared by a short-term consultant from PwCS and stumbled on the concept of "Subordinated debt"—something I never heard of. When I asked the consultant to explain the term, he shrugged his shoulders and replied, "Subordinated debt! It is a tough concept. There are books on it that you can read. However, it takes much time to understand its depth and comprehensiveness, you know! Even I am still grappling with it!" The impression I had from him was that this was a complicated concept not to be understood easily. I found his response unacceptable and did not give up. I got hold of the book *The Law and Business of International Project Finance* by Scott L. Hoffman that the consultant recommended and started reading it to understand what it was. Since I did not want to rely on only one book, I also browsed the internet, hoping to learn about *subordinated debt*. However, I found this dense legal writing and could not extract the term's precise meaning. The more I read about it, the more confused I became. Nothing worked! As I fretted over the matter, a thought occurred to me: "How will I manage my work here if I cannot even understand the concept of *subordinated debt*?"

At about the same time, we were negotiating a loan for the American Energy Supply (AES) Corporations Meghnaghat 450 MW Power Plant near Dhaka with the sponsor and other lenders. This power plant is the largest in Bangladesh in terms of generation capacity by a private sector company. IDCOL supported the project with a loan of US$80 million that included a subordinated debt of US$60 million. During this time, the concept of subordinated debt (a debt ranking lower in priority) became crystal clear to me, at least for the level of understanding I needed to do

my job at IDCOL.[8] Learning by doing proved to be the best way to grasp the intricacies of the business. As someone has rightly said, *there are no schools for CEOs except the School of Experience*.

The Meghaghat loan negotiations coincided with our first ongoing Project Finance course. During that time, we had given only PowerPoint slides as our course materials. However, the participants requested additional materials to augment their understanding of the new concepts like *subordinated debts*. Accordingly, we started giving out relevant articles written by practitioners and chapters of books on the issue, along with the PowerPoint slides. We used to evaluate each lecture after the course, and it turned out; the participants found the training productive and useful. They also provided suggestions for improvements ranging from a change in snacks menu to seating arrangements to course content and lecture delivery.

Most importantly, they suggested summarizing the reading materials so that they can easily understand the matter. Bob and I also felt their need and proceeded to do something about it and started acting accordingly.[9]

One day, the course staff showed me a massive pile of photocopied presentation slides and training notes prepared for the next course. The neat stack of notes looked like a book to me. That was when the idea of writing a book occurred. I discussed the idea with Bob, "Bob, why don't we put the training notes and the presentation slides in the form of a book?"

Bob replied, "But do we have time to write a book now? We are very busy with managing all these training and loan negotiations."

I told him of my plan to work on the book at night after office.

Bob asked again, "Why do you want to write a book?"

I replied, "See, I had to go through a great deal of difficulty since I did not have any training or experience in project financing. I want to save others in my situation from going through the same ordeal. Since we already have the notes in our hands, all we need to do is to polish up our notes."

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[8] Subordinated debt, as I found out later, was indeed a simple concept with practical use. There could be two difficult situations in any project's life: the project has insufficient revenue to meet all its obligations or, the project has no revenue but some assets. In the first instance, subordinated debt holders get paid after senior lenders have been paid in full. In the second instance, the proceeds from the sale of assets go first to the senior lenders, and anything remaining after meeting their claims goes to the subordinated lenders.

[9] From the very beginning, we took a client-responsive approach to run IDCOL. We promptly attended to the trainees' suggestions, be it changes in snacks menu or course content.

Just editing, restructuring, and fine-tuning the available notes were not enough, however. Writing such a book that I envisioned takes much work, painstaking effort, dedication, and commitment to quality research. Our colleagues at IDCOL helped us in research and assisted in the compilation of the book. After many late hours at the office and two years of hard work, we pulled it off! Happily, for Bob and me, subsequent trainees appreciated the book very much, and it was translated into Chinese by Tsinghua University in Beijing. It was also used as a reference book in top North American and European universities.

CHAPTER 3

THE ROCKY TRACT

Our greatest glory is not in never falling, but in rising every time we fall.
- Confucius

With the office in place and recruitment and training of the core staff members completed, we formally began our work. We did so by gradually trying to lend the US$225 million the World Bank gave us for financing privately developed infrastructure projects.

At the start, we decided to hold roadshows at home and abroad to familiarize the new entity with various stakeholders. Only a few people knew about IDCOL, even in Bangladesh, let alone the outsiders. As a new financial institution, we needed to build meaningful connections with our future clients.

Accordingly, we first targeted international infrastructure development companies and financing institutions, domestic entrepreneurs, and local banks. Shortly afterward, in 2000, an opportunity came for us to present our case at a meeting of international donors, held annually in Paris, to help Bangladesh in its social and economic development.

Bob and I participated in what was then known as the Bangladesh Aid Consortium Meeting, where I made a presentation for the assembled donors, business people, and bankers. That presentation made some impact, sparking interest among some foreign companies and banks for investing in Bangladesh infrastructure projects. However, they made it conditional, saying they would get involved if there were transparency and timely decision-making in the tendering process. At the same time, we reached out to various trade bodies such as the Federation of Bangladesh Chamber of Commerce and Industries. We also held separate roadshows for banks, financial institutions, and leading entrepreneurs. In one such meeting, the finance minister's presence highlighted the government's commitment to infrastructure development. We also made separate presentations to top local and foreign banks operating in Bangladesh.

Happily, they agreed to participate in IDCOL efforts by providing short-term financing, such as trade finance.

In no time, we received various requests from local entrepreneurs, who initially thought IDCOL would provide financing at a concessionary rate, only to be disappointed to learn that we would charge a market interest rate. Still, they were somewhat encouraged to know that IDCOL would provide foreign currency loans with long repayment periods. However, they requested the loans be repaid in local currency for fear that repayment in dollars would expose them to greater currency fluctuation risk.[1]

These same people also requested equity support since infrastructure projects are big-ticket items, and the 20% equity requirement would be burdensome. They were rightly concerned about the profitability of their equity investment. In this respect, we went to great lengths to explain how infrastructure projects could be profitable like any other business if their tariffs were calculated correctly following the best practice cost-recovery principles. We also stressed the government's keenness to engage the private sector in the infrastructure business and provide the expected support. We assured them, neither IDCOL nor the co-financing banks would be interested in financing a project that was not structured to be financially sound and profitable.

There was also good news on the impact of roadshows, both at home and abroad. By the end of 2001, IDCOL's office hummed with potential investors' visits, seeking information about applying for its loan and subsequent approval and disbursement processes.

Our near-empty office gradually turned into a small but vibrant place with interested clients, dedicated and enthusiastic staff. The initial loan applications included projects such as hospitals, schools, and hotels, as well as power plants. Also, there were requests for funding to modernize existing plants and industrial expansion. To the disappointment of most of these investors, we explained that industrial projects were beyond our mandate.

At the time, the Private Sector Infrastructure Development (PSID) project was evaluated by the World Bank to determine if it had enough prospects to justify its existence. A list of projects such as power, port, water, and toll-roads, valued at about US$230 million, were identified with

[1] Notably, hedging products to avoid risks arising from disparate foreign exchange movements, affecting taka and dollar, were unavailable in local markets in 1998 and are unavailable even today. Most local developers had little experience with the hedging products readily available in international markets. A swap mechanism that would guarantee a fixed rate between dollar-denominated debt and taka-denominated revenues did not exist – either in global or local markets.

high to moderate probability for IDCOL financing. Our roadshows also attracted clients interested in our loans. It seemed that if IDCOL could participate in all or most of the projects, the initial allocation of US$225 million would be exhausted forthwith, and additional funds would be required to meet the growing demand. We were off to a good start.

Or so we thought!

Reality Check

Once IDCOL started receiving loan applications, it issued a Preliminary Letter of Supports (PLS), based on an initial review. This step signaled our interest to the sponsors and external lenders in the projects, subject to further due diligence–a standard first-step of the loan approval process. The next stages included detailed evaluations to ensure that the project's technical, financial, legal, and commercial viabilities were satisfactory. A paper documenting these evaluations was prepared and delivered to the IDCOL management for approval. Following internal clearance, the staff placed it before the IDCOL Board for its consideration. If it was approved, IDCOL forwarded it to the World Bank for issuing a no-objection certificate. Based on these steps, IDCOL would then proceed with loan negotiations and subsequent disbursements.

However, to our dismay, we found many projects to be ineligible for PSIDP support.

One such project was the *Haripur 360 MW gas-fired power plant* near Dhaka. IDCOL had issued a preliminary letter of support, indicating financing of up to US$80 million as subordinated debt for the project. The project was earlier listed as having *a high probability of IDCOL financing* in the Bank project appraisal document mentioned earlier.

We sought clearance from the World Bank to begin due diligence on the project. To our chagrin, the Bank told us the project did not meet its International Competitive Bidding (ICB) criteria, the mandatory precondition for using the Bank-provided IDCOL funds. According to ICB rules, the procuring entity must publish an advertisement for tender of large projects in three international periodicals. In that advertisement or a subsequent one, interested bidders are required to issue an *Expression of Interest* along with supporting documents regarding their capabilities. Based on an evaluation of their submitted papers, a handful of them, usually five or less, are selected. It is this shortlisted group that is invited to bid for the project.

In its objection, the Bank observed that the tendering had been limited to competitive bidding among pre-selected shortlisted bidders and had not been subjected to the usual Expression of Interest stage. Hence, the first-

ranked bidder was not eligible for Bank financing. Nevertheless, IDCOL would be allowed to finance the project only if the first-ranked bidder, American Energy Supply (AES) Corporation, met the mandatory ICB guidelines. We informed the AES about the Bank's decision. Regrettably, the sponsor told us that they had already completed the procurement process with Hyundai, a South Korean contractor, for a bundle of power plant projects to be implemented by both parties. Adhering to ICB rules at this late stage, the sponsor argued, would lead to delayed project implementation and prevent them from maintaining the low tariff they had quoted to the government.

The imbroglio had cast a shadow on IDCOL's future, prompting its then chairman to write to the World Bank president, requesting him to allow IDCOL to finance the project based on the following aspects: the Bank had identified the project as having a high probability of funding; the power tariff proposed for the project was the lowest anywhere in the region and therefore met the ultimate purpose of competition; achieving value for money.[2] ICB was unlikely to lead to an even lower price; all the participating bidders were the top international power companies active in the region; AES Corporation, the selected sponsor, had a portfolio of about 65,000 MW installed power capacity globally. The same sponsor and construction contractor had also been chosen for the Meghnaghat 450 MW power plant, following the ICB guidelines. Moreover, IDCOL would lend to the project at market interest rates and thus did not have much influence in the sponsor's decision-making process.

Unfortunately, the World Bank declined to accede to our request. Curiously, the Haripur project was eventually supported by a World Bank Partial Risk Guarantee (PRG), for which ICB guidelines did not apply. The Bank agreed to finance the project through MIGA (Multilateral Investment Guarantee Agency), another Bank affiliate, but surprisingly, IDCOL was not allowed to participate.

The Training Fiasco

Although the World Bank did not agree to relax the ICB guidelines for IDCOL financing, they arranged for its staff and prospective sponsors' training on the Bank's procurement guidelines. At their request, we organized a seminar at the local Hotel Sheraton (now called Intercontinental). It was meant to be a platform to bring together different

[2] Notably, Pakistan's Prime Minister Nawaz Sharif was reportedly charged for corruption in the procurement of power projects using the Haripur power project's low tariff as an example.

parties so the participants would better understand the Bank policies. Likewise, the Bank representatives would themselves become aware of the problems and challenges faced by local sponsors.

The matter was so urgent that the Bank's trainer had to cancel his vacation and fly to Dhaka from Washington to conduct the seminar. I could not be present full time for the first session as I had a prospective borrower's meeting. I made the opening remarks, introduced the trainer to the participants, and then returned for my meeting. Bob and our head of procurement stayed back. After the training session was over, Bob returned to the office, and I asked him, "How did it go?"

"Not well at all," Bob replied.

"What happened?" I asked anxiously.

Bob explained.

At the end of the session, there was a question and answers segment. In that segment, the World Bank came under severe criticism from local sponsors as irrational and overly bureaucratic. They also asked the trainer to relax the ICB guidelines. In reply, he told them these were the Bank policies, and he was not mandated to change the policies. He could not rationalize the Bank's position to their satisfaction; thus, the discussion between sponsors and the trainer got increasingly personal and aggressive. Therefore, the whole training session, many participants concluded, was a sheer waste of time.

The trainer was visibly upset and took Bob aside and confided in him in Spanish, "*Estofue una mierdo*." Loosely translated, "this was a shithole of a meeting!"

I sympathized with the trainer, called him at his hotel, and offered my support. I also wondered if it was due to the prejudices that some local companies have towards donor agencies that were behind the discontent. I also requested Bob to meet the trainer in person to convey our disappointment with the audience and explain to him that IDCOL had no control over the individual trainees. Bob met with him with a bottle of wine and stayed with him for some time. After the meeting, the trainer said to Bob, "*Entiendo que no fue culpa de IDCOL.* —I understand it was not IDCOL's fault." I felt relieved.

Small Disappointments

IDCOL also could not finance a 3x10 MW power generation project tendered by the Bangladesh Rural Electrification Board (BERB)- again for non-compliance with ICB guidelines. United Summit Power Company Limited, a Bangladeshi company, applied for a loan of US$7.4 million to partially finance three 10 MW rural electricity generation plants. As per

the tender, it was selected as the first-ranked bidder by the BREB. IDCOL issued a preliminary letter of support to the sponsor, subject to the Bank's formal no-objection to the first-ranked bidder. The Bank initially gave no-objection to the PLS issuance, but later it deemed the sponsor ineligible for not adhering to ICB guidelines.

The government organization in charge of rural electrification conducted a bid process for eight more 10 MW plants on a build-own-operate (BOO) basis. Three out of the 18 prequalified bidders had approached IDCOL for support. After reviewing and consultations with the Bank, IDCOL issued a pre-bid *Preliminary Letter of Support* to M/s Comilla Spinning Mills Limited. Rolls Royce Power Ventures Overseas Limited and Khansons Limited, the other two bidders, eventually lost interest and did not pursue the matter further.

Lafarge Surma Cement

Lafarge Surma Cement in Sylhet, a French-owned company, approached IDCOL for financing a power plant to provide electricity to its manufacturing plant. The project was quickly removed from IDCOL's pipeline by the Bank because Lafarge's *inside-the-fence* captive power generation project was ineligible for financing under the World Bank guidelines. Based on the agreement between the Bank and the government, IDCOL could only finance public infrastructure projects. Given the country's prevailing power crisis, IDCOL requested the Bank to relax its conditions, arguing that funding such projects would reduce demand from the national grid, but to no avail.

Medium-sized Independent Power Project

Due to an unsuccessful negotiation between the government and the sponsor, IDCOL could not finance the power plant at Baghabari in the northern part of the country. In 1997, the company had issued a PLS to two companies—Unocal and Cinergy, of which the latter was the lowest evaluated bidder. Accordingly, Cinergy received a Letter of Intent. Still, the project did not go ahead as Cinergy walked away from the deal when it failed to persuade the Bangladesh Power Development Board (BPDB) to modify the plant's technical configuration from open- to combined-cycle.[3]

[3] A combined-cycle power plant uses both a gas and a steam turbine to produce up to 50 percent more electricity from the same fuel than a traditional simple-cycle plant. The gas turbine's waste heat is routed to the nearby steam turbine, which generates extra power.

Landlines Telephone Project

In July 2001, the WorldTel was awarded a license to operate 300,000 landlines across Bangladesh, excluding Dhaka, the capital city. This restriction, coupled with the rapid expansion of mobile phones, made the project financially unattractive to the sponsor. They procrastinated, and only recently, in 2016 Bangladesh Telecom Regulatory Authority allowed them to operate in Dhaka. However, due to the low demand for fixed-telephone, the project was eventually abandoned.

Container Terminal Project

SSA Bangladesh Ltd (SSAB), a US-linked company, proposed to develop this project at an estimated cost of US$200 million on a Build-Own-Operate (BOO) basis. It applied for a loan of US$80 million and was willing to carry out procurement following ICB guidelines. Based on its Board's decision and the Bank's endorsement, IDCOL agreed to issue a preliminary letter of support to SSAB for a loan amounting between US$40 and US$60 million. However, the project did not go through as the country's High Court declared the sponsor's selection illegal and revoked the award. The SSAB Container Terminal Port case study (in Appendix3.A) underscores that although we could insulate IDCOL from the surrounding corrupt and inefficient environment, it was not entirely free of events beyond its boundaries.

Disappointing News from Jeddah

Constrained by the World Bank's restrictions, we took the initiative to diversify our funding sources. In 2002, I made a presentation before the Islamic Development Bank (IsDB) officials in Jeddah, which appeared to have made some positive impact. Shortly afterward, they informed us that they would recommend to their Board for giving us a US$25 million assistance. The good news quickly turned sour as we soon learned that the IsDB Board shot it down because of IDCOL's low capital base of only US$2,000.

In hindsight, I feel that I should have been more proactive in expanding IDCOL's capital base in those early years of operation. If I had done so, the company might have got the IsDB money, funding from different institutions such as International Finance Corporation, Asian Development Bank, and German DEG. Undoubtedly, this was one of my significant shortcomings as the IDCOL chief executive.

The Other Behemoth

In addition to dealing with the World Bank, IDCOL had to follow the government's lead. The cycle of the infrastructure projects processing was as follows:

IDCOL and IIFC were both owned by the government, but the projects' approval authority remained with the respective ministries. For example, the Ministry of Roads would approve road projects. If the government did not approve projects, IIFC could not structure projects, preventing IDCOL from funding.

There are several reasons for a private-sector infrastructure project not getting government approval:

- The government was reluctant to accept the transfer of ownership of public projects to private parties. They were unwilling to hand over the authority to approve and supervise the implementation of infrastructure projects. Also, there were considerable vested interests surrounding government implementation of infrastructure projects. Award and implementation of such projects were also sources of political party finance and personal corruption involving politicians and bureaucrats;
- Once a ministry deemed a project a priority, the conventional approach focused on availing donor or public funding for implementing the project. The remaining projects, not picked up for donor or public funding, were earmarked for private sector implementation, were less bankable, plagued with market uncertainty, and were technically more challenging. Hence, the risk-reward profile for residual projects was unacceptable to private parties, not worthy of investment; and
- The few projects that the government approved were limited to power generation. The development of a business model for power generation acceptable to the private sector paved the way for such awards. Power Cell's presence under the Ministry of Power

facilitated the tendering of power projects, which had developed the capacity to process procurement of private sector infrastructure projects. Award of projects in other sectors such as roads, ports, water was hindered due to the absence of business models acceptable to the private sector and capacity within the government to approve such private sector projects.

Had the government been able to award more infrastructure projects following the World Bank's ICB guidelines, IDCOL would have utilized all funds at its disposal. Besides the hindrance created by the Bank and the reluctance of sponsors to follow its ICB guidelines, various other issues such as the failure of the government and the selected sponsors to reach agreements, sponsors' reluctance to pursue the project, and the High Court's intervention also impeded IDCOL's performance.

I am confident that if IDCOL participated in at least some of the projects mentioned in this chapter, the country could have reaped immense benefits. To name a few:

- The power situation in the country would have eased up sooner.
- The Country could have avoided sub-optimal outcomes arising from inefficient equipment used in the quick-rental power plants later.
- Road congestions reduced.
- The current port crisis would not have come to pass.

The First Deal

To solve the deepening power crisis, the government tendered two large power projects: near Dhaka, Haripur 360MW (already discussed above), and Meghnaghat 450 MW power plants. In 1997, IDCOL issued PLSs to all shortlisted bidders of the latter project, such as American Energy Supply (AES), Midlands, Genting, Marubeni, and ABB. AES was declared the first-ranked bidder under an ICB conducted by the Bangladesh Power Development Board. Shortly after that, AES approached IDCOL for a subordinated loan facility of US$80 million. The project ran into a series of delays before it finally started moving forward. Two years later, in 1999, AES executed agreements with the government to implement the project. The Bank subsequently accorded procurement clearance for the selection of AES as the sponsor in September 1999.

IDCOL achieved its first success in 2001 by investing US$80 million in the AES Meghnaghat 450 MW gas-fired power plant. The sponsor

signed agreements in April with the Asian Development Bank (ADB), IDCOL, and the Australia and New Zealand Banking Group Limited (ANZ) Investment Bank for the financing of its US$300 million project. Up to US$220 million of the total project-cost was being funded on a project finance basis with local and foreign lenders, the first such debt financing transactions ever completed in Bangladesh. The financing consisted of a US$50 million direct loan from the ADB, a US$20 million co-financing facility arranged under the ADB's Complementary Financing Scheme, and a US$70 million facility guaranteed by the ADB's Partial Risk Guarantee program. ANZ acted as the sole arranger and underwriter of both the ADB co-financing facility and its guaranteed facility for a total commitment of US$90 million. IDCOL provided a total of US$80 million, which consisted of a US$60 million subordinated and a US$20 million senior debt. AES made a US$80 million equity contribution. The credit negotiations were not easy as IDCOL had to negotiate with both the sponsor as well as with the other lenders, as we had a large amount of subordinated debt of US$60 million that would rank lower in priority. (The critical issues faced in the negotiations are discussed in chapter 9.)

IDCOL Takes the Flak

In 2002, the idle money sitting at IDCOL drew harsh criticisms from different groups, business people, media, and civil society. The Federation of Bangladesh Chambers of Commerce and Industries was very critical about the relevance of IDCOL in the infrastructure sector. It also drew a rebuke from the then Finance and Planning Minister, who specifically mentioned that *IDCOL had been holding back the World Bank money for five years when the country was in dire need of infrastructure investment. He was so critical to the extent that he even suggested that the company should be liquidated and a committee be formed to investigate why it had failed to disburse the allocated amount.* Some business leaders lambasted IDCOL for showing bias towards the big projects by foreign firms and ignoring the locally initiated private sector projects.

The Daily Star published news highlighting IDCOL's failure. Before the publication of the Finance Minister's hostile remarks, a journalist friend called me to verify whether their reporter was correct.

He asked, "Fouzul, is it true that the Finance Minister wants IDCOL to be shut down? Has he ordered an investigation into why more investment funds have remained unutilized and who is responsible for it?"

I answered in the affirmative by saying, "Yes! Your reporter was right. I was present at the meeting, and those were the exact words of our Finance Minister."

Shocked, he asked, "What do you think about it?"

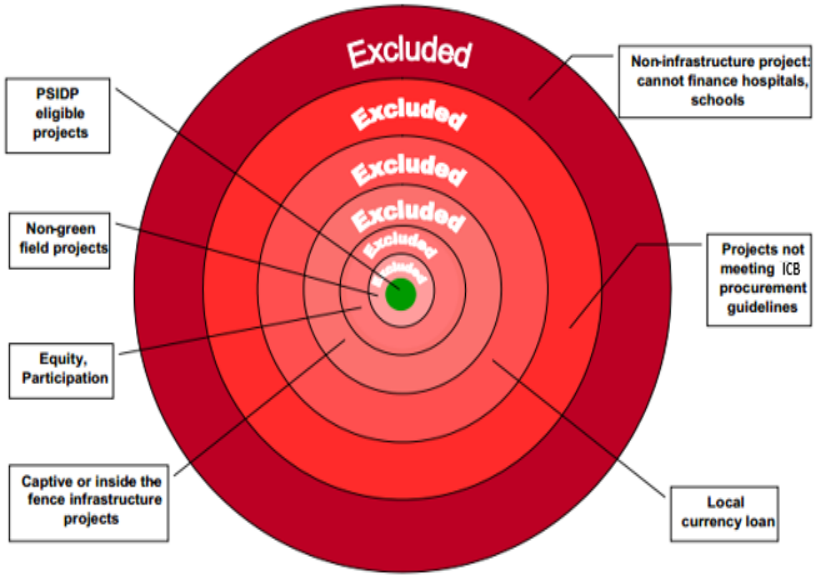
I replied that the Finance Minister was right because all public institutions must either justify their existence or should close. IDCOL had to justify its existence and explain why it could not produce the expected results.

Dartboard

By now, I felt myself under attack from every side. Everywhere I went, people kept reminding me of IDCOL's shortcomings. We needed to do something quickly to overcome the predominantly negative perception. It was a fact that the company had failed to use the World Bank money, but the underlying reasons discussed above underscore that the failure was mainly rooted in the project design (discussed in chapter 8). IDCOL faced two significant problems in utilizing the Bank fund. One was the lack of eligible infrastructure projects in the market, and the other was the company's extremely limited mandate.

I prepared a diagram that showed how the project finance mechanism works and the Private Sector Infrastructure Development Project (PSIDP) scope of financing to illustrate how constrained IDCOL was due to the World Bank guidelines.

Project Finance Universe and PSIDP Eligible Projects



IDCOL could not use the Bank fund to finance projects such as schools and hospitals since they are not considered physical infrastructure projects (represented by the circle's outer-most ring). If we move further inside the circle clockwise, the exclusion of the projects gets even more widespread. IDCOL could not invest in projects that did not meet International Competitive Bidding (ICB) guidelines. It could not provide local currency loans; it was barred from investing in inside-the-fence infrastructure projects, such as a power plant supplying electricity to a cement plant owned and run by the same business group. IDCOL could not make equity investments, even though there was considerable demand in the market. Only Greenfield projects were on the eligible list. After all these, the small black circle at the center depicted IDCOL's scope of investing in infrastructure projects. Because of these constraints, the Bank found only the AES Meghnaghat power project to be PSIDP eligible and financeable by IDCOL.

Difficulties arose in the application of the ICB guidelines as well, a few of which are mentioned below:

- The World Bank's procurement processes are designed for use by public sector entities; IDCOL was not directly involved in the procurement process since this task belonged to the ministries.
- IDCOL did not have leverage on the government agency making the procurement because it could not guarantee its participation in the project's financing (for failing to meet due diligence criteria), even if the government followed ICB procedure in the guidelines.
- The private sector has its procedure and rationale for selecting contractors and related equipment and services that generally are viewed as more cost-effective and time-efficient.

Finance Minister to the Rescue

In December 2004, we invited the Finance and Planning Minister at that time, M. Saifur Rahman, as the chief guest at an event organized by IDCOL. I gave a presentation explaining why IDCOL had failed to finance more projects and utilize the funds at its disposal. During the presentation, I discussed issues such as how IDCOL's capital base of about US$2,000 was too insignificant to finance any infrastructure project from its resources. A few projects that approached IDCOL did not materialize as the government and the respective sponsor failed to reach an agreement. IDCOL had been denied participation in Haripur Power Plant and 3x10 MW BREB Power Plants because of non-compliance with the Bank's procurements rules.

I also discussed how several other projects were rejected on different grounds. We approached the World Bank at the highest level, but not a single restriction was relaxed. The directives imposed on the projects developed under PSIDP were highly rigid and often not rooted in the ground reality. However, IDCOL did not have any other option but to accept the conditions since it depended heavily on the Bank's resources.

I showed and explained the dartboard to the Finance Minister and other guests present at the event. In his speech, the Finance Minister seemed to get swayed, as he committed US$3.5 million immediately and another installment of US$3.5 million to IDCOL within the next year to increase its equity capital.[4] He also committed to providing all necessary assistance to the private sector for investing in infrastructure. IDCOL thus survived the first attempt on its life by its owner, the government! Fortunately, in this instance, the lifeline was also extended by the would-be assassin, the Finance Minister - who wanted to close down IDCOL and now supported it wholeheartedly with equity capital!

However, there was a second attempt on IDCOL's life by its principal funder, the World Bank. That is another story altogether (detailed in chapter 9).

[4] IDCOL received US$ 4.5 million out of the committed fund.

CHAPTER 4

MAKING USE OF THE LIFELINE

Every wall is a door.
-Ralph Waldo Emerson

Once we got the finance ministry's US$4.5 million, it felt like a huge burden had been lifted off IDCOL's shoulder, enabling us to make independent investment decisions without having to worry about World Bank restrictions. For instance, the additional equity allowed us to finally finance projects in the local currency, a significant demand from the sponsors. However, the finance ministry amount was small and limited IDCOL's options to financing small and medium infrastructure projects only.[1] Luckily, during that time in 2002, we started receiving repayments from our US Dollar-denominated loan to AES Meghnaghat 450 MW Power Plant, enabling us to consider projects seeking foreign currency financing.

Lead Arranger

We had previously participated in the syndicated transaction of the AES Meghnaghat 450 MW Power Plant project along with ANZ Investment Bank, Singapore. As the lead arranger, ANZ prepared the project information memorandum,[2] oversaw legal counsel and independent engineers' work, and coordinated the lenders' activities. As a young institution, it helped us gaining experience as to what a lead arranger does in a syndicated transaction. This experience, coupled with the new infusion of equity, gave us confidence that IDCOL was now well-positioned to undertake such a venture on its own. The opportunity came when DNS SatComm Ltd., a Bangladeshi company, approached us to finance their Very Small Aperture Terminal (VSAT) hub station project, as well as requesting IDCOL to be the project's lead arranger. Compared to AES

[1] As a non-bank financial institution, IDCOL is not allowed to accept deposits.
[2] A document that provides project details for the benefit of potential investors and lenders.

Meghnaghat, this was a minuscule project, but we applied the same rigor in conducting due diligence[3] as the lead arranger.

At that time, the Bangladesh government owned four satellite hub stations that served the government organizations only. Square Informatix, a local company, ran the only private hub station that served its requirements but offered limited use to outside clients. Foreign satellite companies such as BtNAccess, SingTel, HKTel, and PAK DataCom using the hub stations located in Singapore and Hong Kong met the demand gap for data communications services. Therefore, there was room for local entrepreneurs to set up a new hub station and serve the country's data communication demand.

The proposed hub station would spare the local companies from spending a considerable amount of foreign currency. At that time, 115 Internet Service Providers (ISPs) were spending about US$1.7 million each year on procuring this connectivity from abroad. Besides, the proposed station would enable 40% local value addition. Offering its services at a competitive and affordable price would also enable domestic entrepreneurs to venture into software development, data entry, and call centers. Against this backdrop, we deemed financing a hub station to be a timely initiative for a development-oriented financial institution like us. The Institute of Information and Communication Technology, housed in Bangladesh University of Engineering and Technology, was appointed the Technical Adviser.

It was a small project, costing around US$2.56 million. The sponsors had proposed a financing structure of 70:30 debt-equity ratio. They approached IDCOL to finance 30% of the project cost as debt and requested IDCOL to raise the remaining 40% of the required debt from local commercial banks. The remaining 30% would come as owners' equity.

After completion, the project would offer the following services to the local market and, if possible, to neighboring Nepal and Bhutan, as well as other Central Asian countries:

- data connectivity for e-mail and web-browsing to internet service providers;
- point-of-sales network and inter-branch data connectivity to banks; and

[3] the detailed examination of a project and its financials is done before becoming involved in a business arrangement.

- distribution houses, chain stores and small vendors, restaurants, and entertainment centers.

It would also provide support services to set up a shared ATM network and online banking solutions to banks and international data connectivity to multinational organizations and embassies; distance learning facility; and pay-phone booth services. A risk and mitigation matrix table of the project is given in Appendix 4.A.

The total loan amount for the project was US$1.5 million, of which IDCOL's s share accounted for US$0.64 million, and the rest was made by two local banks, Prime and Janata, with a loan repayment period of seven years, including a grace period[4] of one year. Repayments were to be made through 12 semi-annual installments. The interest rate was set equal to the rate of Bangladesh Bank's 5-year Treasury bond rate plus 400 basis points,[5] to be reset each year. The minimum interest rate would be 11.50% per annum. The project's equity was contributed 51% by the sponsor and 49% by the Equity and Entrepreneurship Fund (EEF) of Bangladesh Bank (the Central Bank).

Initially, the project looked promising because Bangladesh at the time lacked a stable countrywide data network infrastructure. However, it soon ran into trouble as the then army-backed caretaker government stopped issuing VSAT licenses at the end of 2006, despite massive demand for it. The government took the measure presumably to restrict illegal Voice Over Internet Protocol (VOIP) calls allegedly eating up the state-owned telephone company's revenue. However, restricting VSAT did not stop unlawful VOIP calls. Denial of a license meant the project earned very little income. Still, the sponsors paid the entire bank liability from their pocket in 2008 to avoid further interest charges on the project, prompting its temporary demise. However, following the first national Satellite launching in 2018, the project has become operational and operates now.

Stepping into the World of Inside-the-Fence Projects

As mentioned in Chapter 3, IDCOL was prevented by the World Bank from investing in a power plant for Lafarge Surma Cement since it was meant to serve its factory. No longer burdened by such restrictions, IDCOL now decided to fund such infrastructure projects on its own. Interestingly enough, like the power plant proposed by Lafarge, this was also an 11.6 MW power plant, owned by Shah Cement, which is needed to ensure

[4] The period in which only interest is to be paid but not the principal.

[5] The Treasury bond rate was about 8% at the time. One hundred basis points equal to one percent.

uninterrupted power supply to run its cement factory. In those days, power outages, on average, disrupted ten days of production in a month, causing an enormous loss for the industries dependent on the state-run power utility.

In some ways, the project was novel and broke new grounds. In the IDCOL-financed AES Meghnaghat Power Plant, the government-owned utility, Bangladesh Power Development Board, had been the purchaser of power through a Power Purchase Agreement (PPA). The independent power producer was assured uninterrupted payment by the utility. However, in this case, the PPA was between the cement factory and the power plant, both owned by the same parent company, Abul Khair Group. The challenge was to structure the PPA to ensure the power company received payments from the cement company so that they would be able to repay IDCOL and other co-financiers without any problem.

The PPA was designed as a take-or-pay[6] contract and included provisions for making minimum payment at all times. It also came with a guarantee in the form of an unconditional and irrevocable letter of credit worth two months' tariff payment. It had one-year validity and annual renewability till the end of the loan life. The lenders could cash the letter of credit should the Company fail to make the payment on time. All rights and benefits of the Project Company, under the PPA, were assigned to the lenders as security. The loan agreement also provided for lenders' cure period, step-in rights, and transfer of the project to an eligible third party if the Company defaulted. During such periods, all rights of the power purchaser under the PPA would be suspended.

Under the World Bank guidelines, IDCOL was barred from financing no more than 40% of the project costs in any particular venture, necessitating other lenders to chip in. Although we did not like many of the Bank's restrictions, we continued to follow some of their guidelines to be fair. We restricted our financing to 40% of the project costs; appointed O&M Engineering, a local company, as the independent engineer; kept the provision of debt service reserve account in the loan agreement; conducted strict due diligence on the project participants; and secured a robust security package from the sponsor. Adhering to IDCOL's guidelines, we extended a seven-year term loan with no grace period and a debt-equity ratio of 70:30 to the Power Company. IDCOL developed a financial model for the project based on actual data and future projections. In the model, tariff payments included capacity and energy components. Capacity payments reflected a fixed amount of payment made by the power

[6] Even if the purchaser cement company did not utilize the power, they had to pay the power company for the capacity.

purchaser to the Power Company to make the facility available. It included debt service, a reasonable equity return for the Power Company, and fixed operation and maintenance expenses. Energy payments reflected the variable payment based on actual electricity generation, which included various cost components such as fuel and O&M costs. Energy payment also had a minimum payment required to be made under the gas supply agreement.

Based on this structure, the project's internal rate of return was 17.66%. The cash flow available for the debt service project was sufficient to maintain a healthy minimum Debt-Service Cover Ratio (DSCR) of 1.40 times throughout the project's life span.

Other significant project documents included the Electricity Generation License, Land Lease Agreement, Gas Supply Agreement, environmental permits, and insurances. Bangladesh Energy Regulatory Commission had issued a provisional license to the Project Company for power generation.

The Company entered into an Engineering Procurement and Construction (EPC) contract with Caterpillar Power Generation Systems of the USA. The latter was required to supply all necessary equipment and provide a performance warranty for 12 months.

The Power Company signed the Gas Supply Agreement with local Titas Gas Transmission and Distribution Company Limited to ensure an uninterrupted supply of specified gas. Lee, Khan & Partners was appointed as Lenders' Common Legal Counsel for the transaction to assist the lenders in preparing and reviewing all the project agreements.

With all the agreements in place, it was time for weighing the risks that could pose significant problems during the project's implementation: construction, operations and maintenance (O&M), credit, market, input supply, and force majeure events.[7] The mitigation measures adopted to address those issues included a performance guarantee from the supplier, appointment of a qualified third party for plant operation and maintenance, and local staff training provided by the EPC contractor. We required the borrower to keep additional funds in the debt service reserve and major maintenance reserve accounts. The take-or-pay contract had the provision for early termination and identified the payments that had to be made by the borrower if the provision was evoked. The total project cost was about US$7 million, with a 70:30 debt-equity ratio. IDCOL contributed 21% of the total project costs; four other local financial institutions provided the remaining 49%. The sponsors' equity contribution was 30% of the project costs. The loan repayment period was seven years, with a 3-month grace period. The interest rate was 13% and payable in 27 installments—the

[7] Unforeseeable circumstances that prevent someone from fulfilling a contract.

project achieved financial close in September 2005. As the borrower's cash-flow position improved, the borrower pre-paid the debt in full by March 2008. The power plant was still in operation in 2020.

Further Diversification of Portfolio

In 2005, two private companies—Panama Sonamasjid Port Link (PSPL) and Panama Hilli Port Link (PHPL)—approached IDCOL to finance two land port projects in northwestern Bangladesh. The projects would meet the needs of growing trade with neighboring India. (A location map of the country is given in Appendix 4.B.) These were small projects compared to the SSAB Container Port Terminal discussed in chapter 3, which IDCOL could not finance because of the High Court ban. Nonetheless, the two projects provided an opportunity to diversify IDCOL's portfolio. M/S Panama Trading was awarded the contract to build the land port on a Build Own Operate basis. It offered the highest royalty, 49% of gross revenue, to the Bangladesh Land Port Authority.

As part of the contract, the sponsors pledged to develop necessary infrastructure facilities such as roads, warehouses and install weighing scales. They would collect various fees and charges. Goods imported from India would be unloaded at the ports, and these would entail warehousing and miscellaneous charges. The sponsor would utilize the money to repay their debt, recoup their investments, and earn a fair return.

A legal issue, however, cropped up at the due diligence stage. A competitor filed a complaint against the award, which was first rejected by the lower courts. Undaunted, they went to the High Court, where also it lost. With the legal issue seemingly over and as IDCOL prepared to process the loan, our counsel instructed us that disbursement be withheld before the case's final resolution.

Bangladesh Consultants Limited was appointed as the Technical Adviser (TA) for both projects. The advisor visited the site, reviewed the project design, and concluded that it was technically viable.

In November 2005, the prospective lenders—IDCOL and the state-owned Janata Bank—agreed to provide US$1 million each for the two projects. Besides, provisions were made for other private commercial banks to participate in the financing plan, if required.

The total cost for the two land port projects—PSPL and PHPL—were estimated at US$2.27 million and US$2.61million, respectively, and were financed under a 70:30 debt-equity ratio. Of the total loan, IDCOL's share was about US$1 million. The remaining funds came from four local banks. The sponsors' contributed the equity and a small amount of subordinated debt. The loan was set to be repaid in 5 years with a grace period of 6

months. The loans were payable in 18 quarterly installments and carried an interest rate of 14.5%.

There were still some problems that required to be resolved before the final release of the money. For instance, if the Technical Adviser, IDCOL, or other lenders identified some issues during their final review of the project, they must be settled to their satisfaction. Disbursements were made in stages subject to meeting loan covenants, milestones achieved, and certification by the technical adviser.

After meeting all the conditions, the two projects finally got the money in January 2006 and became operational in May 2010 and January 2012, respectively. Sadly, the take-off was not as smooth as the sponsors defaulted on repayment in the first year of operation (2010) and royalty payment to the Land Port Authority.

We were somewhat puzzled by this unforeseen development as we found that the project was technically feasible, financially viable, and had healthy cash flow during due diligence. A subsequent investigation revealed that the number of trucks carrying imported goods per day and the daily project revenues were higher than the financial models' estimates; the sponsors were not depositing the revenue in the designated Bank, and infrastructure development was off the mark.

I invited the borrower for a meeting and asked why the Company had defaulted despite having a very robust cash flow. I also asked him to remedy the port's development deficiencies and deposit the revenues to the designated Bank. In his defense, the borrower blamed some technical issues, including the limited number of products imported through the route, as the inhibiting factors. After being pressed, the sponsor confessed he had to pay a considerable amount of bribe to secure the project. He sarcastically remarked that the minister and the top government officials had eaten up the legs, the breast, and all other meaty parts of the two projects and left him with the bones only!

Subsequent events proved that he was right. After the general election and change of government in 2008, the Anti-Corruption Commission filed a case against the minister, and the charges included bribery in the award of these projects. The sponsor also mentioned he had borrowed money from his partners to pay the bribes, and they were pressing for a quick return of their money. He also admitted to having quoted a very high royalty payment to the Land Port Authority to secure the projects. He could not develop the infrastructure as promised and failed to deposit revenues in the designated Bank because of these factors. He assured me that once he had settled the debts to his partners, he would meet his payment obligations and complete the port's development. Sadly, he did not keep his promise.

IDCOL and PHPL reached an amicable out-of-court settlement in 2017. The lenders rescheduled the loan, and the borrower is now making regular payments. For the PSPL project, the borrower requested rescheduling of the loan in late 2018. The lenders accepted the proposal. Both the projects were now making payments to IDCOL as per the revised schedule in 2020.

We realized that we had made a mistake by underestimating the project's pre-operating expenses. Although we included an amount in the category of unspecified "other expenditures," we had no precise estimate of the actual amount of bribe paid and did not realize that it was such a high percentage of the project cost. Even though there was no scope for including bribes in the financial calculations, it remained the reality in many countries, including Bangladesh. Such expenses were like other pre-operating expenses and must be financed by the project and serviced from project revenues. Eagerness to diversify our portfolio may have blind-sighted us to miss some of these factors before approving the loan.

The experience was a crucial lesson for us. We learned that a competitively awarded project had an inside story for which there was no documented evidence. Had we known this before, perhaps we would not have financed the projects. As a development finance institution, we needed to delicately balance social demand and pressure to upgrade infrastructure and commercial prudence.

Learning from Mistakes

In 2007, a big conglomerate's top management sought an appointment to meet us to discuss their fixed-line telecom project. The date and time were set up for the meeting. Usually, we met such important prospective borrowers at the CEO's office to satisfy their pride and ego. I was also primed about the visit by an official of the Prime Minister's office.

As the visitors came, I told the staff assigned to the project to bring them in. She said that there were eight persons on the team. Since the CEO's room could accommodate only four persons, I told her to take the visitors to our conference room next to my chamber.

I thought the meeting could take some time, and therefore went to the washroom. As I stepped out of my room, I found half a dozen gun-wielding plainclothes personnel inside the IDCOL office. On my inquiry, an office staff told me that these people were security details of the visitors!

Dispirited, I met the visitors and listened to their business plan of connecting 1 million subscribers within just one year. I told them that financing infrastructure projects such as telecom were within our remit and that we would be interested in the project. I explained our due diligence process and answered their queries about how long that would take and the

final disbursement of loans. I also explained that mobile phones' rapid expansion would substantially cut the demand for fixed-line phones. That scenario did not seem to dampen their interest. They tried to impress me by dropping names, saying they would not have any problem as most influential people in the country, including ministers and top bureaucrats, were regular visitors to their penthouse to relax and unwind in the evenings. They also invited me to stop by, as the place was near our office. I thanked them for the kind invitation!

I left the meeting stunned, not only for their unrealistic plans but also for the unusual invitation and the presence of the armed security details. To learn how it happened, I called for the building's security officer and asked him why he let those people in. He replied that he had detained a dozen of them at the entrance and allowed only a few at the visitors' insistence. I realized the helplessness of the unarmed security personnel.

As per practice, we held a debriefing meeting with the concerned staff after the visitors left. The staff-in-charge asked me how we should proceed. Instead of replying, I asked her; you tell me what we should do? She was perplexed by my reply and said should we issue the data request sheet to the project company as is done in other cases. I said, not so fast.

I said, look, they brought in 18 automatic gun-displaying persons to our office before getting the loan. Suppose they did not repay the loan, what would you do for recovery of our loans! She was silent for a while. Then she said, well, that would be a severe problem. Nevertheless, we have to tell them something. I told her to bring the data request sheet and added a few more items that I thought would require at least six extra months to fulfill. We wanted to buy time, given the loan default culture among the influential borrowers. Because of IDCOL's delaying tactics and the sponsors' realization that the prospects for fixed-line phones were bleak, they abandoned the project. Good riddance!

Use of Reflows

As already mentioned, in addition to the government's equity contribution, IDCOL started receiving repayments on its foreign currency loan to AES 450 MW Meghnaghat Power Project in 2002. The reflows were in US dollars, which enabled IDCOL to start extending foreign currency loans without the World Bank's consent. The first such opportunity came when the Pacific Bangladesh Telecom Limited (PBTL) approached IDCOL for a US$4.5 million loan for expansion of its CityCell cellular telecom project.

PBTL enjoyed a monopoly in mobile telecommunication until 1997. Subsequently, three other private operators–Grameenphone, AKTEL, and

Sheba–entered the market. By the time they approached us, PBTL had ranked third among four operators in subscriber base. Their lackluster performance was due mainly to PBTL's lack of corporate governance and mismanagement. In the second half of 2003, PBTL hired Michael Seymour, a well-known name in the telecom sector, as its chief executive.

Shortly after taking over, he began streamlining the Company's product lines and operations, rolled out new telecom products in Bangladesh, and introduced corporate culture. PBTL was the only operator to offer mobile telephone services using Code Division Multiple Access (CDMA) technology. The three other operators were using the Global System for Mobile Communications (GSM) technology.

Until May 2004, PBTL had an active subscriber base of 245,000, about 80% of its net capacity (310,000 subscribers as of May 2004). The remaining capacity was kept unutilized to lower the switching network's pressure, especially during the peak demand period.

At this point, the Company approached IDCOL for the loan. It was preparing to implement an expansion plan, which included the up-gradation of the network's technology and additional capacity to sustain the Company's growth targets until the end of 2006—the proposed up-gradation aimed to increase PBTL's nationwide coverage from 51 to 58 districts.[8] The new equipment was expected to increase PBTL's network capacity to 747,636 subscribers, almost two and a half times the existing capacity. PBTL had appointed Citibank NA as the lead arranger for the deal. IDCOL appointed a professor of Bangladesh University of Engineering and Technology as the Technical Adviser for conducting technical due diligence, especially on the proposed CDMA technology. The adviser opined that the up-gradation plan was realistic. He concluded that, if implemented, PBTL would be one step ahead of the GSM service providers like Grameenphone and AKTEL.

Convinced that the expansion project had merits, we decided to go ahead with its appraisal covering all the aspects: the country's demography, economy, telecom sector indicators, regulatory issues, and market share. Simultaneously, the financial analysis assessed the project's cash flows for the sponsor, lenders, and other stakeholders directly involved, such as the equipment supplier. Key parameters examined in this analysis included:

- Project and budgeted project expansion costs;
- Project's debt plan;
- Sponsor's equity support commitments;

[8] Bangladesh has 64 districts.

- Financial statement analysis;
- Sensitivity analysis regarding DSCR; and
- Other key variables.

The budgeted project expansion cost amount was US$70.2 million. The foreign exchange components comprised about 93%; its expansion was financed based on a debt-equity ratio of 67:33; the sponsor would meet their equity obligations from excess cash generated from the project's operations. The forecasted financial results confirmed that the sponsor would be able to fulfill its debt service commitment. The lenders performed sensitivity analysis[9] to verify the financial robustness of the project by changing the following key variables: (a) maintaining working capital at historical level; (b) operating revenue; (c) operating cost; (d) depreciation; and (e) annual Bangladeshi taka devaluation against US dollar.

Unlike other IDCOL financings, this was a corporate loan. Furthermore, we went ahead balancing two factors: first, although the TA had found CDMA technology to be efficient, we, at IDCOL, remained skeptical about its customer acceptance, based on the high global growth trend of GSM compared to CDMA technology; second, Singapore Telecom, a globally known company with robust cash flow, had acquired a stake in PBTL that encouraged IDCOL to switch to a corporate rather than a traditional project finance loan.

IDCOL's loans were secured by corporate guarantee and other standard security packages typical of such corporate loans. Standard Chartered Bank was the agent bank and security trustee.

Key risks of the project were identified, and their mitigation procedures were adopted. The risks included: (i) construction; (ii) operation and maintenance; (iii) technology; (iv) systems failure; (v) market; (vi) foreign exchange; (vii) interest rate; and (viii) regulatory.

The IDCOL Board approved two loans: the Dollar loan was US$10 million[10] at an interest rate of LIBOR plus 3.15% per annum with a 6-year repayment period and quarterly installment payments; the Taka loan was

[9] Sensitivity analysis involves changing the assumptions or estimates in a calculation to see the impact on the project's finances. It allows the business's managers and lenders to see the possible outcomes if the project doesn't generate the expected results, before investing.

[10] Other dollar loan lenders include US$20 million from Citibank Bahrain and US$80 million from China Development Bank.

worth US$3.33 million, with an 8-year repayment period, with an interest rate of 11%, and had quarterly payments.[11]

The borrowers paid the debt in full as scheduled in October 2009. However, PBTL was shut down in 2016 by the regulators for failure to pay up to US$60 million in government dues.

With mixed results, these four projects helped us learn important lessons, paving the way for IDCOL to be more cautious and better prepared in future dealings. We will also see in chapter 11 how useful these lessons were for IDCOL as it expanded and diversified its portfolio.

At a personal level, I learned how any entrepreneur who wants to invent, innovate, or create must try hard to be imperfect and accept mistakes to know what works and what do not. Furthermore, in this learning process, there is no difference between public and private enterprises. Both must continuously innovate, take risks, and always learn from their mistakes to survive and succeed.

[11] Other taka loan lenders include Bank Asia Ltd, BRAC Bank Ltd, Commercial Bank of Ceylon Ltd, Dhaka Bank Ltd, United Commercial Bank Ltd, Eastern Bank Ltd, Mercantile Bank Ltd, and IIDFC Ltd.

CHAPTER 5

OH, MY SUN!

The Stone Age didn't end because we ran out of stones. It ended because there were better ideas about how to meet society's needs. Similarly, the end of our current 'oil age' won't end because we run out of oil…It will end because we have better ways to meet our energy needs. Those better ways exist now, are proven, cost-effective and have multiple benefits to individuals and society.
- Amory Lovins

When Vijay Iyer from the World Bank met me at my office in 2002, IDCOL had only one project at hand, and business was slow. Vijay is a former Indian bureaucrat with an MBA from Yale. He was the task leader for large and medium infrastructure projects but was doubling down on a renewable energy project development mission. The Bank had an ongoing project supporting the Bangladesh Rural Electrification Board (BREB) to extend the rural areas' power supply. They wanted to add a renewable energy component to the project, mostly Solar Home Systems (SHS), similar to their Sri Lanka project. Vijay mentioned that the project there was doing well.

I had no idea what SHS was all about except that I read somewhere that NASA astronauts used solar radiation to generate electricity during their space flights and reduce payload.[1] Vijay and I visited a house in Kapasia, near Dhaka, to see a demonstration of SHS, organized by BRAC. Honestly, the demonstration left me nonplussed. We saw a square structure on the roof, something that looked like a car battery, a charge controller, and some exposed electrical wirings were producing dim lights and powering a black and white TV. I found the system clumsy and unimpressive. (A sample picture of an SHS is given in Appendix 5.A.)

On our way back, Vijay asked me whether IDCOL would be interested in promoting SHSs. I was non-committal. He kept pursuing the matter

[1] Generating electricity from abundant sunshine in outer space would cut down the requirement of fuel. It would make flights easier.

through emails, but my previous experience working with the Bank made me reluctant. I told myself, "I am not going to sign up for a blind date again!" However, due to Vijay's persistence, I asked Ruhul Quddus of Grameen Shakti, an affiliate of the Grameen Bank, to install two SHSs at my village home on the remote Island Sandwip. I paid for the systems from my pocket and then totally forgot about it.

Postcard from Home

Some three weeks later, I received a postcard from the local village mosque committee's Secretary, informing me that the SHS was a big help. They were using it for the *Azan* (an Islamic call to prayers) relayed through amplifier five times a day, and it was helping them light the mosque for nightly prayers. They were even praying regularly for my family for providing an excellent service! The other SHS was installed at my cousin's home. Soon after, I received a letter from my nieces, who were ecstatic about the amazing lighting system. The SHS helped them study for longer hours, they informed me, and they felt safer than before at home. Most importantly, they watched their favorite movies on Bangladesh Television, the national channel, on their black and white set! At the bottom of the same letter, my sister-in-law added that she no longer had the tedious chore of cleaning four kerosene-lamps every afternoon!

From Space Expedition to Rural Bangladesh

Solar power technology is not a recent development. Edmund Becquerel, a French physicist, discovered the photovoltaic effect in 1839, the solar cell's operating principle. The widespread use of the technology dates back to the mid-1800s when scientists created solar plants to heat water to produce steam and power machinery during the Industrial Revolution. However, much later, in 1954, scientists at Bell Labs found an efficient way to turn sunlight into electricity. The first practical solar cell was made of silicon. The first spacecraft to use solar panels was the Vanguard 1 satellite, launched by the USA in 1958.

It was a part of the lifestyle of the 'Yuppie' generation, a term coined in the early 1980s for a young professional working in a city, which brought solar panels to home use. Some Yuppies rejected the urban lifestyle and started living in the woods and mountains with no grid electricity. They used solar panels for lighting.

Convinced about the utility of SHS from the postcard and feedback from Sandwip, I started thinking about five questions:

- How to make such a sophisticated technology acceptable to simple folks in rural areas?
- How to make the technology affordable for them?
- Who would install the system and maintain it?
- If SHSs were so useful, why had they not become popular in Bangladesh already, given some NGOs' efforts? and,
- How could I convince my Board to accept the program?

The use of solar power to generate electricity was unknown, even to most educated people in Bangladesh. It was hard to explain how it would work, be stored, and made available at night. I gave SHSs to my village free of charge. Of course, providing these lights free to thousands of rural households would not be sustainable. The system needed installation and maintenance. Who was going to do that? How could we motivate villagers to pay for it? Also, by 2002, only about 8,000 SHSs, as against the modest target of 20,000, had been installed in Bangladesh. What was the cause of such lackluster progress?

Moreover, IDCOL was set up to finance medium and large infrastructure projects, not the minuscule solar power system. How could I convince the IDCOL Board to include this program in its mandate? As I pondered these questions, I decided to go ahead, sending Vijay an email in Washington to inform him that IDCOL would consider financing the program.

Fortunately, Bangladesh has two advantages in harnessing solar energy in rural areas. Firstly, the average daily solar insolation ranged from 4 and 6.5 kWh/m2. The other was the ubiquitous microfinance institutions' presence. Active at the grass-root level, they are well-positioned to work with rural households.

I could already see how an SHS program, under IDCOL, could be successful in my head. However, before that, there were hurdles to overcome.

Shouting Match

Fortunately for IDCOL, Prokousholi Shangsad Ltd., a local consulting company, had already done a Bank-funded feasibility study on SHSs. The study provided insights into its demand, operating cost, i.e., monthly

expenditure on kerosene, lighting issues, and possible rollout options. The research and our site visits convinced us that most rural households could not pay for an SHS.

In 2002, the system was quite expensive, beyond the reach of most in rural Bangladesh. The price of solar panels was US$5 per Wp, and the efficiency of solar cells was low, hovering at around 15%. Each light needed about 10-11Wp of electricity to operate. A small 40Wp system with four lights and one black and white TV would cost about US$350-$400: a considerable sum even for middle-class Bangladeshis. So, there was a need for installment payment. Also, which organizations had the reach and wherewithal and could maintain and supply the SHSs, in addition to collecting installment payments?

To discuss these and other issues, we met with Bank officials several times. The task leader, Vijay Iyer, had a good grasp of both the rural economy and finance. We discussed the idea of bringing down the cost. He suggested applying for a Bank-provided grant, which would substantially reduce the cost to the target groups. The Bank would seek a Global Environment Facility (GEF) grant for this purpose. The grant amount would be declining as the market expanded to make the program sustainable. The Bank will also provide loans to the government to lend to IDCOL. In turn, IDCOL would refinance the purchase of the SHSs by the participating organizations who would subsequently recover its dues through the installment payments by the electricity consumers. So far, so good! However, there were still some issues to be resolved. For example, who would maintain and supply the SHSs and collect installment payments, and who would procure the equipment?

I decided to invite the Bank team to my home for dinner to discuss these and other outstanding issues. Bank officials told me that they thought the program should use new small but untested specialized institutions. However, I was against this and bluntly told them I was unwilling to risk the program by working with all rookies. Instead, I insisted on including established NGOs and microfinance institutions already working in the field, such as Grameen Shakti and BRAC.

"What about the procurement of the SHS equipment?" Vijay asked. "Shouldn't IDCOL procure the equipment to reap the economies of scale (realize low price on bulk purchase) and ensure quality?"

However, as a civil servant, I was aware of corruption and low-quality procurement by public institutions and was not inclined to get IDCOL involved in the business. I told them so, adding that we are a financial institution and should not get embroiled in procurement, which would make our core job—financing–difficult. IDCOL, in consultation with the Bank, should set the technical standards. I argued that institutions involved

in the supply and maintenance of the equipment such as Grameen Shakti and BRAC should also be entrusted with procurement responsibility.

We were a group of men arguing for and against each other's views. As it often happens during such exchanges, we ended up in a shouting match! That was when my wife came out and politely admonished us with the words, "Gentlemen, could you please calm down?" The effect was electric. We calmed down, and our conversation became sober again. We had a good dinner afterward. Vijay said he would come back after consulting with the management in Washington. He kept his words. The Bank agreed to include Grameen Shakti and BRAC in the program. They also agreed to procurement by NGOs and microfinance institutions on the condition that the Bank would conduct a study on SHS equipment prices and quality in two years. We also agreed to have a pilot before the actual rollout. We kept participation provisions for private businesses with the countrywide retail network.

Convincing the IDCOL Board

After reaching broad agreements with the World Bank, I thought it was time to seek the go-ahead from the IDCOL Board. I informed the Board about the discussion with the Bank and the tentative agreements reached about the proposed program. As expected, the Board members observed that the SHS program was outside IDCOL's mandate as it had been created to finance medium and large infrastructure projects only. Moreover, it would be too risky and challenging for IDCOL to manage small loans to households in rural areas.

The Board's concerns were genuine and valid. I explained to them that power or electricity was one of our key sectors. SHSs were mini power-generation plants with transmission and distribution facilities all in one place. I also gave a demonstration to the Board with an actual SHS and explained how it worked. To address their second concern, I said that IDCOL would not take any credit risk on households. It would rather be a wholesaler of loans to selected NGOs/microfinance institutions/private businesses collectively, called Participating Organizations (PO). They would borrow from IDCOL, pay for the equipment, and install the systems. Also, the POs would collect installments and, with this cash flow, repay IDCOL loans. I also told them that the Bank would give the required money to the government, which, in turn, would be provided to IDCOL. With these funds, IDCOL would refinance the POs, who were buying SHSs on behalf of consumers, installing the equipment, and collecting the monthly payments. The POs would be responsible for monitoring, collecting, and repaying the loans IDCOL had made to them.

After a lengthy discussion on how we should proceed, the Board nodded its agreement with the pilot program for 500 SHSs.

The pilot proved to be successful, and the Board authorized me to join the government team for credit negotiations with Bank in Washington. The talks were cordial. Still, there were issues relating to procurement and IDCOL fees.

I was most concerned about the Bank's International Competitive Bidding (ICB) procurement rules, discussed in chapter 3. As we learned, it did not work in large and medium private project financing. I was almost sure that it would not work in SHS procurement of much smaller value. I kept thinking about how we could address the issue. As mentioned earlier, we had agreed that POs would procure SHS components, and we would include large existing players such as Grameen Shakti and BRAC. An issue arose as to how would the POs finance such procurements? I told the Bank that Grameen Shakti and BRAC had the resources to procure independently, but it would be difficult for new and small POs. Vijay suggested we could forgo the advance given for pilot projects after being satisfied that POs had installed the systems, they were working, and were collecting installment payments. This money would provide them with some seed-money to finance initial procurement. (IDCOL would refinance a part of it as per program design discussed in detail in chapter 6.) Vijay confirmed that since the procurements made by the POs would be small in financial value and IDCOL would be refinancing such procurement using standard commercial practices would apply. I was relieved that the ICB guidelines would not be applicable!

The Bank initially suggested that it set aside an amount, and IDCOL would be reimbursed for its expenses in promoting SHS. From IDCOL, we proposed a flat fee per system (US$ 7 per system was agreed upon) installed under the program. As the former would be cumbersome to implement and the flat fee would be straightforward and performance-related, the Bank agreed. During the negotiations, Raihan Elahi, then a staffer at the Bank's Bangladesh office, helped provide the country context.

After signing the credit and project agreement with the Bank, we started a detailed design and fine-tuned it.

Call from the Cabinet Secretary

IDCOL is a fully government-owned institution, and we were answerable not just to the World Bank but also to the government. One day, I received a call from the then Cabinet Secretary, the highest bureaucrat. He knew me personally and asked, "Tell me, Fouzul, what is the per kWh generation cost of electricity using one of your SHSs?" He

needed the answer urgently to prepare a reply for a Minister. I knew the answer. In those days, solar panels were costly, and the efficiency of solar cells was low. We had done some back-of-the-envelope calculations, and the cost came to about US$1.50 per kWh, against the generation costs of a few cents for grid-based electricity using natural gas, supplied at artificially low prices.

I knew that if I gave him the correct answer, it would mean trouble for the program. So, instead of giving him a direct reply, I told him, "Sir, I know the answer to your question. However, before I give you the answer, may I ask you a different question?"

"Go ahead," he said.

I asked him, "What is the price of keeping a household in near darkness for 60 years?" [2]

In addition to the question I posed, I explained that a generation cost comparison would be misleading in this case, given all the distortions in our energy market, such as natural gas pricing and calculation of generation cost by government-owned power stations. Our targeted population was not projected to get grid electricity in the next 50 to 60 years. The Cabinet Secretary understood my point and did not insist on knowing the per kWh price of generating electricity using SHS.

Fourth Time Lucky

IDCOL was not the Bank's first choice for implementation of the SHS program. After knocking on three other doors, they had come to us. Earlier, Vijay had approached the Bangladesh Rural Electrification Board, which it was already supporting for grid expansion. The Chairman of BREB had politely refused to consider the program, presumably based on their disinterested engineers' advice. Next, they approached the Palli Karma Sahayak Foundation (PKSF), a government-owned umbrella organization supporting microfinance institutions. Since the use of SHSs did not directly translate into additional income-generating activities for families, the Managing Director of PKSF said it was not within their mandate. The Bank had also tried working with Grameen Shakti and BRAC directly since they were already promoting SHSs in remote rural areas.

Both had initially turned down the Bank request. Later, when invited by IDCOL, both Grameen Shakti and BRAC joined the SHS program, and I found their initial refusal unusual. Why would they refuse to accept concessional financing and grants for an activity they were already

[2] The average life expectancy of the Bangladesh population at that time.

carrying out with their resources? When IDCOL took up the program, I contacted Prof Muhammad Yunus (the architect of all Grameen institutions, soon to become a Nobel Laureate in 2006) over the phone. I requested his consent for Grameen Shakti to join us. He was aware of the World Bank's approach and told me that his staff thought working with the Bank in such a rural-based program would be difficult. I assured him that IDCOL would take care of that, and Grameen Shakti would only have to deal with IDCOL. At my request, he sent its managing director to discuss the program with me. After our meeting, he promised to discuss the matter further with Prof Yunus and get back to me. The following day, he confirmed that Grameen Shakti would join IDCOL's SHS program.

Compared to Shakti, convincing BRAC was more difficult. I called the then Executive Director of BRAC, a former civil servant, and invited his institution to join the SHS program. He discussed the matter internally, especially with those working on their existing SHS program, and told me that the answer was negative. He detected the disappointment in my voice and said that he could arrange for a presentation of IDCOL's SHS program to be made before Fazle Hasan Abed (knighted later in 2010), the Chairman and Founder of BRAC. I accepted and made the presentation myself in front of Sir Fazle and the BRAC team. The next day, the chief executive called to say that the "ice had melted," and BRAC would join the program.

Both Prof Yunus and the BRAC chief executive attended the agreement signing ceremony between their institutions and IDCOL at our office.

Minor Hiccup

Like all donor-funded programs, we had agreed to accept an international consultant selected by the World Bank. Based on the fantastic experience we had with Robert J. Parra in our large and medium infrastructure financing program, I was looking forward to working with the new consultant. However, my hopes were dashed when we found that he was not very helpful and his advice not very relevant.

To wit, he would call our staff to his temporary accommodation in Gulshan, about 8 kilometers away from our office, and tie them up there for the whole day. In those days, we had only a handful of staff. They were already overworked, working on large infrastructure projects as well as the SHS program. The team complained about being away from the office for hours without doing much. Also, we found his advice on feed-in-tariff and

net metering issues, based on his European experience,[3] were not helpful at that time. I requested him to come to the office and work with us. He seemed to agree but continued as before. He wanted us to email our queries and send his replies from the International Club, where he stayed. He even tried to tempt me with foreign trips, which I politely declined, saying I would love to visit Europe but would not have time given my workload at IDCOL.

I observed him for a few days and concluded that his presence was counterproductive. I requested the World Bank to withdraw him, and they hesitantly agreed. By that time, we felt we could handle the program ourselves, asking the Bank not to send any replacement for the time being. Meantime, the Bank could monitor our performance, and if we failed in implementing the agreed program properly, they could send a replacement. The Bank reluctantly agreed. What followed is now history. I will come to that soon.

Teething problems

We faced two significant challenges in implementing the program: (i) marketing of SHSs; and (ii) preventing potential abuse of subsidy. We launched a massive countrywide publicity campaign, including erecting giant billboards alongside major highways, distributing flyers, handbills, TV commercials, and even a docudrama. We gave the POs demonstration sets for the villagers to see for themselves. We also joined the POs in marketing campaigns in village markets and educational institutions with live displays of SHSs in the evening. Villagers would look at the exhibition in bewilderment, perhaps thinking whether we were showing them a magic trick! They appeared skeptical. Some of them even asked if the devices would work when they took them home!

We agreed that the POs would install the system and claim reimbursement of consumer and PO subsidies, and 80% of their loans extended to households (detailed in chapter 6) from IDCOL. We were afraid that the POs might claim grants and loans without installing the SHSs. Given previous experience under different government-subsidized programs, we decided not to release any money without an on-site physical inspection of the installed SHSs. It was a tough job as they were in remote rural areas, often about 3-4 miles away from each other. I used most of my weekends to inspect the systems and required all the IDCOL staff to do the

[3] The feed-in tariff (FiT) and net metering are methods by which a utility company compensates a homeowner or other producer for the energy fed back into the grid.

same regularly. We had to fill out a form detailing terms of sale, system features, number of lights and other appliances, type of household accommodation, number of beneficiaries, and system performance during the on-site verification. Our inspections helped prevent abuse and develop a strong rapport with our POs and the beneficiaries. As a bonus, it also enabled us to understand the field-level problems and find their solutions.

Beauty of the SHS

During our early inspections, we learned a lot. For example, SHSs are self-advertising. When installation numbers were low and usually spread far apart from one another, a single functioning SHS would shine brightly in a sea of darkness and could be seen from afar. Not surprisingly, inquiries and visits from would-be beneficiaries grew substantially. Moreover, satisfied clients would become publicists themselves, telling friends and relatives about the system's merits. Many buyers said they got interested after seeing one at a relative's or neighbor's home. For some, it became a status symbol.

The other attraction was that SHSs were easy to maintain. The solar panel on the rooftop had to be kept dust-free and away from shade. Thus, occasional trimming of tree branches and dusting-off of the solar panel would ensure uninterrupted electricity generation. The battery needed to be filled with distilled water once a month for proper charging. The charge controller required close monitoring to prevent overuse of electricity. The womenfolk could perform these activities even with little training.

There were, of course, challenges. For example, the villagers would add additional lights and appliances to the system or carry cables further away than the design would permit. Such tweaking would result in poor performance of SHS, electricity supply disruptions, and customer complaints. To address these issues, we embarked on an ambitious training program.

Capacity Building

IDCOL supported several training activities for capacity building—training of trainers, management, staff, technicians, and customers. A Technician Accreditation program was also initiated to ensure consistent quality of practitioners' skills. The table below shows the types and numbers of different training provided by IDCOL, their providers, and participants. We outsourced some of the training to ensure a better impact.

Number of Training Organized by IDCOL

Type of training	Providers	Participants	No. of trainees
Training of trainers	IDCOL	PO officials	496
Management training	PKSF	PO officials at head office	202
Staff training	PO	PO field staff	31,675
Technician training	PO	PO technician	1,774
Customer training	Technical institutes	Household	1,601,412
Total			**1,635,559**

Source: IDCOL, 2018

Training programs sought to enhance PO capacity to train their office staff on operational, financial, legal, and promotional aspects of the program. It also covered PO field staff training to inform them about configuration, positioning, installation, maintenance, and troubleshooting of the equipment, monitoring and inspection guidelines, and improvement of installment collection efficacy. Technicians were trained to support the customers as they were likely to remain available even after completing the project. Customers were trained on the use of the equipment and handling small technical problems by themselves. A total of 1.64 million persons were trained in different categories.

Off to a Flying Start

Thanks to efficient program design, careful preparation, support from the World Bank, and the IDCOL and PO field staff's hard work, we had an excellent start. In less than a year, we reached the critical landmark of installing 10,000 SHSs, one-fifth of our target. We organized a small event to mark the occasion at Rajnagar, the Finance Minister M. Saifur Rahman's electoral constituency. The event generated positive publicity in the media and earned us an enthusiastic supporter of the SHS program: The Finance Minister himself. He remained a life-long patron and became a customer of seven SHSs installed in his village and paid out of his pocket. The publicity was crucial to demonstrate the government's wholehearted

support for the program. We also invited the World Bank Country Director to acknowledge their support. The PO representatives were present too, and we gave prizes to their outstanding staff members.

We organized similar events for 20,000, 30,000, and 40,000 SHSs milestones attended by other ministers in charge of Local Government, Power, and Environment ministries. Their presence helped boost the program's publicity and, interestingly, resolved a ticklish issue. For instance, POs told us that some locally influential people were trying to evade their loan repayment. However, after seeing all these ministers at the event, the errant households fell in line, thus eliminating significant credit risk for the POs and, ultimately, for IDCOL.

Soul Searching by the World Bank

In the meeting to celebrate the 20,000th solar home system installation, Christine I. Wallich, Country Director, the World Bank, referred to my speech and said, "I just learned about another one, thanks to Dr. Khan's description of the early days here, and I must say I am both humbled and somewhat embarrassed, but perhaps not surprised by what he said. Because I think it is the World Bank's tendency to be, I'm not sure what word to use, to be a difficult partner. I like to think that we're not, but I often think we aren't. But I think this a sober reminder of how a good idea could almost have been killed at birth because of a lack of willingness to be open-minded, to try the untried, to take a risk, and to have confidence and faith in local people and local institutions' ability to design something sensible for their circumstances. So I take my hat off to you, Dr. Khan, for your persistence, because you didn't have to be persistent, and glad my colleague Vijay Iyer, who has unfortunately left South-Asia Energy Unit, I'm glad that he had the courage to take a risk. But I think there is a lesson in there for us, and I appreciate your frankness in mentioning this."

Women as Decision-makers

During my field visits, I used to ask family members whose decision it had been to install an SHS. Invariably, I found that it was the women who played a significant role. In most cases, the housewives or the mother and daughter team had persuaded the male household-head to purchase the system. I would follow up by asking the women to give me the most important reason why they wanted SHSs in their houses. Most of them replied that it provided improved security for them. When asked to explain, they would say that earlier; if they had to ease up after sundown, they were apprehensive about venture out of the house to toilets located at a short

distance. They would suppress the urge until dawn to the detriment of their health. With SHSs, they could just switch on the light and go out without fear.

Time to Celebrate

Finally, the hard work of all of us—IDCOL staff, POs, and other stakeholders—was starting to pay off. We achieved the crucial milestone of installing 50,000 SHSs—three years ahead of the target date in 2004, US$2 million below the budget, and most importantly, without the involvement of any international consultant. We invited the then Prime Minister Begum Khaleda Zia to inaugurate the 50,000th SHS in her village in Porshuram, Feni, via satellite. She spoke directly from Dhaka with Pear Ahmed, one of the direct beneficiaries in Porshuram. The satellite connection was provided by DNS Satcom, a medium infrastructure project, which was financed by IDCOL. The PM talked to Ahmed's family members and asked how they felt about having the SHS at their home. They seemed overwhelmed not only because they now got electricity, but more excitingly, they got to talk to the country's most powerful person directly. Their daughter, a schoolgirl, invited the PM to their house and promised to provide her lunch of lobster and various homemade cakes. Their raw enthusiasm seemed infectious as the prime minister giggled all through the conversation! The Finance Minister, our patron from the beginning, and the World Bank's country director also spoke at the ceremony. The Bank's South Asia Region Vice President sent us a congratulatory message for achieving this critical milestone.

We organized a similar event with Prime Minister Sheikh Hasina to celebrate one million SHS's installation in 2010 on Sandwip, the remote island, where it all began. Both occasions were a testament to the fact that IDCOL enjoyed the full support of both prime ministers despite their adversarial attitude to one another.

Message to IDCOL from Praful C. Patel, Vice President, South Asia Region, The World Bank

Congratulatory Message to IDCOL

Projects reaching their target three years early are very uncommon. When the *Rural Electrification and Renewable Energy Development Project* was under preparation, back in 2002, the idea that 50,000 Solar Home Systems (SHS) might be installed in rural Bangladesh within a period of five years (2003 – 2008) seemed highly ambitious. However, we now find ourselves proved wrong in the best possible way. This project stands as an excellent example of the transformations that can be achieved by committed people working in a good institutional environment.

The 50,000 SHS were implemented through a partnership between IDCOL and several partner organizations, each doing the parts it could do best. Using clear eligibility criteria, agencies with credible micro finance experience were selected to extend micro finance to their members for buying SHS. A *"technical standards committee"* was formed by IDCOL to identify equipment that could be used under this project to maintain performance standards. Partner organizations and suppliers entered into contracts for timely supply of equipment, provision of training to households, and after sales service. IDCOL managed the whole process from start to finish and with proper monitoring and supervision. They provided training to the partner organizations, and carried out effective awareness campaigns through television, movie theaters, and village markets. IDCOL harnessed the strengths of various organizations and created a team effort full of synergy. All the parts working together made this project a success.

The World Bank is proud of its association with such a project. As a sign of our continuing commitment and support, we have approved additional funding to IDCOL to install more SHS in rural Bangladesh.

Bangladesh faces a tremendous challenge in improving the efficiency and quality of power services it provides to its citizens, and the World Bank is committed to working with the Government to meet this challenge. This small but very valuable project shows what can be achieved in the sector by committed and efficient players. With more than 85 million people without access to electricity, Bangladesh is in dire need of good institutions to reach its goal of electricity for all by 2020.

Praful C. Patel
Vice President
South Asia Region
The World Bank

Frost and Messiah in Berlin

However, it did not take us long to realize that success could pose some problems down the line. A few months before we hit the 50,000 SHS

milestone, it was clear that we would achieve the installation target way before the timeline. As we were nearing the target way ahead of time, the PO staff kept asking me during field visits what would happen to them after they had installed 50,000 SHSs. Their concern stemmed mainly from the fear of losing job prospects. They would even ask me if they had made a mistake by working so hard, completing the task three years ahead. I would vaguely assure them that something would happen, and their good work would not go in vain. Frankly, I was not sure how things would turn out. There were funds from the World Bank available to provide loans, but the grant money would be exhausted with the installation of 50,000 SHSs. The Bank told us that while they would be happy to support the program with loan financing, it was unlikely that they would be able to provide the grant support. A breaker was provided by the bank by reallocating the grant earn avail after 14,000 SHS–to be implemented by BREB. We discussed the matter with the POs in our operations committee meetings. They all told me that the program would be doomed without the grant support as households would not be able to afford higher installment payments.

The unresolved matter kept me thinking as to what could be done. In late October 2004, I was invited to join the InfraPoor workshop in Berlin, organized by the OECD, the rich nations' Paris-based club. I accepted the invitation but politely asked them to make a 10-15 minutes' presentation on our Solar Home System (SHS) program. The organizers informed me that they had already finalized the schedule, and there was no scope to accommodate my request for the main session. However, they offered me a 15-minute slot for interested participants during the lunch break. I was a bit disheartened but decided to take the opportunity to highlight the program and seek funds from the international community. Our IT expert at the time (now the Deputy CEO of IDCOL) and I prepared a 12-minute presentation with short video-clips showing thankful and excited villagers using SHSs.

I attended the workshop and was looking forward to making my presentation. As it happens in such meetings, the talks and discussions overran 30 minutes past the lunch schedule. However, the delayed presentation had pretty good attendance, with nearly half the main workshop participants showing up. Regrettably, barely 5 minutes after I had begun, the afternoon session's call was made, and the Chair abruptly stopped me, inviting everyone to join the main session. I felt crushed and went to the Men's Room to compose myself.

While I was there, tears welled up in my eyes when someone tapped me on my shoulder. In a gesture of consoling me, the person said sorry about the abrupt way I was cut off. He introduced himself and gave me his visiting card. He was from the German Development Cooperation Agency,

BMZ. He also said that he would like to see the rest of my presentation at the BMZ office after the workshop. I went and gave the full presentation, where I highlighted how sad it would be if the program were to end for a shortage of funds. After the presentation, he asked me how much money was needed. I told him that US$15 million would suffice to meet the needs for the next two years. He said that he would not promise anything but would try his best to assist the program. Happily, it later turned out that he did try, and the German KfW came forward with a US$20million grant to support the SHS program!

Tailwinds

The SHS program was fortunate to benefit from four tailwinds that pushed the program to unexpected heights. Without these global phenomena that change the game's very parameters, the SHS program's success would have been more modest. These powerful tailwinds were:

- Between 2003 and 2012, fossil fuel prices were rising globally. As kerosene prices went up, the economics of SHS became more favorable. We initially set up SHS monthly installments slightly above monthly expenditure on kerosene as we provided superior lighting. With the rising price of kerosene, the installment payments became lower than kerosene cost;
- Between 2003 and 2015, massive global investments in solar energy technology were made in response to an enormous increase in global demand. These investments brought down the price per watt-peak (Wp) of solar panels from US$5.00 in 2003 to US$0.30 in 2015. Fall in the solar panel prices lowered the price of SHSs as its price constituted 40% of the total system cost. Reduction in SHS prices brought in more customers who could not have afforded it earlier;
- When the SHS program started in 2003, with a 40 Wp SHS, a household could run 3-4 lightbulbs and a black and white TV. With the advent of LED bulbs, the scenario changed dramatically. While the earlier incandescent/CFL bulbs would need 11Wp of power, new LED bulbs gave the same illumination with 2-3 Wp. As a result, what could be done earlier with a 50 Wp system became possible with a much lower-priced 20 Wp system.
- Furthermore, many Bangladeshi workers went to middle-eastern countries during this period, often leaving their families behind. These workers, well informed about SHS, worried about their young

and vulnerable families' safety back home, sent money back home to install SHSs as a security measure for them.

Benefits of SHSs

At the household level, installing SHSs has many immediate benefits for families, such as lighting after dark. It helped the consumers in three significant ways: It allowed the women in households, who spend most of their time indoors, more flexibility by providing better kitchen lighting. They were able to prepare and serve dinner after dark and thus freed up some time for them during the day. The extra time allowed cooking and other household activities, such as cleaning and sewing, to be done better at a relaxed pace. Interestingly, we noticed that the female members of families were making most SHS-related decisions. As I already mentioned, the decision to purchase an SHS was usually made by them, and they were also maintaining the systems and taking care of them. We already talked about the improved security situation in households with SHSs and an increased role of the female members in decision-making. It helped the family income streams by allowing additional hours for income-generating activities such as artisan crafts, handiworks after dark. It allowed them to keep the shops at the market open for longer hours and opened up new income-streams (from charging mobile phones through the SHSs). It helped school-going children by providing additional study hours after dark. The black and white TV powered by the SHS became their window to the world and a significant entertainment source.

SHSs also led to better health outcomes, especially for women and children, by lowering kerosene-burning and household air pollution inside the house. At a more macro level, the system's use leads to other positive externalities such as reducing carbon emission through burning kerosene and firewood.

Sometimes I would visit households of comparable income that did not have SHS for comparison with those with the lighting. Every time, I would find children in the latter was cleaner, better clothed, and more cheerful and women less shy of speaking. I am unsure whether families with more confident mothers and joyful children adopted the SHS or the solar-powered lights improved their lifestyles and made them radiant.

Unsung Heroes

The story about "one of the fastest-growing off-grid SHS programs in the world" would not be complete without a special mention of the unsung

heroes that made the program a phenomenal success. The case of Md. Shoyaeb, a young solar engineer, is worth a special mention. I first met Shoyaeb when he was the Manager of Grameen Shakti on Sandwip. He had installed the two SHSs that I purchased for our village mosque and my cousin's house even before our program began. Few months after we started, I requested then in-charge of IDCOL Accounting and IT to find out which Upazila[4] had the highest concentration of SHSs. From our database, he pulled out a list of Upazila-wise installations. The first name was Shyamnagar in the southern Satkhira district. The second was none other than Sandwip– my village. I had already visited Satkhira, so it was time for me to go back to Sandwip.

Reaching Sandwip was, and remains, a perilous and arduous commute even after 50 years of Bangladesh's independence. I started from Dhaka by train for Chittagong. From there, I went to Kumira, about 20 km away by car; then, I took a speedboat to Sandwip, located at the estuary where the mighty river Meghna merges with the Bay of Bengal. It took just 45 minutes to cross the channel, but boarding and disembarking were hazardous, especially on the Sandwip-side. We arrived there at about 11 am. The mighty river Meghna was on the ebb. We had to descend from the speedboat and then on to a country-boat at Meghna's muddy slope. The shore was still some half-a-mile away. Several people pushed the boat along the mud for about 20 minutes, and we finally arrived at the coast. There was no landing station. Two people carried me off the boat to the shore.

My nephews were there to receive me as well as an unknown face. He introduced himself, "Sir, I am Md. Shoyaeb, Manager of Grameen Shakti, Sandwip branch. I installed the SHSs in your village home." My nephews were about to hire a rickshaw to take me home. Shoyaeb came forward and said, "May I take Sir on the back of my motorcycle? It will be a faster and a more comfortable ride compared to rickshaw on a broken road." I agreed.

After meeting my relatives at home and having some refreshments, I went to Shoyaeb's office. We planned to inspect SHSs there and showed him the list of 25 randomly selected households that I would like to visit. We started right away: from one home to another, about 2 to 3 miles apart. Sometimes we would have to navigate through the narrow dividers between the paddy fields. Shoyaeb knew the precise location of each house that we visited and never had to ask for directions. He was also very popular among the villagers, and they offered us coconut drinks and snacks. During the motorbike ride, I asked him who the buyers were, how

[4] Upazila is an administrative region in Bangladesh, functioning as a sub-unit of a district.

he selected them, the types of complaints he received, and installment collection. He was on top of all these issues.

He would go to a village and inquire who the most trusted people in the village were and their economic conditions. He would try to persuade one of them to buy an SHS in installments. These people were usually school teachers, freedom fighters, and religious leaders. Once he convinced one of them, he would ensure the best possible after-sales services. He would visit their houses to check the system's performance even when no complaints had been made. He would later use these customers as examples and motivate them to campaign for SHSs among other villagers. In marketing parlance, this is called *influencer marketing*. Given how closely knit the rural communities are, salespeople such as Shoyaeb were putting their reputations on the line by selling an expensive product for those households.

Shoyaeb was an engineer and had never gone to business school, yet he knew all about marketing. I thought business school students could learn about rural marketing from him. It is not Shoyaeb alone who exhibited these great qualities. I have met hundreds of similarly smart and dedicated solar engineers and technicians during my field visits. Sure, the World Bank support, concessional financing, and the program design helped, publicity worked, our hard work at IDCOL paid off. However, without the support from this cadre of last-mile solution providers, there was no way the program could have been such a stellar success.

CHAPTER 6

GOOD DESIGN IS WHAT WORKS

Design is not just what it looks like and feels like. Design is how it works.
-Steve Jobs

From the very start, Solar Home System (SHS) aimed to quench the thirst for electricity in remote areas that were unlikely to be connected with the national grid soon, primarily because it was prohibitively expensive and beyond the financial reach of most would-be consumers. However, there was a bright spot: those areas enjoy an abundance of sunshine throughout the year, providing ample opportunity for harvesting this inexhaustible natural resource. That was the fundamental reason for launching the SHS program. However, we had to ensure that the purpose was to meet the unmet demand and make it affordable and beneficial for the users and worthwhile for other participating NGOs and microfinance institutions. That is what drove us to design the program in a way that would bring the system's cost substantially down.

Participation Agreement - The Linchpin

The Participating Organizations

The key features of the design are its openness, flexibility, and adaptability. At the outset, the program accepted three types of participating organizations (POs): (a) supplier, who delivered solar equipment; (b) lender–who provided microcredits for purchasing SHSs; and (c) supplier and lender–a combination of both for the provision of equipment and microcredit functions. As the program evolved, the three categories were merged into two: the supplier; and supplier and lender POs.

To ensure the selection of competent POs, they were required to have two years of experience in providing microfinance and have minimum equity (including capital fund) of US$130,000. Since the POs were engaged in other microfinance programs such as crop and cattle loans, we required them to segregate their SHS operating activities by creating a

Special Project Vehicle (SPV) with separate accounts to be monitored and audited separately. Additionally, they had to maintain an overall micro-credit recovery rate of at least 90%, a debt-equity ratio below 4.0 (minimum 20% equity), and an SHS-business plan approved by IDCOL.

Financial Engineering

One of the critical challenges of the program was to make SHS affordable to low-income customers. To achieve this, IDCOL provided two types of grants to the POs: Grant A and B: Grant A was meant to lower costs of solar equipment, which, in 2003, was US$90 but came down to $20 in 2014 as solar panel prices dropped drastically during the period. While both the supplier and the supplier and lender POs were eligible for grant A, the POs performing both the functions received an additional Grant B of $20 per system initially for institutional development, which was also reduced significantly as the POs started to install a large number of SHSs.

The supplier and lender POs provided microcredits to households for the purchase of solar equipment. The lending terms–the loan repayment period of 3 years at a flat interest rate (not compounded) of 16% per annum–were set to make the consumers' installment payments affordable. IDCOL set ceilings for both per system and percentage of PO loan refinancing, as shown below. We did this differentiation to secure a higher contribution from larger POs.

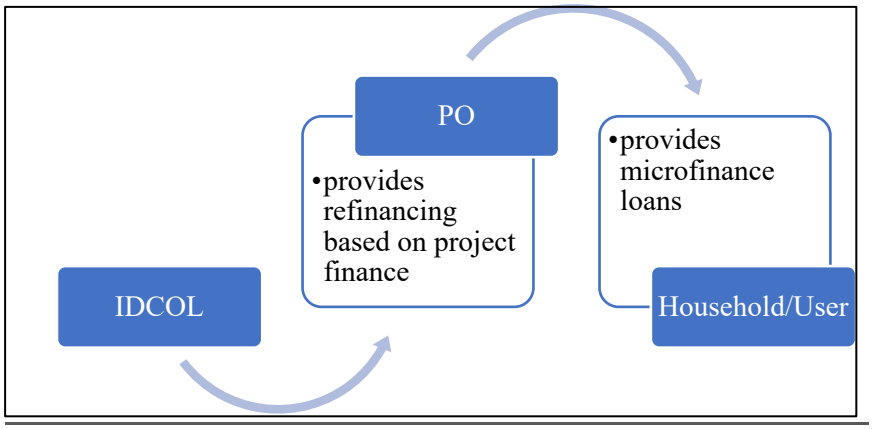
Total Refinancing Required from IDCOL	% of Refinancing	Refinancing Ceiling
Below US$ 3.3 million	80%	US$ 285 per system
Above US$ 3.3 million	70%	US$ 260 per system

While the POs used microcredit principles for their loans to households/owners[1], IDCOL extended refinancing to the POs on a project finance basis.[2] Notably, both microfinance and project finance were loans given with no/little collateral.

[1] Besides households, small businesses such as tailors, grocery shops purchased SHS to continue their business after dusk.

[2] Project finance is a limited recourse financing in which the project's cash flow is the basis of lending instead of corporate assets.

Blending Microfinance with Project Finance



Source: Author

Two significant microfinance features[3] for SHS were that it allowed consumers with no means to buy and own an expensive asset, i.e., an SHS, and they did not have to provide any collateral. Also, the monthly installments were fixed not to put any extra burden on the borrowers and were comparable with the cost of alternative lighting sources such as kerosene. This particular feature made repayments much easier for users.

Since there were no collaterals for the money it provided to the POs, IDCOL needed to take some measures to ensure its loan security. Therefore, it required the POs to meet three conditions.

First, each PO had to create a *Special Purpose Vehicle (SPV),* which enabled them to separate their SHS operations from their existing businesses. This arrangement proved beneficial for both the POs and IDCOL, as it allowed them to pledge only the SHS program-related assets and not their entire business to secure a loan. On the other hand, the separation of SHS-related activities from their existing businesses gave IDCOL a clear understanding of the SHS operations.

Second, each PO was required to open a *Proceeds Account* with an IDCOL-approved bank in which it kept all the proceeds from SHS activities and met its expenses. This account is also where the POs deposited the users' down-payments. The *Proceeds Account* enabled

[3] Traditionally, microcredit is provided for productive purposes. However, in this case, they were provided for energy consumption. The usage of SHSs provided the users with socioeconomic benefits (e.g., more time after dark to work, study), which gradually enhanced income and made it easier for households to repay the loans to the POs.

IDCOL to closely monitor the POs' operating cash flows and liquidity position.

Third, each PO had to maintain a *Debt-Service Reserve Account* (DSRA), where they would deposit an equivalent of four quarterly installments of the debt service amount, one-month before the repayment date. In the event of default in any given month, IDCOL had the legal rights to recover the amount due from the DSRA, which served indirectly as cash collateral.

Ownership of the Program

For their part, the households/owners were required to make a minimum 10% down-payment for each SHS. POs had to contribute another 20-30% as IDCOL did not refinance the full amount of their loan to households. These were done to make all stakeholders accountable and ensure that all parties had financial stakes in an SHS.

The End Product – Financing

The financing structure for a small 20 Wp SHS is provided in the table below. For example, a 20 Wp SHS costs US$110, an amount, which was beyond the affordability of a potential user. However, the innovative financing structure (which blends both project finance and microfinance) allows the same system to be purchased with 36-monthly installments of US$2.60. For this 20Wp asset, the POs get a loan of US$64.8 from IDCOL, which is paid back over seven years at a 6% interest rate.

Financing Illustration of a $20W_p$ SHS

Details	
a) Market Price	US$110
b) Consumer subsidy	US$20
c) System Price for User [a-b]	US$90
d) Down Payment from User to PO [10% of c]	US$9
e) Loan Payable from User to PO [c-d]	US$81
Loan repayment period(User)	3 years
Interest Rate(User)	16%
Monthly Installment for Users	US$2.60
f) IDCOL Refinance [80% of e]	US$64.80

Loan repayment period(PO)	7 years
Interest Rate (PO)	6% p.a.

Source: IDCOL

Disbursement of Refinancing

After providing users SHS on microcredits, the POs ask for grants and refinancing from IDCOL through what is known as the *Disbursement Request*, which must be sent at least 21 days before the actual disbursement date. If the POs had met all the necessary preconditions, IDCOL usually sent the money within 21 business days.

The US Dollar/Bangladeshi Taka exchange rate is determined on the day IDCOL receives its funds from the government and is used as the rate for loan reimbursement to the POs. The exchange rate is reviewed every six months. The grants and refinancing amounts are subject to the availability of funds, which are notified periodically.

Conditions Precedent

To receive the funding, the POs had to meet preconditions that, in financial jargon, are known as conditions precedent (CP). To get the first installment based on what is known as the "General CP," the POs had to submit copies of legal documents related to their operations and a certificate of SHS installations. They were required to provide the lease agreement with the user and proof that they had deposited the down-payment in the Proceeds Account (through copies of bank statements). For subsequent disbursements, the POs had to ensure that the SHSs had been installed outside the existing grid area and that there were no changes in representations and warranties (discussed below) the PO had to make. If the POs did not strictly follow these requirements, IDCOL had the right to refuse the grant and refinancing.

Monitoring and Evaluation

Apart from the CPs, IDCOL needed to ensure that SHSs were installed at the designated areas, the system was working correctly before releasing the money. For verification, IDCOL officials conducted random field

visits.[4] The visits' objectives were to confirm that the PO had used IDCOL-approved equipment, POs were using the money appropriately, and users were satisfied with the SHSs and the services. If we found POs had filed any 'false claims,' they had to pay a penalty of US$70 per SHS and bear the expenses of additional inspections to be done. Fortunately for us, through our frequent visits, we conveyed to the POs that they would not be able to get away with any false claim.

Loan Terms

As the SHS program progressed, refinancing terms for the POs were gradually tightened to bring the same closer to the market rate. Although it is customary for large borrowers to receive more concessional terms, we did the opposite in this case to limit the amount of loan to a particular PO. (The loan terms for the POs are shown in the table below).

Refinancing Loan Terms for POs

Cumulative Refinance	Interest Rate (on the outstanding balance)	Loan Tenor	Grace Period
Up to US$ 3 million	6%	7 years	1 year
From US$ 3 million to US$ 6 million	7%	6 years	1 year
From US$ 3 million to US$ 12 million	8%	6 years	1 year
More than US$ 12 million	9%	5 years	0.5 year

Source: IDCOL

Repayments and Late Payments

The POs had to make quarterly repayments of the principal amounts and the service charge/interest rates accrued. In case of default, IDCOL would charge a late fee of 2% annually over and above the interest and principal amounts overdue.

Representation and Warranties

[4] The practice of visiting every single installed SHS was discontinued, tentatively, in mid-2005. The practice was replaced by visits by field level technical inspectors recruited solely for the purpose.

The POs were required to make certain representations and give warranties.[5] For example, it was a company/NGO that validly existed under the laws and had the corporate power, authority, and dedicated staff to carry out its operations. They had to accept that the Participation Agreement's terms were legal, valid, binding, and commitments under the Agreement would not violate any law, rule, or regulation. They must have all the authorizations required for operating the SHS business. That the POs were not currently facing any litigation, arbitration and administrative, or other legal proceedings concerning its SHS operations. They were compliant with Bangladesh's environmental laws and regulations. They had not received any funding from other sources to carry out the SHS operation, avoid duplication of financial gains and liabilities.

Event of Default

IDCOL could declare an event of default if any PO did not repay the loans on time, failed to achieve SHS installation targets, breached any undertaking, or incurred or undertook any insolvency or bankruptcy proceedings. If there were an event of default and deemed *curable*, IDCOL would give the PO a legal notice to rectify the situation in less than 30 days. If a *cure* was not possible, IDCOL could suspend or cancel any undisbursed grant or refinancing and declare all outstanding amounts immediately due and payable. During the ongoing event of default, if the PO wanted to make any payments from the Proceeds Account, this would require prior approval. Moreover, IDCOL had a legal authority to cash the amount in the reserve account of the POs if they fail to repay loans. An indicative term sheet[6] is included in appendix 6A to help public entrepreneurs draft legal agreements for electricity access or similar programs.

[5] Representations concerning present facts – either by words or by conduct – made to induce someone to act, especially to enter into a contract. For example, a representation may attest to the validity of POs license to be in the business of selling SHS, or it may certify that the article being sold is free of defects. Warranties differ from Representations in that they refer to the future. The PO agrees to fix any defects for a specified amount of time into the future. Some SHS products may have a lifetime warranty. Hence if a user buys an SHS with a lifetime warranty, then every time the instrument malfunctions, it can be sent back to the PO to get fixed. The warranty obligates the PO to comply with the terms of the contract.

[6] A term sheet is a bullet-point document outlining the material terms and conditions of a business agreement.

Sustainability of POs

To address the sustainability of the POs and their institutional development, IDCOL provided them with a grant. This grant, titled Grant B, was US$20 per system in 2003 but had been reduced to the Taka equivalent of US$3 by 2014. IDCOL's refinancing terms were more concessional than the microcredit loans POs provided to the households. The grant and loan terms were designed to ensure the financial sustainability of the POs so that they would be able to carry on their businesses without IDCOL's support in the future.

Environmental Sustainability

While the SHSs were environment-friendly, a significant concern persisted in terms of the safe disposal of lead-acid storage batteries and solar panels once their warranties had expired. While the solar panels had a warranted life of 25 years, the lead-acid storage batteries had a much shorter life of only six years. To encourage the POs to collect and properly dispose of the expired batteries, at the designated collection points, of the manufacturers, a Grant C of US$5 was provided for each battery disposal for recycling. Also, IDCOL refinanced 100% of the POs' loans to the households to purchase new batteries. We also set a ceiling of a maximum of US$100 per unit.

Raising Awareness

IDCOL engaged in a country-wide marketing campaign to raise awareness for SHSs, using traditional marketing mediums such as posters, billboards, TV commercials, and docudramas. Since POs were in the best position to understand the users' requirements, IDCOL engaged them to bolster the campaign further. They relied on live product demonstrations in community buildings, educational institutions, mosques, hospitals, and others to motivate potential users. We arranged exhibitions to create a platform for the manufacturers and distributors to display their products. The campaign also focused on women users through separate awareness programs in girl's schools and colleges. Initially, IDCOL funded the country-wide campaigns because they were expensive. However, the POs later shared the cost as they had realized that it was helping their businesses.

Organizational Structure

While the POs were responsible for procurement, sales, after-sales support, and microfinance, IDCOL had the critical task of driving the SHS program forward. We did so by selecting the excellent POs, ensuring that the products had the right quality, and effectively carried out operations. To make the program work smoothly, IDCOL created several committees to oversee its proper functioning: They were tasked with monitoring technical standards and PO selection. (The responsibilities of these committees and how they contributed to the program's success are detailed in Chapter 9.)

Commercialization

From the beginning, IDCOL focused on commercializing the SHS market in two ways. First, subsidies were reduced in phases after 2003. Institutional development subsidies were gradually phased out from 2012.[7] Consumer subsidy was decreased from US$70 to US$20 and was only provided for smaller SHSs (less than 30Wp). The adjustments were made as a part of the program's pro-poor approach to ensure that the systems were affordable for the less well-off users.

SHS Grant Phase-Out (US$ per SHS)

	2003	2004~5	2006~7	2008~9	2010~11	2012	2013~2018
Capital Buy-Down Grant	70	55	40	40	25	25	20
Institutional Development Grant	20	12	10	5	3	0	0

Source: IDCOL

Second, the lending terms between IDCOL and POs were gradually made more commercial by increasing interest rates, reducing loan repayment periods, and refinancing over the years.

Concessional to Commercial Lending

	2003~2008	2009~2011	2012~2018
Loan Tenor	10 years	6-8 years	5-7 years
Interest Rate	6%	6%-8%	6%-9%

[7] The subsidy of US$ 3 remained for small systems.

% of Loan Refinanced	80%	80%	70%-80%

Source: IDCOL

The above measures led to the emergence of a private *non-IDCOL* SHS market in Bangladesh in 2013, and it started competing directly with IDCOL. Given the rapid growth of the market and the promises it offered, it was only a matter of time before others jumped in. After gaining the skills and knowledge from the SHS program, the former experienced PO staff, suppliers, and technicians established their own businesses. The result has been both disruptive and phenomenal as the alternative market is currently selling more SHSs than the IDCOL. (The non-IDCOL market, its operations, and its impact on the IDCOL SHS program are discussed in detail in Chapter 11.)

Maximizing Finance for Development

The SHS program is an example of how a state-run project succeeded in attracting private sector financing, something genuinely unusual for economies like Bangladesh. Conventionally, in these economies, governments usually look for foreign partners to finance development projects. Primarily, it is because loans from donors are available at a low-cost, repaid over a long period, and have the lowest impact on the government's budget. If donors do not prove to be a viable option, the government will then attempt to tap its fund.

In other words, the SHS program is an example of a successful cooperative approach between the private and public sectors, demonstrating how it can succeed. In the 14 years since the World Bank started funding the renewable energy (RE)[8] in 2003, it provided US$425.59 million between 2003 and 2017 to IDCOL. Simultaneously, the program managed to attract private finance through user contribution (from down payment) and debt financing shared by the PO. From 2003 to 2017, the user down payments and PO-contributions amounted to US$173.64 million (14.3% of Bank financing) and US$227.07 million (18.8% of Bank), respectively.

The program also leveraged private financing from SHS equipment suppliers. Back in 2003, most of the solar equipment needed to be imported. The viability of SHS and the impressive gains over the years created an opportunity for local production and jump-started the solar

[8] IDCOL's RE program included solar irrigation pumps and mini solar grids.

components manufacturing industry in Bangladesh. Now, local companies produce equipment such as photovoltaic (PV) panels and charge controllers. The program also helped create an additional market for existing manufacturers of tubular plate batteries and inverters. From 2003 until 2017, the suppliers invested around US$63.08 million (5.2% of total Bank financing) in PV panels, batteries, and charge controllers. In total, the SHS program was able to attract 38.3% of World Bank funding from the private sector.

Over the years, IDCOL was able to attract grant and concessional loans from the Asian Development Bank, Japan International Cooperation Agency, Islamic Development Bank, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), United States Agency for International Development (USAID), and Department for International Development (DFID), UK. The loans and grants from other donors mentioned above amounted to US$176.86 million (14.7% of total Bank financing) and US$73.5 million (6.1% of total Bank financing), respectively, from 2003 to 2017. The POs were also able to obtain carbon financing of US$6.96 million from the United Nations. Altogether, the SHS program was able to attract 21% of the World Bank funding from other donors. These contributions demonstrate the confidence of other multilateral and bilateral donors, private investors, microfinance institutions, and NGOs in IDCOL's program.

Policy or Program – What Should Come First?

When IDCOL first introduced the SHS program in 2003, Bangladesh's power sector was going through significant reforms as part of its decentralization, focusing on the private sector to handle: (a) power generation; (b) transmission; and (c) distribution services. The emphasis, however, remained on private power generation using fossil fuels. As a result, when IDCOL started the SHS program, there was no policy guideline or regulatory authority for off-grid electrification. Because of the 'policy vacuum,' IDCOL took on the mantle of *quasi-regulator*. An excellent example of this role is the Technical Standards Committee (TSC), which sets the SHS components' standards. The first renewable energy policy support from the government came in import duty exemptions on solar equipment during 2004, a year after the SHS program's start due to IDCOL's persuasion. Therefore, government policy and regulatory support followed the advent of the IDCOL program.

The standard approach is to have policies in place first and then implement a program. Bangladesh's neighboring countries follow this approach. For example, India created the Ministry of New and Renewable

Energy (MNRE) in 1982 to lead its renewable energy plan. On the other hand, Pakistan started to support implementing its renewable energy policy and creating the Alternative Energy Development Board in 2006.

Both these scenarios pose an interesting question as to what should come first–policy or program. As it turns out, the more entrepreneurial approach 'program before policy' has worked well in Bangladesh. The government formulated the renewable energy policy in 2008, five years after the start of the SHS program. By then, IDCOL's participating organizations (POs) had installed around 270,000 systems. By the time Bangladesh's regulatory authority—Sustainable and Renewable Energy Development Authority (SREDA)–was created in 2014, the POs had installed around 3.5 million SHSs.

Why did this approach work? Sarah Feron's research from Leuphana University, Germany[9] suggests that sustainable renewable energy electrification projects require strong formal institutions. It is more critical than full-fledged policies. i.e., the project implementation institution must be stable, adaptable, and able to enforce its decisions. IDCOL demonstrated these characteristics well in its dual role as a financing institution and a policymaker.

For example, the Technical Standards Committee (TSC) was formed despite having the state-run authority standards and testing institution, known as BSTI. The TSC ensures the quality standards, adapted throughout the program and enforced through technical inspectors. In India's case, the presence of the MNRE did not guarantee success in off-grid rural electrification. Its 'top-down approach' of providing subsidies to solar electricity service providers through rural banks to reduce end-user prices met with bureaucratic hurdles and enforcement issues.

IDCOL's experience showed that properly-designed entrepreneurship from a public sector agency, more often than not, resulted in a strong champion for a desirable social activity and perhaps be a better launch-pad to solve a problem than a policy-first approach.

[9] "Sustainability of Off-Grid Photovoltaic Systems for Rural Electrification in Developing Countries: A Review" Sustainability 2016, pp 1-26.

CHAPTER 7

BEYOND LIGHTING

We have this handy fusion reactor in the sky called the Sun. You don't have to do anything. It just works. It shows up every day and produces ridiculous amounts of power.
–Elon Musk

After our first SHS renewable energy program's success, we were keen to explore what other technologies could be developed using the abundant sunlight. In no time, we had thought of two ideas: solar irrigation pumps (SIP) and solar mini-grids (SMG). Unlike SHS that only served one household, these alternative technologies were designed to provide power for a much larger consumer base.

Solar Irrigation Pumps

In 2009, there were more than 1.6 million irrigation pumps in Bangladesh, mostly operated by diesel-powered generators and electricity provided by state-run utilities. These pumps were then consuming about 1 million tons of diesel annually, costing about US$900 million, of which the government provided US280 million in subsidy. It was a no-brainer that replacing diesel with solar power to run the pumps would yield tremendous benefits.

Furthermore, the Bangladesh Rural Electrification Board (BREB) had decided to stop providing electricity for the pumps, leaving their operations dependent on diesel or solar energy, which is a cheaper and cleaner alternative to diesel. According to BREB, in late 2012, 79% of the irrigation pumps were operated by diesel, 18% run by electricity, and solar energy accounted for only 3%. No wonder there was massive potential for solar-powered irrigation. However, there was a caveat: how to minimize the costs? Unlike SHS, which is used for individual households, solar-powered irrigation in a wide area would be very expensive unless

individual farmers can be brought under a system where they would collectively share the cost.

A fee-for-service model was introduced to address the issue, where a sponsor would install a solar water pump and sell water to neighboring farmers in exchange for a predetermined fee.

However, IDCOL encountered some hurdles during the program's initial launch in 2009, as the farmers appeared reluctant to go along, ostensibly being unsure about its benefits. For instance, in 2012, only five pumps were in operation three years after the program's commencement. This slow pace made us worried about how IDCOL would meet the target of installing 1,500 solar irrigation pumps (SIP) by 2018 and 50,000 by 2025. It turned out, a combination of technical, financial, and behavioral issues contributed to the tardy progress.

Besides, installing the pumps required careful, thorough planning, including site selection, as the first and most critical step toward designing an SIP. The sponsor needed to conduct a survey of the designated area covering a host of issues: total number of farmers, the land to be irrigated, existing irrigation practices and charges, underground water availability, and flooding history. IDCOL's inspection team would then do its own survey to verify the sponsor's findings. Some of the rule-of-thumb criteria for site selection were: the project must be in an off-grid area, producing 2-3 crops per year, existing fuel-based irrigation, and no historical record of flooding. During the inception of the program, an IDCOL-conducted study showed that Bangladesh's north-western part was suitable for such projects. However, some earlier studies done on the use of solar water pumps were somewhat discouraging. They revealed that solar water pumps-dependent areas grow fewer crops, have low water requirements due to heavy rainfall, and have more in-depth water tables requiring more power to lift them. These conditions have resulted in lower-than-expected revenue, making installment payments to IDCOL hard for the sponsors.

Moreover, SIP demand had gone down in some areas as they received electricity from the government-supported rural electricity cooperatives called Palli Bidyut Samities (PBS) within a year or two of setting up the SIPs. The availability of grid electricity also pushed down the water tariff. As a result, in five years, only 89 SIPs were found to be operational by the end of 2014, against a revised target of 500.

However, the issues were more than just technical. With the fee-for-service model, the farmers did not have any stake. The operational risks were entirely on the sponsor, in addition to his equity burden. Hence, between late 2014 and early 2015, an 'ownership model' was introduced to distribute equity between the sponsor and farmers. Under this model, the participating organizations (POs) installed the solar water pumps, and the

farmers purchased the pumps from them in cash or through credit payments. (Both the fee-for-service and the ownership models are discussed in Appendix 7.A.)

Happily, the ownership model's introduction helped push up the pumps' sale as 629 SIPs had been approved by the end of 2016, an encouraging upturn, but still short of IDCOL's initial target of 1500. A review of the slow progress revealed that the financial support was inadequate and the farmers' equity share burdensome. Therefore, in 2016, IDCOL revised the model:

- The grant amount increased from 40% to 50% of the total project cost.
- The loan amount decreased from 40% to 35%.
- Equity reduced from 20% to 15%.

IDCOL appointed agriculture professionals to revisit the site selection criteria and cropping assumptions such as intensity and crop types. It also revised the financial and operational models accordingly. About 250 pumps were installed in 2017, taking the sum to 873 irrigation pumps.

By 2018, 1,000 pumps were in operation—500 less than the initial target. This shortfall in 2018 was due to IDCOL's focus more on research and revising solar water pump models than approving new projects.

The SIP program made slow progress in the early years because the farmers struggled to understand the revenue model properly and failed to foresee the benefits of shifting from diesel to solar energy. With their limited resources, the farmers wanted a cheaper irrigation solution but were not motivated to substitute their diesel pumps, given the solar pumps' higher upfront cost. In the case of an SHS, an individual decided on the purchase and use of the equipment. With the SIP, a group of farmers was involved in group decision-making, and aggregation of their preferences and benefits became difficult. IDCOL revised the solar water pumps financial model multiple times to address these concerns, and further changes are still being made. However, some challenges remain.

Capacity utilization of solar water pumps had always been an issue. Electricity generated by pumps during rainy seasons is left unutilized, as irrigation is not needed. This deterred sponsors from taking up SIP projects.[1] Existing *farming practices* were also an impediment. For

[1] During the rainy seasons, the idle capacity could be utilized for other economic activities, i.e., rice husking and spice grinding. However, this arrangement would meet seasonal demand and cannot ensure constant supply due to the rains. Also, supplying electricity to other beneficiaries will require a feed-

instance, farmers preferred to irrigate their fields early in the morning, making the pumps sit idle during the rest of the day. This practice of early-morning irrigation had been encouraged by the rural electricity cooperatives due to the low demand for grid electricity in the early hours and shortage later in the day. Agricultural experts engaged by IDCOL saw no scientific or agricultural significance of the practice. The Sun shines brighter in the midday, and the panels generate more electricity at the time. Therefore, the pumps function smoother during midday than early in the morning. In some cases, the farmers had been over-irrigating the fields. A general tendency that has been noticed among farmers is that they tend to keep the crops, particularly paddy, underwater all the time through continuous irrigation. Agriculture experts, however, argue that this is not necessary. To address the issue, IDCOL appointed experts to train the farmers in optimizing water use and change their irrigation time to coincide with the sunshine hours.

Other limitations that hindered the use of solar water pump technology were site-specific. It cannot supply electricity at night and serve a single purpose. The option for sharing electricity during idle time (when irrigation is not needed) is still being explored. Recent trends indicate that the program still has the potential to become successful.

Solar Mini-Grid

The SHS consumers now wanted more reliable, uninterrupted supply to use motors and water pumps and refrigerators and air conditioners for hospitals and clinics having met their basic electricity needs. However, given their remote locations and rugged terrains, supplying electricity in such areas through the national grid was considered too expensive and financially unfeasible.

Therefore, solar Mini-Grids (SMGs) were identified as a feasible solution to provide grid quality electricity in off-grid areas for residential, commercial, industrial, and agricultural use simultaneously. The first mini-grid in Bangladesh, a 100kWp solar power plant, started operations in September 2010 on the remote Island of Sandwip in the south of the country. Before setting up the mini-grid, a diesel generator operated by Bangladesh Power Development Board (BPDB) supplied electricity, which covered only 20% of the Island. It was expensive and could supply electricity for just 6 hours a day. In contrast, the new mini-grid provided electricity for 14 hours.

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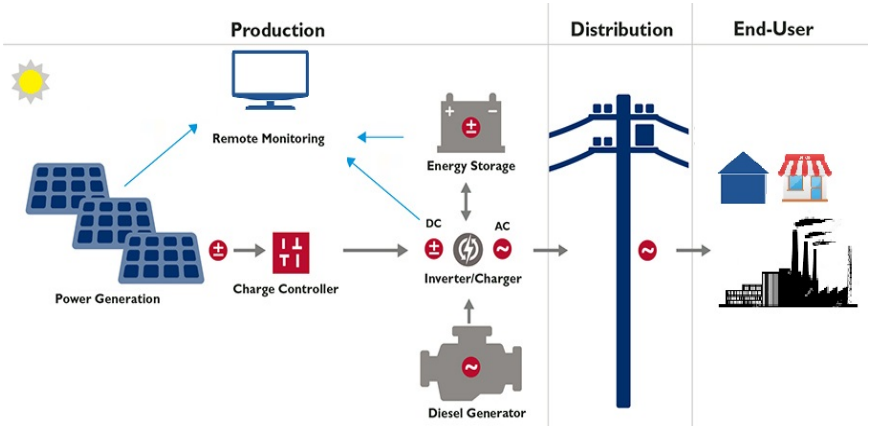
in-tariff (FIT) mechanism. Although FIT policy has been recently approved in Bangladesh, it is yet to be put into practice.

Mini-grids generate power with photovoltaic panels and convert it to grid-quality electricity using inverters. Consumers are served through an off-grid transmission network and receive electricity through an individual meter. For social institutions or health centers requiring larger loads, multiple meters are used. A portion of the panels' electricity generated can be used to charge the attached battery banks, which can be used after dark. Additionally, a back-up diesel generator is kept ready to be used in the rainy season or in the circumstance where the plant cannot meet consumers' demand. The diagram below shows a typical mini-grid set-up.

Solar mini-grid set-up



Mini-grids are installed and operated by a company responsible for implementing and managing the whole project. Mini-grids are more extensive and more expensive than solar irrigation pumps (SIPs), connect many consumers, and serve multiple purposes, but they involve more risks than the latter. Therefore, the de-risking mechanism had to be comprehensive, and the approval process of a mini-grid is more complicated than that of an SIP (discussed in Appendix 7.B.).

For solar mini-grids, the consumers pay a one-time installation fee, in addition to the monthly bill. In recent years, prepaid meters have been installed, for which consumers pay a connection fee as before and recharge the meters as needed using software installed at the sponsor's site office.

The Sandwip project can be considered the pilot, and its experience was crucial for other stakeholders, including potential sponsors, renewable energy experts, and IDCOL itself. It was a steep learning curve and took four years for other sponsors to learn and initiate another mini-grid.

The challenges faced were both technical and operational. For example, battery malfunctioning became a primary technical concern. PV panels had a lifetime of 20 years, but batteries had seven years only. The Island's high temperature and humidity affected the performance of the batteries, causing their faster decline. The operator was required to replace the batteries before expiring its life span, which was expensive. The project collected enough revenue to meet its debt service obligations but struggled to make a profit. The revenues also could not cover the depreciation cost.

To better understand how the solar mini-grid (SMG) could be more useful, IDCOL conducted a survey of potential consumers in 2012, which turned out to be not very encouraging as people were uncertain about its actual benefits. Other operational issues included:

1. *Tariff rate*: The consumers considered the SMG tariff very high compared to grid electricity supplied by state-owned and supported electricity providers.

2. *Ownership*: Unlike SHS, customers could not claim any ownership of the mini-grid;

3. *Energy usage*: Mini-grid consumers had to pay monthly line rent and electricity charges as long as they subscribe. Hence, they became very conservative in electricity use. Many customers were also owners of SHS and used the mini-grid electricity only at night after the former ran out of charge. Only a small minority of customers continued to rely solely on the mini-grid, as they realized that its electricity was cheaper than diesel generators.

4. *Appliance use:* Customers continued using traditional appliances instead of energy-efficient ones. As a result of these issues, the first mini-grid was able to attract only 288 consumers against a target of 400, which shrunk the revenue from connection fees and monthly line rent. Accurately estimating the actual demand for electricity connections represented one critical threat to mini-grid projects' viability.

The electricity demand and the number of consumers for mini-grids of the same capacity varied widely by location. For example, two mini-grids in Rajshahi—one141 kWp and another 148 kWp—connected more than 1,000 consumers—mostly residential with limited electricity requirements. By contrast, another 148kWp mini-grid in Narshingdi could connect only

586 consumers, against a design of 848, including local shops with higher electricity demand.

For mini-grid, the actual cost of electricity generation was about US$0.87 per unit, of which 50% was subsidized by the grant provided by donors as the solar panel prices were very high in 2008. Apart from the Sandwip plant, all other operators charged a tariff of US$0.40 as solar panel prices declined significantly later as manufacturers made more investments in the technology and increasing production and supply of solar panels. Even this tariff rate was high compared to the state-owned electricity suppliers, which was US$0.10 on average. It was essential to making the consumers realize the effective price of their electricity usage. The prepaid meters served this purpose by displaying the amount recharged, cost of consumed energy, and available balance. The consumers could also see for themselves the cost for the previous day and plan their usage accordingly. Pre-paid meters proved to be useful at Jamalpur mini-grid in the northern part of the country.

As mentioned earlier, daytime demand was low, and what could be done about the unused energy, which was utterly wasted. To remedy this, IDCOL had conducted training for the consumers on how they could optimize the electricity generated during the daytime. The possibilities included irrigating lands, sewing, spice grinding, rice husking. Most importantly, to convince the users that it was cheaper than diesel-generated electricity. Connecting a fixed load such as a mobile telecom tower could be another solution to ensuring a steady flow of revenue. Mini-grids were operational in remote islands with weak mobile network coverage. The poor connectivity problem could be resolved by erecting a mobile telecom tower in the vicinity, which would generate revenue for the mini-grid sponsors and vastly improve the area's mobile phone communication. People would also be able to use smartphones and computers if they received a better internet connection, increasing electricity consumption. The feasibility of such an arrangement had been explored, and tie-ups with mobile telephone operators were made. Setting up towers turned out to be a win-win situation for both the mobile operator (attracting more customers due to improved connectivity) and the mini-grid operator (higher daytime electricity usage).

Sponsors had also discovered some new operational techniques aimed at attracting new consumers. As the meters were expensive, sponsors provided them in return for installment payments without any additional cost to the sponsor. Although it was not incorporated in the earlier financial model, providing meters proved to be an effective strategy and was a critical market learning experience and is now included in the financial models.

Today, the mini-grid sponsors are still struggling to optimize selecting various types of consumers and design the distribution systems accordingly. As mentioned earlier, consumers' energy consumption patterns are site-specific. For example, Shariatpur mini-grid has a small ship-building facility nearby attempting to acquire an SMG connection. The shipyard would require a large amount of electricity even at night, which could have been supported by the batteries. However, the SMG operator faced some technical malfunctioning and kept some batteries aside for repair. Hence, the operator did not provide a connection to the shipyard.

However, a review of various mini-grids appraisal reports has revealed that the specific areas' realities have not been accurately reflected. For example, the Jamalpur plant considered a vehicle charging station[2] as a potential commercial consumer. A field visit to the area revealed that there were no battery-operated vehicles there. By contrast, a vehicle charging station was consuming a substantial amount of electricity on Monpura, an island in the south, where there were numerous battery-operated vehicles.

After the first mini-grid started operations in 2010, it was not until November 2014 that a second one could do so. Since then, several mini-grid projects were approved and became operational, with the highest capacity of 249.5 kWp. By 2018, 18 mini-grids were in operation, providing electricity to more than 8,000 consumers. Additionally, 25 more mini-grids had received approval from IDCOL and were being installed. IDCOL's target was to reach 50 mini-grids by 2018, which unfortunately could not be achieved due to a slow start in the initial years.

It seems things are now heading in the right direction.

In 2019, the government adopted a policy that is likely to provide impetus to solar irrigation pumps and potentially mini-grids. Two significant issues for both the systems are: (a) high investment costs of storage batteries and (b) smoothing the demand for electricity produced over the day and night. With the new policy, solar irrigation pumps and mini-grids can cut down their investments in costly storage batteries. The new policy will allow them to draw electricity at night from the grid and supply surplus electricity to the grid during day time. The policy (known as feed-in-tariff and net metering) is likely to address the twin problems simultaneously. Solar irrigation pumps and mini-grid schemes are now being developed to take advantage of the new policy.

Exploring Other Alternatives

[2] Solar panels are used to generate DC electricity, which charges batteries. These batteries are used to run three-wheelers like rickshaws and easy-bikes.

At IDCOL, we also wanted to explore other forms of renewable energy besides solar. Since Bangladesh is a riverine country, the first thing that came to our mind was hydropower. However, a flat terrain deters large-scale use of hydro-electricity. The estimated hydro potential in Bangladesh is only 755 MW, of which 230 MW is being generated from a single power plant at Kaptai in Chittagong, commissioned in 1962. Also, hydro projects require dams that are controversial for their adverse environmental and social impacts. Therefore, we had to drop that option. According to experts, wind energy is not viable either. Studies indicate that the onshore wind speeds are below 5 meters per second, considered way too low for such an option. Data are also available on offshore wind, which indicates that the speeds there are only slightly higher than onshore (approx. 5-6 meter per second on average).

We soon realized that we had to start looking for sources other than the Sun, water, and wind. Happily, new avenues appeared, notably, generating energy from *biomass* and *biogas*. Biomass is typically a 'primary' form of biofuel, created by taking organic matter and burning it for energy. Burning woods to cook food is an example of biomass fuel. However, the practice is detrimental to the environment. Biogas is similar to biomass but uses cow dung, poultry litters, and such materials use a process similar to human digestion to produce gas. A large amount of energy and time is consumed at rural households in Bangladesh for cooking. They use traditional, inefficient biomass fuels such as firewood, rice husks, paddy straws, and dried leaves for the purpose. Most rural families use traditional cookstoves. An estimated 40 million tons of biomass were being burned for cooking annually back in 2006. At the same time, wood-burning poses a significant threat to the already diminishing forest resources. Therefore, we explored technologies to produce biogas from manure and poultry litters, which could be used as fuel. In Bangladesh, most rural households rear poultry or cattle, commercial dairy and poultry farms also show promise, and these could be a significant source of raw materials for biogas plants.

Domestic Biogas Plants

The domestic biogas program implemented by SNV, an international NGO from the Netherlands, had been very successful in Nepal between 1999 and 2009. In early 2005, SNV approached IDCOL with offers to finance a similar program. At first, I was reluctant to adopt the domestic biogas program because this technology did not have a good track-record in Bangladesh. Biogas technology was first initiated in 1972 at the premises of the Bangladesh Agriculture University in Mymensingh. In the

1980s, efforts were undertaken by other agencies, including Bangladesh Council of Scientific Industrial Research (BCSIR), Danish International Development Agency (DANIDA), Local Government Engineering Department (LGED), and Grameen Bank to promote biogas across the country. Among them, the 'Biogas Plant Project' by BCSIR during 1995-2004 was the largest. Some 22,000 units of small domestic biogas plants were installed under its auspices. However, the outcome fell short of expectation. Many plants were shut down, had technical issues, and the program was alleged to have been plagued by corruption. IDCOL, by this time, had a reputation of technical soundness and transparency. The lousy performance of earlier domestic biogas systems had tainted the market, and we did not want to put our reputation at stake.

SNV conducted a feasibility study in August 2005. The report showed the potential of establishing more than 3 million small biogas plants in Bangladesh. As the continuous use of chemical fertilizers had deprived soil of essential nutrients, the report also highlighted the option of converting bio-slurries (mix of water, dung, or litter) released after gas production into fertilizer. The report considered both IDCOL and LGED as two potential implementing partners, but SNV preferred IDCOL because of our SHS program experience. It proposed that they would promote the smallest-sized biogas plants, enough to meet one rural household's needs. The commitment by SNV and focus on smaller-sized biogas plants and the focus on organic fertilizer changed my mind. We started the National Domestic Biogas and Manure Program in 2006.

The technology of a domestic plant is quite simple. Biogas is generated at a digester by fermenting cow-dung or poultry litter. The gas is then transferred to the kitchen through a pipe and used for igniting stoves. However, the program faced many challenges. The first and most critical one was ensuring the continued availability of manure. For instance, at least four cows are needed to keep the smallest plant running. With technological progress, power tillers have been steadily replacing cows used for plowing agricultural fields in Bangladesh. The practice of maintaining 3-4 cows by a rural household, by then, had been decreasing for some time. This change shrunk the domestic biogas market from what was estimated. Additionally, rural people would often need to sell their cattle during a financial crisis, bringing a biogas plant's operations to a sudden halt!

There were two more issues. The manure or poultry litter was put in the digester and mixed with water for fermentation. The digester outlets would clog easily due to sediments in the feeds. This cluttering would reduce the workable area inside the digester, decrease the amount of gas produced, or even halt operations. This malfunction forced consumers to stop paying the

installments and resort to traditional cooking methods. Managing the bio-slurry discharged also caused difficulties for the households. After producing the gas, it took several days for the liquid slurry to dry and reduce in quantity. Also, the foul-smelling slurry could not be kept uncovered in an open area.

Besides, selecting the appropriate technology became an issue due to price and performance. At the program's inception, digester domes were constructed underground with brick and mortar. However, their quality and performance depended on the skills of the mason. The fixed dome technology also required a long time to install, and the masons could not work during rainy seasons. These technical factors contributed to the slow growth of the biogas plants.

In addition to SNV, IDCOL also received funding for biogas plants from German KfW and the World Bank. Still, the biogas program did not proceed as expected. By early 2015, only 37,700 plants had been installed against the target of 100,000 using the fixed dome technology. By 2018, IDCOL had started using pre-fabricated fiberglass digesters imported from China. They were quick and easy to install but expensive due to high import duty. To compensate for the higher price, IDCOL started providing a subsidy of US$170 for each traditional plant and US$310 for each pre-fabricated fiberglass bio-digester. The subsidy offer had no significant impact as only 9,000 new plants had been added by December 2018, and the program was struggling.

Biogas-based Electricity Generation

IDCOL's domestic biogas experience encouraged it to explore other options, such as using biogas for electricity generation, generating 1kW of electricity required about 15kg of poultry litter or about 10kg cow-dung. An initial study showed that the poultry industry alone was estimated to have the potential of generating 50MW of electricity.

Before these projects, the sponsors, usually poultry and dairy farm owners, used electricity from the national grid and supplemented their needs with diesel generators during load shedding. The generators operated for just about 4 hours a day and were very expensive. For them, generating electricity from biogas was a cheaper alternative.

The first biogas-based power generation project was commissioned in 2009. We sponsored nine plants with a total capacity of 680kWp against a target of 7,000kWp by the end of 2018. These nine projects had been supported with a grant (20-40%), concessional loan (20-40%), and needed equity of 30-40%. The electricity produced at these plants was used mainly

for dairy/poultry firms' consumption and sold the excess gas to nearby households.

The biogas-based power plants in Bangladesh faced the same operational challenges as domestic biogas plants:

(i) Maintaining a steady amount of feed.

(ii) The clogging of the digester outlet due to sediments.

(iii) Managing the bio-slurry.

Besides the operational challenges mentioned above, there was no study available to identify the amount of litter from each bird or the amount of dung available from each cattle. The appraisal reports, it turned out, either underestimated or overestimated the amount of feed available. These reports also failed to consider the possibility of bovine or aviary epidemics, which could decimate birds and cattle. As a result, today, most plants have either stopped generating electricity or are only selling gas to a handful of households.

The slurry management for the biogas plants turned out to be an even more daunting undertaking. About 60% of the water separated from the slurry using a separator, with the residual product sun-dried at an open space and packed as bio-fertilizer. Although the fertilizer has proved to be environment friendly and less harmful than chemical fertilizers, drying the slurry in open spaces led to various adverse environmental consequences. The slurry leaked into ponds, seeping into the ground and polluting groundwater, releasing foul smell and attracting insects such as mosquitoes and flies. These environmental challenges had not been anticipated in the appraisal reports, and the sponsors had not made provisions for any remedial measures. These issues were noticed after commissioning, and the sponsors did not know how to deal with them. Their unpreparedness and the poor performance of the existing plants inhibited further development of the program. IDCOL, working with a sponsor, has recently successfully found a satisfactory solution to the bio-slurry management problem that it will replicate in its upcoming projects.

Biomass-based Electricity Generation

The gas produced from biomass wastes such as rice husks is dry and suitable for generating electricity.[3] With a large agricultural sector and rice as its staple food, Bangladesh produces plenty of rice husks used for various purposes. According to a 2008 study, 6 million tons of husks were made from about 30 million tons of paddy. Approximately 4 million tons were used for rice parboiling, domestic cooking, poultry, and fish feed. The remaining 2 million tons were being wasted. Producing one unit of energy requires 1.5 to 2 kg of husks, which looked like a good prospect. However, only two biomass-based power plants were financed by IDCOL to date. Neither is fully operational, primarily due to market-related issues.

The first biomass-based power plant, producing 250kW electricity, was commissioned in 2008 at Gazipur, near Dhaka. It was installed and operated by a poultry farmer. In 2008, the area was not connected to the national power grid, and he was facing difficulties in running his business without electricity. He learned about generating electricity from rice husk during a visit to India. The similar agricultural practices in India and Bangladesh, availability of rice husks throughout the year, and the dire need for electricity to operate the business inspired him to plan his own micro-energy company by installing a rice husk-based power plant.

The plan involved producing gas from the rice husk and then be mixed with diesel. This mixture would be utilized to generate electricity through a dual-fuel generator. The fuel cost for producing per unit of electricity was estimated at US$0.07. However, the tariff was set at US$0.15 to ensure the project's commercial viability.

IDCOL approved the project and provided concessionary loans and grants of US$72,800 sourced from the World Bank and the Global Environment Facility of the UN. Apart from meeting its electricity requirement, the project was able to supply electricity to 500 households and small and medium commercial entities in nearby villages. The sponsor was planning on expansion but was unable to pay interest in the first year. However, seeing its initial performance, IDCOL approved another US$97,700 loan to expand the project and disbursed US$46,600 in 2008-09. Unfortunately, the plant proved to be unsustainable commercially.

The project, when active, covered 400 consumers, mostly households, from 7 villages. It became difficult to collect tariffs from all consumers, resulting in unpredictable revenue from electricity sales. Furthermore, the plant was located far away from rice mills. Transportation expenses raised

[3] Biogas can also be used to generate electricity. However, the produced gas is wet, contains a high amount of water and sulfur, and is corrosive. This corrosive gas damages the blades of the generator. The water and sulfur contents can be filtered out but increase the project cost.

the price of feedstock and increased the generation cost. The area was connected to the national grid in 2011, which made customers disinterested in more expensive electricity from the plant, forcing it to cut its production to 56kW, catering to only 50 households. The owner also failed to convince the government to sell its excess electricity to the national grid. Unable to sustain the losses, the plant was auctioned off in early 2016.

Another biomass-based power plant received approval from IDCOL in 2009-10, a 400kW rice husk-based facility located in Thakurgaon in the northern part of the country. The initial plan included supplying electricity to an adjacent silica production plant owned by the same sponsor, nearby irrigation pumps, and on-site consumption. The project was estimated to cost US$1.38 million and proposed to be financed with a 70:30 debt-equity ratio. The sponsor injected equity of US$480,000, and IDCOL disbursed a loan of US$900,000 in 2011. An Indian company was assigned as the turnkey technology provider. The plant was commissioned in October 2015 against the initially scheduled date of late 2011.

The project experienced implementation delays due to the late receipt of environmental clearance, permission to do business, loan processing, and project cost increase due to underestimating taxation during the appraisal. A revised date for the commercial operation was proposed in December 2015, but that did not materialize. The sponsor did not enter into any institutional agreement with any local rice millers for guaranteed rice husk supply and purchased the same at twice the market price. The gasification plant was operational for 16 to 18 hours per day, requiring extensive labor-inputs for continuous feeding.

A significant portion of generated electricity was to be supplied to nearby irrigation plants. However, the soil of that area was sandy and required more water than usual. Additionally, there was a government-funded deep tube-well supplying water at a low tariff. The irrigation cost with electricity from the biomass-based power plant had far exceeded the prevailing water tariff, and it failed to attract farmers. The sponsor also did not have any technical expertise to oversee the operation, and the expert from the contractor was in-charge only till its commissioning. At present, the plant is barely operational, meeting only the requirement of the silica plant.

The Common Threats to These Programs

From these experiences, we have learned several important lessons. The price, purpose, and scope of each of the technologies may differ, but they all have some common challenges. The power grid's expansion remains the most significant threat for all the alternative electricity-providing

technologies discussed in this chapter. For example, Sandwip Island, the first mini-grid location, is now connected to the grid through submarine cables. The government has a target to provide access to grid electricity to all areas of the country except 1,078 villages, identified by the Bangladesh Rural Electrification Board (BREB) and Sustainable and Renewable Energy Development Authority (SREDA). Many of these have already received or will be receiving grid connectivity very soon. The government's free SHS supply is a threat for SHSs and solar irrigation pumps (elaborated in chapter 11). Unfortunately, free SHS distribution of the government disrupted IDCOL's credit sale programs. The SHS program was meeting all its targets until 2013-2014. Afterward, both grid expansion and free supply of SHS badly affected IDCOL's program, and growth has been negative since then (see chapter 11).

It would also seem that IDCOL should bear at least part of the blame for some of these other renewable energy (RE) programs' relatively muted success. The on-field supervision by IDCOL staff that was the hallmark of its SHS program, and contributed to its success, was lacking in these other renewable energy programs. If IDCOL had maintained the same level of vigilance and attention-to-details as the SHS program, the outcome of some of this and other RE programs might have been different.

Improved Cook Stoves

The environmental and health benefit of rural women and children prompted IDCOL to adopt the improved cookstove (ICS) program. The program was initiated in May 2013 with an initial target of disseminating 1 million stoves by 2018. So far, 1.62 million stoves have been supplied, and the target has been revised to reach 5 million by 2021.

Cookstoves are purchased with cash and do not require refinancing. Only a fixed grant of US$7 was given per unit to the supplier to reduce consumer price. The improved technology reduced cooking fuel requirement by 50-65% compared to traditional stoves by efficiently using the fuel and keeping the heat in a closed chamber. It also reduced the emission of particulate matter such as black carbon and carbon monoxide, which reduced indoor air pollution and incidents of respiratory diseases, especially among women and children. Rural households were quick to realize the benefits of improved cookstoves.

Apart from these benefits and affordability, the program was primarily successful because of its market-driven approach, i.e., extensive market promotion, awareness building, supplier and dealer network, local manufacturing, product improvement, and efficiency increase. While promoting cookstoves, IDCOL worked with German Technical

Cooperation agency GIZ to develop improved cookstoves' versions. The highest annual installation for cookstoves was 650,000 units in 2016. The systems sold earlier were portable and of low efficiency. From September 2016 onwards, IDCOL had concentrated on selling more efficient products with fixed chimneys. However, these models' take-up had been very slow, mainly because of higher prices, unavailability of some parts for some of the manufactured models, challenges of installing and maintaining stoves with chimneys. In 2017, the annual installation was half of that in 2016, and in 2018 it was only one-third. To reduce the manufacturing cost, IDCOL had started to collaborate with USAID, GIZ, improved cookstoves manufacturers and suppliers to develop local manufacturing capacity to manufacture the upgraded models at a lower cost.

CHAPTER 8

COMPARING AND CONTRASTING PROJECTS

It is easy to see, hard to foresee.
-Benjamin Franklin

When he made the remarks more than 200 years ago, Ben Franklin was unaware of what we were doing at IDCOL because it simply did not exist then. However, as we began our journey, it became clear how right he was.

For instance, two projects IDCOL implemented with the World Bank financing had very different outcomes, which we could not foresee. One, under Private Sector Infrastructure Development Project (PSIDP),[1] got the overall rating of *Moderately Unsatisfactory*. Rural Electrification and Renewable Energy Development Program (RREREDP),[2] on the other hand, was so successful that the Bank began promoting replication of the solar-based off-grid electrification program in other Asian and African countries with low access to electricity. The contrasting performance of the two projects, therefore, raises interesting developmental issues.

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[1] The targets of large and medium infrastructure financing projects were 700 MW of electricity generation and 100 km or longer of gas pipeline in the private sector, identifying ten other infrastructure projects, and having a BOO/BOT framework. Only 450 MW of electricity generation and a BOO/BOT framework were in place by closing the project in 2008. The financial target was to invest US$225 million, but only US$80 million could be invested.

[2] The initial target of REREDP was the installation of 50,000 SHS in five and a half years. IDCOL achieved the target two and a half years ahead of schedule and US$2 million below the budget. Initial World Bank allocation for the RE program was US$16.45 million. Up to December 2017, total IDA disbursement under REREDP I and II projects amounted to US$425.59 million. As a result of the REREDP, 4.13 million SHSs, 46,700 domestic biogas plants, 1.62 million ICSs, more than 1,000 SIPs (covering more than 15,000 farmers), 18 SMGs (about 6,000 consumer connections), and nine biogas-based power plants have been implemented by December 2018.

Project Briefs

Private Sector Infrastructure Development Project

This US$235 million project was provided for infrastructure development in the private sector. It was a loan with a maturity of 40 years, including a 10-year grace period. The money was meant to be disbursed from a Private Sector Infrastructure Development Fund established under the Bank's credit. Loans made to private sector sponsors had maturities of up to 23 years, including grace periods of up to 8 years, and were denominated in US dollars. For interest payment, the borrowers had two options: a variables interest rate that would be periodically reset and a fixed rate.

Rural Electrification and Renewable Energy Development Project (Off-grid Component)

This project provided credit to the government for SDR36.10 million (US$ 50.35 million equivalent) to help finance the renewable energy programs, with a maturity of 40 years that included a 10-year grace period. The money was provided for the installation of 64,000 Solar Home Systems (SHSs) in remote rural areas, out of which 14,000 SHSs were to be implemented by Bangladesh Rural Electrification Board (fee for service model) and 50,000 by IDCOL (credit sale through microfinance institutions, NGOs, and private sector). For its part, IDCOL made loans to Participating Organizations (POs) to ease individual households' burden by refinancing up to 80% of the loan they needed to buy the SHS. In addition to the loan, a Global Environment Facility (GEF) grant program operated in tandem with the loans to overcome the solar market development barriers. The credit and grant components also supported pilot-level development and financing of wind energy, small hydro, and biomass sub-projects by the private sector, NGOs, and communities to promote renewable energy technologies.

Project Concepts

The medium and large infrastructure financing project, PSIDP, identified an important area for intervention—the development of inadequate and dilapidated infrastructure in Bangladesh through the private sector. However, it was based on the premise that subordinated debt was required so that the private investors and financial institutions could

be motivated to step in. IDCOL was set up to provide that debt with funding from the Bank. The project also emphasized developing a project pipeline. Infrastructure Investment Facilitation Center (IIFC) was created under the same project to develop infrastructure projects for IDCOL financing. Both the premises turned out to be wrong. We found out that subordinated debt was not an essential requirement for the private investors or the foreign private commercial banks. For instance, only one project was financed using the Bank funds, and it showed that private commercial institutions were willing to accept senior debt from IDCOL. The overriding concern of foreign commercial banks was sovereign payment guarantee against failure of parastatal obligations. Similarly, IIFC failed to develop any projects for IDCOL financing.

The renewable energy project, REREDP, on the other hand, addressed the long-persisted hunger for electricity in remote areas by providing subsidies and soft loans for the customers to make available practical and affordable energy options such as SHS. It also supported training for technicians and households so that they could operate the SHS efficiently. As discussed in the earlier chapters, the project proved to be highly successful by enlisting active support from all stakeholders: The World Bank, other donors, micro-finance institutions, NGOs, and academic institutions.

Project Designs

Plagued by multiple defects, the large and medium infrastructure financing project, from the very start, proved to be a non-starter—foremost, among the barriers were the World Bank's International Competitive Bidding (ICB) guidelines. They were extraordinarily cumbersome, and their process-driven mechanism seemed to be least bothered about the outcome. As a result, many corrupt procurements allegedly passed through this arduous process by simply crossing all the 't's and dotting all the 'i's. In contrast, other transparent and efficient procurements were flunked for minor deviations from the guidelines cast in iron.

To be sure, Bank guidelines were designed for public procurements. Applying the same guidelines in selecting private entrepreneurs for investment and infrastructure projects' implementation was problematic because of how the public and the private sector work. It became more complicated when both the sectors were involved that the project designers failed to foresee. How ICB works and what the private sponsor must do to obtain financing under the guidelines have been detailed earlier (the AES

Haripur 360MW power plant's financing is a case in point, discussed in Chapter 3).

The second defect of large and medium infrastructure financing project was limiting the types of projects that could be financed. As already mentioned in chapter 3, there were only a limited number of projects in the market, and we could finance only public ones. It ruled out captive or inside-the-fence projects and local currency financing. Moreover, IDCOL was allowed only to finance physical infrastructure and Greenfield projects and was barred from financing up-grading existing infrastructure, social infrastructure projects such as schools or hospitals; so were real estate and industrial projects. These limitations severely hamstrung IDCOL from developing into a fully-fledged financial institution.

The third defect was limitations on financing instruments. After considerable email communications, we persuaded the Bank to provide both subordinated and senior debt. Notably, the latter debt had earlier repayments and carried less risk. Another limitation was that the Bank funds could not be used for investment in the project equity. Unavailability of equity especially hurt the local entrepreneurs as most did not have the necessary equities to implement private sector infrastructure projects costing millions of dollars.

Fortunately, these defects were absent in the renewable energy development project, which has been discussed in chapter 6. In contrast to PSIDP, the REREDP project was designed with local inputs, which took into account conditions prevailing in the country, provided broader scope and flexibility. It also allowed the use of various financing instruments such as owners' and PO's equity, organizational support, grants for marketing and training, and concessional loans. All these made the renewable energy development project successful.

Government's Readiness and Support

The government had different commitment levels for the large and medium infrastructure projects and the renewable energy projects. Under PSIDP, medium and large infrastructure projects implemented by the private sector were to be financed. Although the government recognized the deficit in infrastructure financing, it was unwilling to budge. Large and medium infrastructure projects were, and remain, the main focus of political parties and politicians. Further compounding the matter was the bureaucracy's entrenched vested interests. They were unwilling to cede control over these projects. While the government gave lip service to public-private partnerships, it retained commercially viable and bankable projects for implementation through public resources or development

partners' financing. The residual projects that were offered to the private sector were commercially weak and non-bankable. Predictably, the private sector was not interested in taking up such projects.

The government also lacked the capacity to design, structure, and tendering public-private partnership projects. One exception is the Power Cell under the Ministry of Power, which had some capabilities but was then at a nascent stage. There was no such department in other ministries such as Roads, Ports, and Telecommunications to process private sector infrastructure projects' tendering. This drawback, coupled with the fear of the unknown, limited the officials' capacity to approve large and medium infrastructure projects for Bank financing. To address this capacity constraint, IIFC was created, but it also failed to develop projects for IDCOL financing.

The renewable energy development project, on the other hand, was for financing small decentralized power systems in remote areas. Initially, the program was ignored by the politicians because of its small outlays and decentralized nature. However, once the project became successful, politicians jumped on the bandwagon to take credit. Indeed, heads of government from opposing political parties extended their full support and blessings to the renewable energy development project, highlighting a rare example of amity in Bangladesh's highly polarized political climate! Another inhibiting factor that turned out to be a boon for IDCOL—the grid-trained electricians in government-owned electricity providers showed little interest in the SHS program. Its installation under "fee for service" failed because the government engineers were reluctant to get involved. They seemed too happy when the fund allocated to BREB remained unused and was finally reallocated to IDCOL. Good riddance, they thought!

The environment at the World Bank

The failure of large and medium infrastructure financing projects and the success of renewable energy financing projects also had a lot to do with the World Bank. Alarmed by the rising corruption across the developing countries in the late nineties, the Bank linked its assistance with transparent and improved governance. It was at that time that the large and medium infrastructure financing project was rolled out. While focusing on governance was the right thing to do, the then Vice-President of the World Bank for the South Asia region took it to an extreme level. Harsh and sometimes whimsical loan conditions were imposed. In general, an environment of distrust and suspicion prevailed between the Bank and governments in developing countries. Anything not in conformity with their books was turned down. The Bank's bureaucracy took precedence

over flexibility and innovation. This rigidity hurt the development outcome. As the Bank disengaged with its borrowers, it lost leverage on governments' policy-making as the provider of soft loans. As a result, governance in these countries deteriorated further, and disbursement of loans plummeted. The Bank management eventually realized that by disengaging, they were hurting their lending institutions' bottom line, their interest rate earnings. The Vice-President for South Asia was replaced in 2001.

Large and medium infrastructure financing project was a victim of this scenario as many of IDCOL's reasonable proposals such as relaxation of Banks guidelines on a case by case basis, widening the scope of financing, and using varied instruments were all turned down. In a different environment, the project could have contributed to meeting the growing infrastructure needs in Bangladesh.

The renewable energy development project, rolled out in 2002, benefitted from the above transition at the World Bank. While retaining its anti-corruption posture, the new administration emphasized flexibility, listened more to the borrowers, and encouraged innovation. The new leadership also showed eagerness to engage with recipient countries to regain their lost clout. Therefore, due to the changing environment, the same Bank staff were more receptive to accommodating IDCOL's views and finding solutions. That contributed to the success of the renewable energy development project.

Task Team Leader

For the success of any collaborative endeavors, commitment and continuity of principals are necessary. The World Bank task manager for both projects was Vijay Iyer. Vijay had a sound theoretical grounding in finance and a deep understanding of rural sociology. He tried hard to make PSIDP successful but to no avail. The changed situation in Washington made Vijay's job easier. He was able to accommodate our views during the renewable energy development project negotiations, for example, by promptly withdrawing an unhelpful Bank consultant at our request. Raihan Elahi succeeded Vijay. He was associated with the renewable energy development project from the beginning and was instrumental in the approval of additional financing. The story was quite different for large and medium infrastructure financing projects. First, through internal change, the project was transferred from Infrastructure Department to Finance Department within the Bank. Vijay's successor devoted more time to finding faults with IDCOL than trying to understand the constraints. He was eager to launch his project, Investment Promotion and Financing

Facility (IPFF), and tried his best to shut down IDCOL (discussed in Chapter 9). While the transition of task manager in the renewable energy development project was seamless, the transition in large and medium infrastructure financing projects was disruptive.

Lessons Learned

The renewable energy development project also benefitted from prior experiments with SHSs. Although not very successful, nearly 8,000 SHSs had been installed by Grameen Shakti and BRAC between 1991 and 2002 before IDCOL came into the picture. A UNDP project pioneered solar energy in Bangladesh in the late eighties. The equipment was supplied free of costs to households and installed in public places but could not be traced later. Put up in public places without any custodian, some unscrupulous people reportedly dismantled the equipment and sold them for scrap in the mid-nineties. The failure produced two lessons for IDCOL: the first was that supplying goods for free was not the best way to promote a program; and the second was that in promoting new technologies, marketing and after-sales services were critically important.

Grameen Shakti and BRAC were unable to make headway due to a lack of financing and high costs of SHSs. Based on the experience of free UNDP-installed SHSs, they introduced down payments. Initially, it was set at 75% of the SHS cost. To attract more customers, they gradually reduced the down payments to 25%. However, they lacked the resources to support such a vast credit sale. IDCOL's program addressed these issues. It reduced SHS costs with consumer subsidies, lowered the minimum down payments to 10%, and provided a grant for marketing and after-sales service and low-cost financing to make the systems affordable to the poor and middle-income families.

Large and medium infrastructure financing projects, on the other hand, also failed because, as a pioneer, it was not in a position to draw such lessons from earlier projects.

Formula for Success

The main reason why the renewable energy financing project succeeded and the large and medium infrastructure financing project performed poorly is that the latter was formulated with much external consultation but little input from within the country. The latter project was negotiated by the then Finance Secretary, an otherwise capable officer with knowledge of public finance but very little understanding of private commercial

financing. He was reportedly reluctant and was convinced about the project's viability only on the last day of negotiations.

The renewable energy development project, on the other hand, was negotiated when IDCOL was already four years old. It took an active part in the project development stage, carried out pilot projects, knew what to expect, and provided input in all phases of project development, negotiations, and implementation. In the renewable energy financing project, IDCOL built good rapport and understanding with the Bank officials. These factors contributed to the success of the project. The prevailing environment of mistrust of the borrower governments and the Bank and the breakdown of communication with IDCOL resulted in the lackluster performance of large and medium infrastructure financing projects.

Recipe for failure

No one has a crystal ball while designing a development project for a foreign country. The future is uncertain and full of surprises. Therefore, project designs have to be flexible. They must be broad in scope with a good variety of interventions. Most importantly, they must be adaptable to changing ground reality. Mutual trust between the donors/lenders and borrowers is *a sine qua non*. Large and medium infrastructure financing projects failed primarily because of their lack of adaptability and mistrust of the borrower, government, and implementing agency. The renewable energy development project, on the other hand, succeeded because of its elegant design, adaptability, and excellent communication between the World Bank and IDCOL.

If I were to point out one root cause why large and medium infrastructure financing projects underperformed, I would say it was the institutional egos, the involvement of big dollars and big players, all of whom had to be satisfied. Reconciling egos turned out to be an arduous task to achieve. On the other hand, the renewable energy development project piloted fresh concepts in the country and engaged many small players who were willing to grow together. These constraints plague public sector entrepreneurship, in my opinion. On the other hand, the private sector usually succeeds as it is allowed to innovate and unhindered by such impediments.

CHAPTER 9

PUBLIC ENTREPRENEURSHIP

There is nothing more beautiful than someone who goes out of their way to make life beautiful for others.
-Mandy Hale

The news of my counterpart's incarceration in a similar project supported by the World Bank in Pakistan (discussed in chapter 2) still fresh in my mind; our most significant challenge at IDCOL focused on developing and running it as a corruption-free institution. We adopted four approaches:

1. Creating the right incentives for IDCOL staff;
2. Tailor policies that were least likely to result in corruption;
3. Keep the institution easily accessible; and
4. Setting personal examples.

We based our multi-pronged approach on the concept of Hydra, which in Greek mythology was a gigantic serpent with nine heads, one of which was immortal. Anyone who attempted to behead the Hydra found that two more heads would spring up from the fresh wound. Corruption is something like a Hydra, in as much; it sneaks in through the smallest of crevices.

The first thing we did, as mentioned in chapter 2, we had opted for recruiting fresh graduates rather than experienced people so that we could mold them afresh. We developed a transparent, influence-free recruitment process in which the candidates were judged purely on merit. We offered them attractive pay and benefits, even though IDCOL was technically a government-owned organization. At that time government was known for paying a pittance to its public servants. We gave them contractual rather than tenured appointments to keep them on their toes.

Moreover, their appointment letter had a clause that said, *"Abide by the company's zero-tolerance policy on corruption. Corruption is defined as*

the use of official position for personal gains." We gave accelerated promotions to hardworking, bright, and committed persons, increasing their salaries and benefits. Besides, staffers were entitled to adequate allowances when they made field visits. They were not required to depend on the Participating Organization (PO) for these visits and avoid any conflict of interest. We reimbursed the POs for all the expenses incurred for our staff. Such measures sent a clear message to the team and the POs that they dealt with a different kind of institution.

Another area of corruption is government purchase. That is why we refused to get involved in the procurement and storage of SHS components. We also negotiated a flat fee per SHS installed, instead of claiming reimbursement of our supervision expenses, because the latter would invariably lead to false claims and invoices. We also proactively set policies that would discourage corruption. For example, we made it a contractual obligation that the POs would receive the grants and reimburse 70-80% of their loans to the SHS customers within 21 working days (including the time needed to inspect SHSs by IDCOL staff) of submission of their applications. We instructed all staff members to inform the POs when their payments were ready for collection. We followed the same procedure in case of disbursements of loans to large and medium infrastructure projects, ensuring no one had to approach IDCOL for payments. If we failed to make payments within the stipulated timeframe, for reasons beyond our control, a letter of apology would be sent to the POs, explaining the reasons for the delay.[1] However, it was rare, and in such cases, we made extra efforts to speed up the payments.

There is a proverb that 'sunshine is the best disinfectant.' We made sure that the sun always shines on IDCOL. It proved surprisingly useful. Having no provision for a Private Secretary's position to the CEO, there were no 'entry restrictions' for visitors and no phone calls screening. Just an appointment or call would suffice. We would invariably return unattended phone calls. To ensure smooth functioning, we held regular meetings with all the stakeholders and made field visits. We were in touch with all our partners at all levels, from technicians to their CEOs, through regular meetings and field visits. As a result, everyone knew that IDCOL was an open and accessible institution. We knew that secrecy and restrictions create environments in which corruption thrives.

Corruption sometimes has an innocent appearance. A satellite telecommunications project we funded illustrates that point. One day, the sponsor, an engineer, came to see me. I inquired about the project's

[1] In a few instances, payments were delayed due to non-receipt of funds from the World Bank or delays in the Central Bank's clearing system.

progress, and he assured me that everything was on schedule. He further informed me that he had recently visited Switzerland with his family and brought a wristwatch for me as a token of appreciation for my help in providing the hassle-free loan. I opened the box and looked inside. It was a genuine Swiss watch. I profusely thanked him for his gesture but returned the Watch. I told him that we had done our duties.

Similarly, I also declined "CEO's cut" (a percentage of loans disbursed) —a common practice in financial institutions. I assured all borrowers that they would always find IDCOL supportive. I intended to convey a polite yet firm message that we appreciated no cash or kind gifts or personal invitations through my refusal. The words spread fast, and nothing of that sort happened again! The staff also followed this lead and refused similar gestures.

Carrots and Sticks

Corruption and bureaucratic inefficiencies were not the only things we had to be vigilant about. In the early years of our operation, a far sinister threat reared its head, and I had to take swift and decisive (yet measured) steps to snuff it out.

It started innocuously, as I noticed that two of our staff were frequently leaving together at the end of a workday. These two would ride in a rickshaw together to a house in Mohammadpur, some 5 kilometers away from our office. Upon further investigation, much to my chagrin, I discovered that they had both gotten involved with substance abuse. I did a little research on my own and located a good rehab facility in Gulshan. I visited the rehab and found the rates to be very high, about half the two staff's monthly salaries. I asked the doctor in charge of the facility about it, but he replied that their rates were reasonable. He showed me a simple back-of-the-envelope calculation about how expensive it was to maintain the addiction and compared it with the rehab rates his institution was charging! He assured me the patients could manage the money if they were willing to. I realized that he was correct; drug abuse is an expensive habit.

Next, I sat down with the two employees and gave them a straightforward choice: either go to rehab or have their employment with IDCOL terminated. Thankfully, without much convincing, they both agreed. I paid the rehab cost for one of them out of my pocket since he could not afford it. IDCOL office did not officially get involved in helping him with the rehab's cost since I wanted to protect his privacy and not have the news of his affliction spread.

Of course, getting clean is not a straightforward process, and the rate of recidivism for addiction to any substance is high. I noticed that one of them

had relapsed. So, we had another talk. I told the staff that I would remove him from service at IDCOL unless he kicks the habit.

I am glad to say that they both worked through their issues and kicked their habits. They are now both successful individuals in their respective professional careers and have two beautiful families.

Innovative Structure

IDCOL is an infrastructure financing institution. Its mandate was focused and limited. To wit, it was not allowed to perform many traditional banking functions such as accepting deposits, opening letters of credit, and engaging in foreign exchange transactions. IDCOL also received necessary waivers from the Central Bank, such as minimum capital and statutory reserve requirements, to finance medium and large infrastructure projects on its relatively thin balance sheet. IDCOL would borrow funds, provided by donors such as the World Bank, from the government and on-lend the same by adding a mark-up to meet its expenses, cover risk premium, and earn dividends for the government. It would also administer grants, provided by various donors, on behalf of the government, in exchange for fees agreed upon among the government, donors, and IDCOL. Well-targeted beneficiaries would receive the grants on fulfillment of agreed-upon conditions.

Initially, IDCOL had 1000 shares distributed among 11 shareholders. None of the shareholders owned the shares. They held their respective shares in fiduciary capacity distributed as follows: Secretary, External Resources Division (now Economic Relations Division), and ex-officio Chairman of IDCOL held 500 shares. Ten shareholders held the remaining 500 shares, 50 shares each. The government, the owner of the company, received dividends, not the individual shareholders.

Although wholly owned by the government, the Board had equal representation from both the public and the private sectors. Seven-member Board comprised 3 Directors each from the public and the private sectors nominated by the government. The appointed CEO was the seventh member of the Board.

The idea was that public sector representatives, usually Secretaries to the government, will bring in their public sector knowledge and expertise. They would leave their government official hat behind and contribute to the decision-making solely based on commercial needs and social goals set for IDCOL. Similarly, private sector representatives, generally heads of trade bodies and business conglomerates owners, would bring their market knowledge and expertise. They would not have access to IDCOL's fund for use in their own business.

IDCOL's success owes a lot to its innovative structure, board members' competence, complementarity between the public and private sector, the proactive but non-intrusive role of the Board, granting operational freedom to IDCOL management, and mutual trust between the Board and IDCOL management.

Prudential Financial Practices

Before approving any loans, IDCOL would conduct due diligence on the borrowers' financial health, making sure we did not get into trouble. In the early years, we did not have many projects and hence a little revenue, forcing us to be frugal in using our limited resources. For instance, I bought a pre-owned car for official use, and many people used to say that it was not befitting the CEO of a company managing US$235 million worth of funds. It is customary for donor-funded projects in Bangladesh to buy several flashy sedans or SUVs even before starting actual work. Even the first Chairman of the IDCOL Board used to tease me and say, "You should buy a new Japanese SUV or a luxury sedan. If you are afraid or if it is beyond your financial powers, send the proposal to me. As Chairman of IDCOL Board, I will approve it." I was neither afraid nor was it beyond my powers.

One day, I sat down with our Accounts Officer to identify our big-ticket expenses. We found that office rent was one of our most significant cash outflows. As mentioned earlier, we had leased space in a posh tower where the UN was the anchor tenant, and the rent was high, increasing by 10% every two years. I decided to find a permanent space.

IDCOL, in those days, was still project-based, with a finite life. Moreover, most government offices either had their buildings or leased office space. Purchase of office space from a private developer was a deviation from the norm. Still, we set up a committee with both public and private sector directors of IDCOL to oversee the process. We did extensive due diligence on the title of the land and the structural design of the building. After being satisfied, we negotiated a fair price with the real estate company and, in 2001, we purchased a permanent 6,600 square-feet space for IDCOL. At the time, I was warned by some well-wishers that I might get into trouble for the purchase, but to my great relief, IDCOL is still using the space today. The purchase price was equivalent to about four years of rent we were paying at IDB Bhaban. Meantime, the property value had also appreciated eight times. I had also applied for government land at Agargaon for the construction of our building. Happily, IDCOL recently received the allotment, and construction of the building is underway now.

These measures ultimately paid off and proved to be a substantial investment.

However, while purchasing the office space, the seller offered us an additional, similar 6,600 square-feet office on the same floor, at the same price. I declined since I did not think it was necessary. However, IDCOL, as it expanded, had to move into that space eventually by renting it. If not for my conservatism and lack of foresight, IDCOL could have become the owner of both spaces of the floor.

Subordinated Debt

One day, a representative of our prospective borrower, AES Meghnaghat 450 MW Power Plant, informed me that there would be a meeting of the lenders' consortium for its financing, which we were not aware of. I contacted an official of the Agent Bank, ANZ. He informed me that it would be a meeting of those providing senior loans only. Since IDCOL was only providing subordinated loans in the transaction, other lenders did not invite us. This omission made me uncomfortable: we were providing the largest chunk of the debt, US$80 million out of the total debt of US$220 million. Nevertheless, they excluded us.

I discussed the matter with Bob, our consultant. He confirmed that the practice was not to invite subordinated lenders to such meetings. I asked him how we could become senior lenders. He said that we could not because ours was a subordinated loan fund. He also reminded me that much earlier—even before I joined as the CEO–IDCOL had already issued a preliminary commitment to lend US$80 million in subordinated debt to the project.

I decided to play hardball. I called the borrowers' representative and told him that we needed to modify the preliminary letter of support and would need a part of our loans to be senior loans, or else we would just walk out. I explained why we could not invest US$80 million into a project without knowing everything. He understood my position and told me that he would look at how it would impact their project's financial model. He came back a day later and said that they could accommodate a small senior loan from IDCOL in the sponsor's model. However, it was up to the other lenders to give the final approval as subordinated debts are mainly in the package to provide comfort to the senior lenders. I sent an email to Paul Sempere, Head of Structured Finance Department at ANZ, saying that without a part of the Senior loan, IDCOL would not participate in the transaction. I also informed him that I had discussed the matter with the sponsor, and AES has agreed to accommodate a small senior loan provided other lenders had no objection. A seasoned banker, he was not amused,

saying it was too late in the day and that the lender's financial model had been prepared based on a US$80 million subordinated loan from IDCOL.

I thought it was time to seek approval for my unilateral actions from the IDCOL Board. I explained my concerns to the Board. They agreed and advised me to seek World Bank's consent. I approached the Bank, attaching the decision of the IDCOL Board. The Bank warned we ran the risk of being left out of the transaction because of this potentially perilous move. Fortunately, the other lenders agreed to divide the IDCOL loan of US$80 million into two parts: US$20 million as a senior loan and US$60 million as a subordinated loan. We informed the World Bank about the decision of other lenders. The Bank reluctantly gave its no-objection. Thus, IDCOL finally became a full participant in the lending consortium for AES Meghnaghat 450 MW Power Plant transaction. Eventually, we prevailed. It was a risky gambit that fortunately paid off! From then on, Bob and I attended all the lenders' meetings.

We would also take along one young investment officer to groom him. Initial negotiations with the borrowers seemed to be acceptable as all the lenders were on the same page. We broke off on two issues. The sticking points were: (i) providing a sovereign guarantee from the government; and (ii) a direct agreement whereby the government would acknowledge the loans given to the power project. Other lenders said these were necessary because they were not parties to the government's contracts with the sponsors. At one point, the negotiations were about to be called off because the other lenders refused to budge. They had an issue: IDCOL, as a government-owned institution, did not need these safety nets but others did. So they asked the sponsor to secure these from the government, which AES was initially unable to obtain.

I realized that we were on the edge of the cliff. From Singapore (the location of the talks), I sent detailed fax to the top official of the energy ministry, explaining the importance of the matter and its urgency. Fortunately, he was also a member of the IDCOL Board and got the government's approval of both the conditions and communicated it to the sponsor.

The negotiations on the subordinated debt turned out to be more difficult. Fortunately, Joseph A Bevash, an outstanding lawyer from international law firm Latham and Watkins, Singapore, advised us on the subordination issues. The first dispute arose about the number of debt service reserve accounts the project should have. The senior lenders wanted a single bank account, but we argued for and got a separate one for our subordinated debt.

The next issue concerned the senior lenders' ability to declare a Payment Block, a blockage of interest and principal service, due to the

subordinated lender, IDCOL. Payment Block could be called, for example, if the company could not maintain the level of free cash flow in any future period that was 1.4 times the amount required to service the senior debt. We argued that this payment block could not be indefinite and be lifted immediately once the situation improved and the project's cash flow reached the agreed level.

The final stumbling block was the rights of acceleration; this is the right of senior lenders to declare a formal event of default and commence proceedings to accelerate the loan. After many deliberations, we agreed that IDCOL would not accelerate its subordinated debt for trivial amounts due or immediately after a default, thereby giving senior lenders a chance to restructure their loans to their satisfaction. IDCOL agreed to delay a declaration of default on its loans only if the sponsors did not remedy the Senior loan default after 18 months had elapsed from the default declaration or if during the Payment Block IDCOL scheduled payments exceeding US$5 million.

On all the subordination issues, we were able to secure satisfactory outcomes. I was doubly delighted because we had achieved more than what we had bargained for. In addition to that, I now clearly understood what subordinated debt was and how it worked with senior debt, something I could not do after reading several books!

Insulating Management

We created several committees to facilitate our SHS-related work. We had initially begun working with a few POs. However, more and more NGOs and microfinance institutions started to express interest in joining the program. We wanted to have an open process and created a PO Selection Committee comprising one Chairperson, Division head of a research organization; two members from the Non-Government Organization Affairs Bureau, and the PKSF—a wholesaler of microfinance.

From our side, we set up clear criteria for PO selection: We would send all applications to the Committee; they would then screen the applications, examine on-site visit reports of IDCOL staff, review documents submitted, conduct interviews, and make recommendations to the Board. Except for providing secretarial support, we outsourced the entire process. The Committee served IDCOL well. We got competent POs, and no one could complain that we favored any particular one over another. It also helped us avoid political influence. Sometimes, politicians would recommend individual POs/microfinance institutions for selection. We would note all

such requests but delegated the responsibility to deal with such recommendations to the Committee.

We created a similar Committee for technical standards, the Technical Standards Committee (TSC). Its composition was as follows: one Chairperson: Vice-Chancellor of an Engineering University, and two members: one from Bangladesh Rural Electrification Board and another from the Local Government Engineering Department.

Like the PO Selection Committee, the TSC was also fully independent. We would make queries about their recommendations but would never interfere in their activities. There was, however, one exception, the Operations Committee, which I chaired as IDCOL CEO.

Catharsis

Operations Committee was the nerve-center of our SHS program, which, besides the CEO, included program managers of IDCOL and all the Participating Organizations (POs) as members. Other stakeholders, such as equipment suppliers, would also be invited to attend the meetings. The Committee discussed all the operational issues, including installation and performance of SHSs, and collection of installment payments.

Some of these meetings were indeed cathartic: *assisting in the release of emotional tension.* Each of our investment officers would oversee a few POs. Now and then, some POs would complain about delays in IDCOL inspections and payment. For their part, Investment Officers would argue that the submissions were incomplete or SHSs could not be found at the given location or were not functioning properly. The equipment suppliers would also complain about non-payment by POs, and the POs would complain about defective equipment. These often rancorous back-and-forths, however, did not deter us from making the right decisions. At the beginning of each meeting, we would discuss the progress of decisions made earlier. If we found any decisions to be non-implementable, we would revise them. We thus resolved all those issues through frank and productive exchanges. Implementation was also easy as stakeholders felt that they were a party to the decision-making process.

We also received many constructive suggestions from the field staff for improvements in the program. In this way, field workers were encouraged to come forward with new and innovative ideas, and it guaranteed that they had ownership in the SHS program.

Uncompromising Professor

We had agreed with the World Bank to have a Technical Standards Committee that would certify equipment for use in the SHS program. Immediately after negotiation, I began headhunting for the Committee. I approached a professor of Civil Engineering at BUET. I knew him personally and thought he would be too senior for the position, as the role called for regular meetings and travel to rural areas. However, I decided to give him a call.

Instead of offering the position to him, I asked him whether he knew someone *young*, knew *solar photovoltaic technology,* and was *driven*. I explained that as Chairperson, this person would have to face the Bank on technical matters and also be able to withstand pressure from businesses and NGO lobbies. He mentioned the name of Professor Rezwan Khan from his University as a possible choice. I invited Professor Khan for a meeting at the IDCOL office to discuss the assignment.

He was a skinny fellow. After our meeting, I was convinced that he was technically up to the task but unsure whether he would withstand the pressure from various groups. I gave some project documents for his reading. He went back and discussed the matter with his colleagues. Finally, he conveyed his acceptance of the position. He proved me both right and wrong. His technical knowledge was exceptional–thus, I was right. He proved me wrong about his capacity to withstand pressure. He was stubborn as a rock; I was happy that he proved me wrong. For example, the Bank wanted to use low-cost short-life batteries, but he insisted on longer-life batteries that would cost a bit more. He was also practical. Initially, he kept the technical standards slightly below what the Bank used in other countries to allow the domestic electronics industry to grow. He tightened the bars as the program matured. He also slapped steep fines on equipment suppliers for selling sub-standard materials and compelled them to recall and replace defective materials installed at the households. He was also suspicious of my civil service background and thought I was carrying the Bank's brief! Over time, however, we developed an excellent relationship.

The SHS program, development of local battery, and electronic industry (manufacturing charge controller and LED light) owe him a lot. A summary of activities performed by the TSC is in Appendix 9A.

A Balancing Act

Despite my best efforts to insulate IDCOL from outside influence, problems did arise. In 2010, for instance, Quantum Power System Limited

(QPSL) sought a US$25.6 million loan for financing a 110 MW High-Speed Diesel-based power plant at Bheramara, Kushtia, and a 105 MW furnace oil-based plant at Noapara, Jessore. IDCOL management had recommended the loan. No longer the CEO, I, as a Director of IDCOL Board, objected to this loan because QPSL, a subsidiary of Otobi, a leading furniture-manufacturer of Bangladesh, had no prior experience in power projects. Furthermore, its bid was unsolicited and did not represent the best terms that could have come out of a competitive bidding process.

However, Bangladesh had a new government in 2009, and one of its priorities was to step up power production to meet a vast deficit that prevailed in the country. Against this backdrop, the QPSL proposal's rejection could have signaled that IDCOL was trying to throttle the government's efforts to augment the power supply. No wonder IDCOL found itself in a delicate situation. We could not turn down the financing, but we had genuine doubts about the project's prospects. Ultimately, the Board, on my insistence, approved US$12.8 million for the two projects, half of what the IDCOL credit team had sought.

As was apprehended, the sponsors defaulted, and the loan amount was rescheduled four times and is now considered a bad debt. IDCOL and other lenders filed a case against the sponsors in 2017 for recovery of their dues. A criminal case had also been lodged against them in 2018 for attempts to sell off assets marked as collateral for the loans made.

This example shows that public institutions are often affected by external factors despite the management's best efforts.

Killer on the Prowl

The second attempt on IDCOL's life came from its other creator-benefactor: The World Bank. As mentioned in chapter 3, due to various restrictions on the use of Bank funds, we were able to invest only US$80 million out of US$220 million allocated for the purpose. The progress was unsatisfactory, and we requested an extension of the project to allow IDCOL to give local currency loans from the fund. The Bank turned down the request. Unfortunately, a flood occurred in 2004, and both the government and the Bank agreed to reallocate the unutilized US$140 million funds for post-flood reconstruction.

As is customary for the Bank, a project completion mission visited us. By this time, the Bank changed the project task team leader. He had little knowledge and appreciation of the challenges IDCOL faced. He proposed to close down IDCOL and divert the reflows to Investment Promotion and Financing Facility (IPFF), a new project he was developing, to our dismay. I explained to him that IDCOL was a wholly government-owned company.

It also had obtained a license from the Central Bank to operate as a non-bank financial institution. So, IDCOL would have a life with or without the Bank. While it owed its origin to and grateful to the Bank, the company would outlive the Bank-supported projects currently being implemented. The Bank should have taken pride in creating such a fine institution. I told him, only the government, the sole owner of IDCOL, could decide its fate. Regarding diverting reflows from the IDCOL loans to the proposed IPFF project, I explained that according to the agreement signed between the Bank and the government, the latter would become the reflow owner since it was responsible for the debt service of the Bank loan.

Curiously, following this, he requested me to allow him to interview some of the IDCOL staff. I reluctantly concurred. The staff was very unhappy about the aggressive nature of his interview. He tried to prove them to be incompetent and not up to the task. I stopped further meetings with our staff and told him that I did not see any good reasons for continuing our discussion and wished him good luck with his new project. Surprisingly, in the new IPFF project, none of the restrictions, such as international competitive bidding imposed earlier on IDCOL, were kept. I still think that if the World Bank had relaxed these restrictions, IDCOL could have invested all the funds made available to it.

Overall, although we were unable to use the funds fully, the large and medium infrastructure financing project was a good experience for IDCOL and the Bank as well, as they learned from their mistakes and granted the IPFF more freedom. The Capacity-building of IDCOL took place under a large and medium infrastructure financing project. IDCOL staff, including myself, learned about Project Finance and Financial Modeling from the Advisory Services team that PwCS had provided. The negotiation experiences provided us with the templates for the loan agreements that IDCOL uses even today. Because we could create a clean and competent institution, other donors such as the Asian Development Bank, JICA, KfW, and Islamic Development Bank came forward to support IDCOL.

As a result, the void left by the World Bank was hardly felt.

IDCOL was Exploiting the Poor!

Grant funds used in the initial SHS program came from the Global Environment Fund of the UN. I received an invitation to speak at a seminar on Renewable Energy in 2004 organized by the UNDP and the Ministry of Planning at Hotel Sheraton (now Intercontinental) in Dhaka. After my presentation, the UNDP resident representative launched a blistering critique of the Solar Home Systems (SHSs) program. He said that IDCOL was exploiting poor people by promoting expensive SHSs. He compared

the electricity generation costs using SHS with fossil fuel-based generation costs. He suggested that IDCOL should instead promote low-cost solar lanterns in rural areas. UNDP was promoting such lanterns in Africa. He also said that UNDP would be willing to support such a program in Bangladesh and engage IDCOL.

In reply, I told the meeting that it was not a fair comparison. Fossil fuel costs are low because trillions of dollars have been invested in hydrocarbon research and development by governments and oil companies. If the world invested a fraction of that amount in developing solar cells and other renewable energy technologies, they would become competitive. The meeting Chair, in his remarks, supported me.

More importantly, my instant remark, without in-depth knowledge or thinking about evolving RE technologies, was later vindicated as the world began investing in solar and other RE technologies. As discussed in chapter 5, solar panel prices dropped from US$5 per Wp to below US$0.30. Solar and other RE-based electricity generation have gradually become competitive with fossil-fuel-based generation around the world.

IDCOL was right about not promoting solar lanterns in Bangladesh. Much later in 2013, the International Finance Corporation (IFC), an affiliate of the World Bank, and the German International Cooperation Agency (GIZ) tried to promote solar lanterns. Value-conscious rural consumers did not accept the product. IFC has now exited the program.

Hand in Glove

An important feature of the work atmosphere at IDCOL is the harmonious relationship between IDCOL Board and Company Management. Although the composition of the Board changed several times, this relationship has remained intact over the years. For instance, in the early days, as mentioned in chapter 3, going was tough at IDCOL. At times, during the discussion of a particular agenda, if I had serious differences of opinion with the Board, I would excuse myself from the meeting and step outside by saying, Sir, please proceed on, I will come back soon. I would sit idly in my room and wait. After a while, the first Chairman of the Board, Dr. Mashiur Rahman, would feign anger and ask the Company Secretary "how long is your CEO making us wait for him?" After getting the summon from the Chairman, I would immediately return to the meeting, and he would ask, "matha thanda hoiche—" (have you cooled down)? After returning to the meeting, I would find that either the Board had accepted my proposal or found an alternative solution acceptable to us.

I had experienced many such situations, often with individual board members, especially the energy secretary, on several occasions but could always find a mutually acceptable way out in the company's best interest. At the time, I was much junior to other members of the Board. But our views have always been respected, and recommendations acted upon. The umbrella of the board was ever-present for IDCOL.

Skills Development

As mentioned earlier in this chapter, IDCOL benefited from having excellent counsel from Latham and Watkins in the AES Meghnaghat project. However, we were concerned about the high costs of legal due diligence, especially for small infrastructure projects implemented by local entrepreneurs. We also knew that the Bank money we were using to conduct technical and due diligence would be exhausted at some point, and then we would have to meet such expenses on our own. The opportunity to rectify this came when we needed an agreement for our SHS program. At that time, there was only one legal staff at IDCOL. I asked him whether we could draft the contract in-house. Usually a quiet person, he said, "If you provide the inputs, I can give it a try." I told the Bank that we wanted to draft the agreement in-house. The Bank advised us to appoint an external counsel as there were funds available for the purpose. The Bank also cautioned us that legal agreements are a serious matter and require considerable expertise. I told the Bank that we would like to give it a try. If we failed, we would appoint an external counsel.

I sat with our legal staff and discussed the agreement's purpose, essential elements, and contract outline. After several revisions, we came up with a draft and sent it to the World Bank. The Bank was happy and did not change it except for some punctuation marks here and there! The Participation Agreement, as discussed in chapter 6, survives even today. We did the same thing for future technical due diligence, relying mostly on in-house staff and local technical experts.

Testimonial

Our three-year Investment Advisory Services Contract with PwCS expired in 2002. We were delighted with their services, and there were savings from the Bank budget. Therefore, we offered PwCS an extension for another two years. In response to my email, Richard Gledhill, the partner-in-charge, stated that they were delighted to receive the offer. However, there were few medium or large infrastructure projects in the Bangladesh market for its meaningful engagement. More importantly, he

remarked in typical English humor that the competence of IDCOL staff had reached PwCS consultants' level, and they would be able to manage the transactions on their own. He added, "The only contribution that the American PwCS consultants could have made at that stage was perhaps in writing slightly better English!"

CHAPTER 10

COLLECTIVE RHAPSODY

Alone we can do so little; together we can do so much.
-Helen Keller

Solar energy had been in use in Bangladesh for about a decade before IDCOL reluctantly got into the program in 2003. In 1995, the Bangladesh Rural Electrification Board (BREB) had undertaken a pilot project to electrify 900 households spread across 29 km on an island in Narsingdi, about 53 km from Dhaka, by providing solar charging stations and stand-alone systems. The project proved technologically suitable, but its grant-based fee-for-service approach turned out to be a liability, both in terms of its operational sustainability and financial viability. It, however, had one positive aspect—a high level of customer satisfaction. That perhaps encouraged us to give it another try, this time focusing on its financial viability.

Simultaneously, there were shreds of evidence that a solar program rooted in private and community-based initiatives could be successful. For example, Grameen Shakti and BRAC were involved in supplying and financing Solar Home Systems (SHS) before IDCOL's program, installing nearly 5,000 and 1200 systems, respectively, in rural areas by 2001. Besides, Rahimafrooz, another local company, was active in importing solar panels and manufacturing batteries mainly for automotive vehicles.

Being in the private sector, they all had financial viability as one of the main objectives. However, because of their nascent stages, it was hard to determine whether they would succeed ultimately. However, it did hold promise for success, prompting some better-known companies like BP Solar, Shell/Siemens, and Kyocera to enter the market. Having seen the prospect, The World Bank did a study in 2000, forecasting that 12,000-15,000 households (against a total of half a million) would be interested in buying the system in the next five years. These people were relatively well off, earning US$1000 a year (per capita income was about US415). Against this backdrop, BREB and IDCOL stepped in to install 64,000 SHSs over

five and a half years; the former would install 14,000 (under fee-for-service model), and the latter 50,000 (under credit sale).

The BREB program, however, hit snags almost immediately and failed. Fortunately, IDCOL became successful beyond our expectations (as discussed in Chapter 5), underscored by the fact that to date, 4.13 million SHS have been installed by the participating organizations of IDCOL, an astounding accomplishment–way above the World Bank estimate of half a million before launching of the project.

Many Parents of Success

As it happens in such cases, there were many individual claimants for the success. For example, Grameen Shakti, which installed the largest number of SHSs (1.6 million) among the POs, had claimed it designed the model, and the program owes its success solely to them. The World Bank, IDCOL, and private suppliers have each trumpeted their respective roles. However, the way I see it, the program had become successful because of all participants' collective efforts.

The World Bank

The SHS program was the Bank's brainchild, which came forward armed with its experience of working in India, Sri Lanka, and Indonesia. The Energy Services Delivery Project in Sri Lanka, for instance, had produced valuable lessons, particularly a flexible design that enabled the program to adjust to address emerging problems and issues as it evolved. Besides, its grant design and delivery models were also simple and easy to implement.

The Government

There is no question that the program would not have taken off without the government playing a critical role. It passed on the grant and concessional finance received from the Bank and other donors to IDCOL at a low-interest rate. The government allowed IDCOL to charge a higher interest rate (by adding a mark-up) and extend loans to POs on concessionary terms, making the SHS installation easier and affordable for consumers. The government also allowed IDCOL to be set up, with a nominal capital of about US$2,000.

Bangladesh Bank (the Central Bank) allowed IDCOL to carry out loan operations beyond its capital base. It also granted IDCOL certain critical waivers to enable it to function as a non-bank financial institution.

The government made the import of SHS components duty-free; allowed the use of its terrestrial TV channel to broadcast IDCOL and its POs' commercials at special rates. Government backing through IDCOL also helped POs in their field operation and collection of installments. The presence of three vital civil servants of the government in the IDCOL Board made it easier for IDCOL to navigate intricate bureaucratic layers in Bangladesh.

Partner Organizations (POs)

They served as the incubator for the program. As already mentioned, POs have been experimenting with SHSs since 1996, seven years before the IDCOL SHS program started. Moreover, they were already familiar with the problems relating to SHS financing, marketing, and technical issues. That experience proved beneficial when IDCOL got involved. For example, finding the first customers of SHSs was a big challenge, and POs knew how to address the issue. They approached locally influential Union Council Chairmen and Headmasters of Schools and persuaded them to purchase SHSs. The first system installed in the area had a considerable demonstration-effect among the villagers, which sparked their interest. Besides, what made IDCOL's job relatively easier was that they already had offices and accommodations for managers and technicians to live and serve in the remote areas. They also helped in a big way in providing microcredit loans and collecting installments from the consumers. Their programs started with standard car batteries. Such batteries had warranted life of only 1-2 years. Expecting villagers to replace such expensive batteries every year would be asking for too much. Therefore, POs approached the battery manufacturers to produce industrial batteries with a more extended warranty of 5 years that later became the IDCOL program's standard. There were problems with the charge controllers, improper maintenance of batteries, and over-use of SHSs. Pioneers such as Grameen Shakti identified these problems, found solutions, and trained villagers on using SHSs. These learnings from the early days helped in designing IDCOL's SHS program. However, the POs were constrained by a lack of resources to launch a nation-wide campaign and credit sales of SHSs in large numbers.

Once relieved of the financial constraint by IDCOL's program, the POs fully seized the opportunity. They joined IDCOL in launching massive campaigns in rural areas, aggressively set up offices, recruited technicians and managers, installed SHSs, provided after-sales services by promptly addressing customer complaints, and collected monthly installments. Although these tasks' listing sounds easy, performing them on potholed

roads under difficult living conditions in an alien land detached from family members was extremely challenging for the POs. The six first-generation POs performed these tasks remarkably well. They also became the trainers and source of skilled employees for the next generation of POs. Without the hard-work and grass-root reach of POs such as Grameen Shakti, the SHS program would have struggled. It was not only to reach the bulk of the people who went on to become the users of SHSs but also to provide the high-quality after-sales services and customer service that soon became synonymous with the program.

IDCOL

The fulcrum in the SHS program was IDCOL. Working together with the World Bank, IDCOL developed a successful business model making SHSs affordable to rural households, replacing the kerosene-based lighting systems. The SHSs were made affordable through well-targeted grants and concessional financing, creating a stake for all the program participants through down payments by consumers and equity from the POs. By requiring a financial stake from all participants, IDCOL made it more likely that those concerned would take good care of assets in which they had invested. IDCOL also ensured the sustainability of the POs through institutional grant support and concessional finance. It also staged a successful nation-wide awareness campaign that POs could not have done on their own. IDCOL also provided extensive training to thousands of technicians, on installation and maintenance of SHSs and to users of SHS on the day-to-day care of the equipment, including instructions related to the cleaning of panels, checking the water level of batteries, and reading the charge controller to prevent over-use of SHSs.

Also, IDCOL provided a home for POs where they came to know about the game's rules. For example, the Technical Standards Committee (TSC) standards for solar equipment would determine grants and refinancing eligibility. In IDCOL, the POs found a lobbyist for them with the government. It became a platform for ventilating their grievances against each other and the equipment suppliers, even IDCOL, to find amicable solutions through discussion.

IDCOL's policies paved the way for the successful implementation of the program. It began with the fair and transparent process of PO selection, extending to other checks and balances, including the field-inspection of SHSs before the release by IDCOL of grants and refinancing and the timely release of grants and refinancing when necessary conditions were met. The integrity of IDCOL also helped the SHS program secure additional financing from the World Bank; attract other donors like ADB, JICA,

DFID, IsDB, and USAID. As the program expanded, the funding needs increased exponentially.

Private Sector

It made significant contributions to the program. Initially, most of the SHS components were imported. There was a single domestic battery manufacturer. Foreign suppliers such as Kyocera and BP dominated the solar panel market. In the beginning, in 2003, the panel prices were very high—in the range of US$5 per Wp. A Bangladeshi staff at the Japanese firm Kyocera persuaded his company to invest and sell at a discount in the Bangladesh market. Most of the SHS accessories were initially assembled and subsequently manufactured in Bangladesh. Following RahimAfrooz's lead, new battery manufacturers set up their plants in Bangladesh. Microsolar and others started producing charge controllers, cables, and lights. Eventually, solar panel assembling started too. They took account of the local needs and conditions and addressed the users' concerns accordingly. Throughout the program, these importers and manufacturers ensured an uninterrupted supply of high-quality solar equipment. As the program expanded rapidly, they swung into high gear, met the market demand, remedied defects, and addressed users' concerns.

Some private-sector enterprises such as Rahimafrooz also established subsidiaries such as Rural Services Foundation (RSF) and became a PO, contributing to the sale of 22-24% of all SHSs installed under the program. It also provided credit to SHS customers and supplied equipment. Besides, it started a solar panel assembling plant. Rahimafrooz sold 8-10% of all panels and 40-45% of all SHS program batteries. Happily, all the solar equipment components are now assembled and manufactured in Bangladesh, which has substantially cut dependence on imports.

Academia

Academic institutions were inducted into IDCOL's activities as well. It sought technical advisory services from Bangladesh University of Engineering and Technology and other institutions such as United International University. Academics, such as Professor Rezwan Khan, Chairman of the Technical Standards Committee, also contributed to the program. His technical competence and integrity helped the SHS program in setting the standards and their enforcement. His role has been detailed in Chapter 9.

Other Donors

As the SHS program expanded rapidly, IDCOL needed additional resources to help the expansion, particularly after the World Bank reallocated US$140 million of its money for flood rehabilitation. This reallocation is one example of why many projects with good prospects are abruptly abandoned and cut adrift. Fortunately, though, IDCOL did not have to meet the same fate as other donors, notably the Asian Development Bank, came to its rescue. However, the other inhibiting factor for IDCOL remained—lack of bankable medium and large infrastructure projects, as the government was reluctant to give up their grip on such undertakings.

Ashden Awards

As we made considerable progress, the world began to pay attention, recognizing IDCOL's contribution to promoting and expanding solar energy technology. In 2005, while the SHS program was still in its early stages, I received a call from the country in-charge of the Netherland-based international NGO, SNV, telling me that he had followed IDCOL's progress with great interest. He wanted to nominate us for the Ashden award. I thanked him for the gesture but told him that I would think about it and return.

Ashden is a London-based charity that works in the field of sustainable energy and development. The annual Ashden award is aimed to "…*uncover and reward the most exciting sustainable energy pioneers in the UK and developing world, who are leading the way to a thriving low-carbon future."* Winning the award would have given IDCOL a global platform to promote our work and access to an elite community of sustainable energy leaders. However, I felt it would not be appropriate at that early stage—as the bulk of our task remained unaccomplished. I was also afraid such a prestigious award may distract IDCOL from its goals or made us complacent. Furthermore, I did not want to hog the limelight and highlight grass-root level operators' performance instead.

Therefore, I told him that IDCOL would not be the most appropriate institution for the nomination. He should instead nominate some of our POs or other program participants for the award. And he did. In 2006, Grameen Shakti and Rahimafrooz were both declared winners of the Ashden award for accelerating and popularizing SHS in Bangladesh.

Medium and Large Infrastructure Projects

The vibe created by IDCOL was not limited to the SHS only. It trained more than 1,500 professionals from banks and financial institutions in

project finance and financial modeling. In the initial years, IDCOL came to be identified by some as a top-class training institution, while others thought of it as a nascent financial institution. Both identities, however, were helpful for us to grow further. Our reputation as a sound and efficient financing organization earned us laurels. For instance, the IDCOL-financed 450MW AES power project won Euromoney Magazine's prestigious *Deal of the Year* honors. Since then, IDCOL has won several awards, such as the United Nations Momentum for Change Award in 2016 for the SHS Program; Financial Innovation Award of London Institute of Banking and Finance 2019 for SIP, and Alliance for Rural Electrification Award in 2020 for Solar Mini-grid, among others.

These awards and laurels also helped enhance IDCOL's exposure to multilateral and bilateral international financial institutions such as JICA, KfW, and Islamic Development Bank. Some of these institutions later came forward to support us in other renewable energy programs.

What if?

Looking back, I kept wondering many things could have happened, and there were many "Ifs" — what if IDCOL's private sector infrastructure and SHS programs had not been implemented? What if individual actors described above had acted alone? Let us take the case of SHSs first. As already discussed, Grameen Shakti, BRAC, and others had an on-going SHS program. Given the worldwide resurgence of renewable energy, their program would have indeed continued. However, in the absence of financial, institutional, and scaling-up support from IDCOL, the best industry estimate was that, in the same period, they could have probably installed 200,000 SHSs.[1]

If the original project design of the World Bank were followed[2], and going by the standards of performance of other donor-supported projects, it probably would have achieved 50% to 60% of the original target of installing 50,000 SHSs. The program would have needed one or two-years of extension on the initial five and half years, as happened with other Bank-funded projects in Bangladesh. Simultaneously, without the World Bank's financial and technical support, neither the SHS nor its medium and large infrastructure program of IDCOL would have been possible.

Without the support from the POs, specifically from Grameen Shakti, BRAC, and others, IDCOL's achievements would have been much more

[1] Interview with Dipal Barua, Managing Director of Grameen Shakti.

[2] That is, disallowing participation of existing organizations such as Grameen Shakti and procurement of SHS equipment made by IDCOL.

modest since it did not have the reach and contacts that they had in rural areas. It would have been far too expensive for us to set up such a robust network. The best estimate is that with the World Bank support, IDCOL could have installed about 100,000 SHSs between 2003 and 2015.

Like the POs, the private sector also benefited from IDCOL's financial support, from its countrywide publicity campaign and the grassroots-level reach of the POs. Again, without these supports, the best industry estimate is that private businesses could have marketed about 100,000 systems during the same period.[3]

Success also flowed from the sharing of know-how and tangible resources. It allowed the stakeholders to pursue coordinated strategies that resulted in combined business creation. The parties brought all their best resources together at the table. The World Bank brought its global experience and deep pockets, and the government's authority was necessary. IDCOL's probity, youth, and drive; PO's grass-root level reach and acceptance; private sector dynamism; and academia's technical expertise were pooled and shared. All these led to a combined business that was sustainable, profitable, and satisfying.

My only regret was not being able to involve more private sector players in the marketing of SHS. Although Singer, a multinational company, initially enrolled in the program as a participating organization, it decided to withdraw from the program later. Its withdrawal perhaps signaled to other private players that marketing SHS was not their cup-of-tea at that time. However, piggy-backing on the SHS dissemination infrastructure developed under IDCOL's program, a vibrant private non-IDCOL SHS market has now evolved (discussed in Chapter 11).

[3] Interview with Misbah Munawar Moin, Group Director of Rahimafrooz**.**

CHAPTER 11

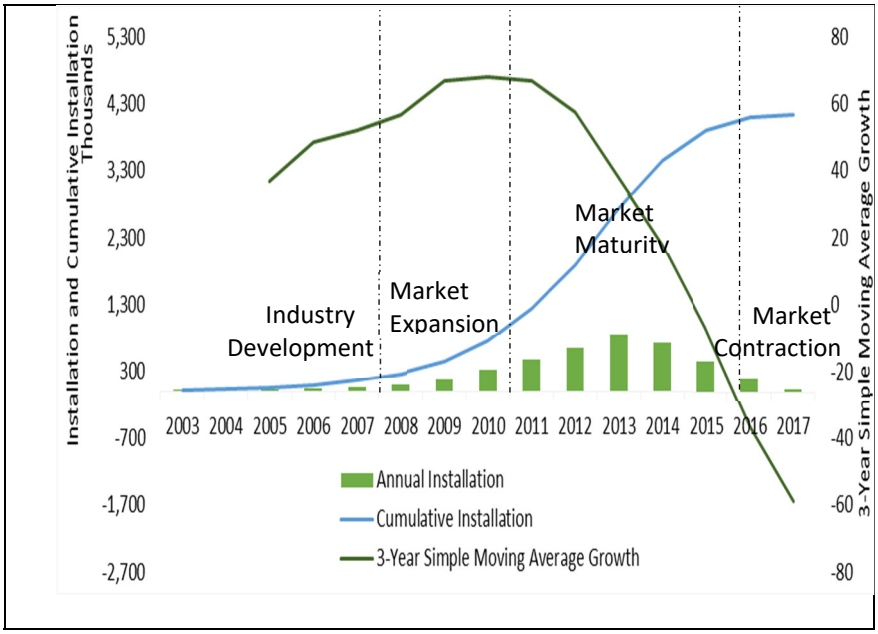
MANAGING WINS

I never lose; I either win or learn.
- Nelson Mandela

From the dizzying heights of 2013, which saw the highest number of Solar Home System installations (over 850,000), the market began to slow down, and in just two year—and sadly, from 2015—it experienced a rapid decline and never recovered. (I relinquished my responsibilities as director of IDCOL Board in 2012). To understand what caused the sudden reversal and why no one anticipated it, we needed to go back a few years.

Different Phases of SHS Market

Annual SHS Installation, Cumulative Installation, and Average Growth



Source: Author

In the early years—2003 to 2007—various IDCOL-supported initiatives saw a burst of growth in solar home systems across the designated areas. Soon enough, its phenomenal growth galvanized more and more Participating Organizations to join in. With increased competition among the POs, the market expanded. For instance, from 2008 to 2010, installation numbers recorded a significant jump, as shown in the graph. The rising trend encouraged IDCOL to recruit more POs, even though the market was approaching maturity. In one of the Board meetings in 2011, I had advised caution and requested to work on an exit strategy as I thought such rapid growth was not sustainable over a long period. However, the installation numbers were increasing so rapidly that IDCOL did not feel it was necessary, and I also did not get the opportunity to pursue the matter any further. For instance, it achieved the target of installing 1 million systems by 2012, a year earlier (2011). Moreover, the trend continued for a few more years until the market became somewhat saturated and non-IDCOL players gained market share (detailed below) by 2015, leading to falling demand.

Unable to fully comprehend the impact of market contraction, IDCOL, nonetheless, went ahead somewhat aggressively, installing two million more by 2014, putting the total to three million SHS. Undaunted, it even set an ambitious target of doubling the numbers (6 million) by 2018. Predictably, market forces intervened, forcing it to push the target three years later, to 2021. To achieve the six million numbers, it now appears that IDCOL will need to install an additional 1.87 million SHSs and the current trend indicates it will not succeed. As discussed in chapter 12, IDCOL had finally withdrawn from supporting the installation of new solar home systems.

Headwinds

As the solar market evolved, the program encountered obstacles in both (i) SHS installation; and (ii) collection efficiency[1] of the POs. Installation numbers went down from more than 852,934 in 2013 to only 34,590 in 2017. Collection performance of the POs also declined– from 88% in 2013 to only 38% in 2017. Not surprisingly, a dark cloud hovered over the horizon.

IDCOL had provided a total loan of US$570 million to the POs against a collateralized amount of a mere US$50 million. As of June 2018, POs had repaid US$315 million. An additional US$145 million has also been paid as interest to IDCOL. Still, US$255 million were due from the POs—

[1] A simple ratio of installment collected divided by installment due.

a large portion of which was unsecured, posing a severe threat to the Company's overall sustainability. As we found out, both internal and external issues were responsible for this speedy decline. Major external issues included

- rapid grid expansion,
- free distribution of the solar home systems under two social safety net programs, and
- the emergence of unregulated private SHS market.

As for internal factors, the POs struggled to find customers willing to pay installments without any hassle as the market matured. In the initial years, for instance, SHS customers were relatively better off and repaid loans regularly. As the installation numbers grew, they started selecting customers outside this group, and the new ones, relatively poorer, failed to make loan payments on time.[2]

Moreover, the deteriorating services also made some customers unhappy, making them unwilling to repay. The deterioration occurred because the POs compromised the equipment quality to reduce the cost to compete. To cut costs further, POs avoided prior survey or design calculations before selling a system. Therefore, in many cases, the SHS was too small to meet customers' energy needs, or the system size was too big. The use of poor-quality wire and cheaper installation techniques led to energy loss and voltage fluctuation.

Higher customer dissatisfaction and lower collection were also attributed to POs' reluctance to hire more productive, efficient personnel. Instead, they preferred to lure experienced staff from other competitors, offering them better salaries and perks. Plagued by the shortage of skilled and experienced workers, POs failed to provide quality services, which, in turn, led to a drop in sales and collection. Some new POs started offering 4-5 years of credit to continue in the business instead of the standard 3, complicating the situation further. Some PO staff even resorted to corruption. (One such case is discussed in Appendix 11.A.)

[2] A common practice among the rural poor people of Bangladesh is migrating to the cities searching for work. Such migration of the relatively well-off potential SHS customers added additional challenges to the POs' collection efforts.

Expansion of the Grid

The fall in SHS demand was also attributed to the government's ambitious grid expansion target, which made new customers disinterested in solar energy. In 2015, for instance, it set a target of providing access to 90% of the households by 2018. As a result, many people from rural areas got access to the national grid, increasing the nationwide electrification from a dismal 47% in 2007 to an impressive 76% in 2016 (including renewable energy). The phenomenal increase was most noteworthy in rural Bangladesh, where 65% got access in 2016, and a massive jump from a puny 9% in 1996. No wonder, availability of better quality electricity made the rural customers further disinterested in solar power. Furthermore, it happened even in areas where grid electricity was still unavailable because they were expecting to be brought under the national grid in no time.

Free Distribution of SHS

Under IDCOL's program, demand for SHS shrank further because of policy change in two government social safety net programs that used to provide destitute people food or cash in exchange for nominal work. Instead, some of them were now given solar home systems for free. Potential customers of SHS started thinking that eventually, they will also receive free SHS from the government. Existing customers were asking why they should pay installments when others were getting the same for free. Thus the policy change created uncertainty in the SHS market.

Private SHS Market

As the demand for solar products skyrocketed, reflecting the success story of IDCOL in the initial years, coupled with the stories of Participating Organizations' (POs) profit and growth, many new private wholesalers entered the market. This development resulted in a burgeoning new wholesale market in 2012: the 'non-IDCOL' SHS market.

The busy and narrow lanes of Old Dhaka, especially Nawabpur, are the country's most extensive hardware and electrical goods market. Seizing on the prospect of cashing in on solar energy products, the local dealers and wholesalers quickly added SHS as merchandise to augment their business. The widespread adoption of SHSs through IDCOL's programs had created trust among the customers about solar technology; and developed market linkages of suppliers, retailers, and technicians. Taking advantage of the customers' trust, these local traders forayed into the SHS market, hiring IDCOL-trained technicians and its POs to promote and install the systems

in rural households. Some technicians worked for both IDCOL POs and private sellers.

Simultaneously, these dealers began importing cheap solar products from China, which enabled them to lower prices and offer a great variety of products for local buyers, resulting in the rapid surge of the non-IDCOL market. Soon enough, it started outperforming the IDCOL market in terms of sales revenue. Initially, the competitive advantage of IDCOL was its quality assurance, after-sales service, and availability of credit. However, over time, the non-IDCOL products captured the market with one primary advantage – lower price.

The private sellers also had lower operation and maintenance costs due to their cash-purchase option only, eliminating the credit collection and technical support expenditure that IDCOL POs had to bear. The cash sales model also helped them avoid credit risks. Moreover, they did not provide warranties and installation services that helped them cut costs further. On the contrary, IDCOL's POs sold solar products approved by the Technical Standards Committee, had fixed warranties, and offered installments, installation, and maintenance services.

What further boosted the non-IDCOL market is that its sellers provided customers with the flexibility to choose their products/components configurations according to their budget and needs. Initially, IDCOL's fixed-package systems captured the market and created goodwill. As the customers used the SHS, they became more conscious of their needs and demand for solar lighting. This customer awareness made the fixed-package system somewhat less attractive to the customers as the POs failed to cater to their changing demand. For instance, under the package system, POs only offered fixed SHSs of different capacities, which came with panels, charge controller, battery, and LED lights, leaving the customers little room for customization.

The non - IDCOL market, on the other hand, offered a wide variety of solar products such as panels, power packs, power systems, power managers, inverters, and controllers. They also sold LED lights, LED flooding lights, street lights, home wind turbines, inverter generators, power banks, power ports, solar fans, solar LCD/LED TVs, Solar Irrigation Pumps, and batteries.

Furthermore, private sellers offered both the options of systems with and without warranty. The panels and batteries with a warranty were sold in both IDCOL and non-IDCOL markets at the same prices. Additionally, private suppliers provided lower quality products with reduced or no warranty at a lower price, which allowed customers to choose products according to their budget and needs. Customers could also avail of after-sales service in the private market on various terms. Freelance technicians

were employed and paid for by the seller or customer, depending on the warranty terms.

Anatomy of a crisis

Three factors led to the fall in sales of SHSs under IDCOL's program:

1. grid expansion, which provided better quality electricity to the consumers at a lower price, reducing the need and demand for SHSs;
2. development of the non-IDCOL SHS market, which was able to provide cheaper products, eating into IDCOL's market share; and
3. free handouts of SHSs by the government under Food For Works (FFW) and Test Relief (TR) programs.

These three factors not only reduced the installation numbers of SHSs but also meant that existing customers stopped paying their dues, leading to a steep fall in installment collection.

However, not all of these were terrible developments when viewed in the overall market context. Grid expansion was a healthy and welcome development. However, IDCOL should have been well aware of this coming phenomenon as, among others, the Power Secretary was a member of the IDCOL Board.

The development of the non-IDCOL market, once again, was a positive outcome. Our goal was gradually moving to a commercial SHS and other renewable energy markets from the very beginning. That is what happened by default – the non-IDCOL segment is purely market-driven. However, IDCOL's failure to foresee this competition coming and devise an exit strategy reflected its severe failure. However, that perhaps had something to do with the initial success that made it complacent.

IDCOL should have foreseen the impact of free distribution of SHS under the government social safety-net programs and ensured that these did not hamper its SHS program. In the least, they should have convinced the government that free distributions were limited to public places (such as schools, hospitals, and mosques.) and not to private households.

The response of the POs

Installation of new systems and installment collections from old SHSs plummeted in 2015. The PO representatives interviewed for this book were asked why they did not foresee what was coming. In reply, most of them indicated that they were relying on IDCOL to provide the market intelligence. Additionally, they said the Company was too focused on the installation numbers, as it brought laurels for the institution and speaking invitations from abroad for its senior staff. They neglected to gather market intelligence and forewarn the POs or prepare an exit strategy for themselves. It was the Participating Organizations Forum that informed IDCOL about the looming crisis. Regrettably, IDCOL had turned away from its hallmark proactive approach and instead resorted to a reactive one—blaming the POs for the debacle.

The POs first began to notice the impending crisis when their bank deposits began to dwindle. For example, some of them, Grameen Shakti, allowed its field staff to deduct their salaries and expenses from their collections. They would deposit the balance in the organization's bank account. The precipitous drop in deposits made meeting operating expenses of the SHS program increasingly tricky. In response, POs cut salaries and expenses of field staff. They started charging staff for food and accommodation that they used to get free earlier, which prompted some staff to leave for other POs. By 2014, with as many as 56 POs, staff turnover had become the game of the day. With experienced staff leaving established POs, installment collection fell even further as the new or redeployed staff did not know the existing customers. To make matters worse, PO staff stealing from installment collections from customers became a common practice.

Also, to claim grants and refinance, IDCOL required the POs to maintain collection efficiency of 90 percent. That made PO staff falsify documents and submit fabricated collection data to IDCOL. As the situation deteriorated, the POs started firing staff, closing and merging offices. For example, at the height of the SHS program, in 2015, Grameen Shakti had 1,259 branch offices, covered by 13,000 staff. By 2016, they only had 840 branches and were left with only 4,553 staff.

The big POs in the market, such as Rural Services Foundation (RSF), tried different business models to counter the falling sales and installment collection. One such model under consideration was the pay-as-you-go that would allow RSF to deactivate SHSs for customers who were in default. Both existing and new customers refused to accept the model. RSF then tried moving on to the entrepreneurship model with village-based commission agents instead of full-time employees. With an assigned area or jurisdiction, each agent would purchase SHS from RSF and sell them within his area for a commission. However, this too failed to resuscitate

sales and collection. At the height of the SHS program, RSF had 3,500 staff. In 2019, they had only 150 permanent staff (for the open market, FFW, and TR) and 450 commission agents.

Private Sector response

While the SHS market may be saturated from IDCOL's perspective, open market sales continued to go up, at about 15,000 to 20,000 systems sold every month. Private sector equipment suppliers, including Rahimafrooz, are still involved in the market, supplying imported and locally assembled solar panels, batteries, and other accessories. They have also started supplying equipment for larger systems, such as Solar Irrigation Pumps and Solar Mini-Grids and importing various energy-efficient appliances. Most SHS open-market sales are made on cash, with no credit facility. Consumers only seek out credit for new technologies (energy-efficient televisions and stoves.).

Response of IDCOL

As the installation number went down and the possibility of recovering the loaned amount from the POs started fading, IDCOL began looking for ways to secure its market. One such measure included demanding 20% of the outstanding amount as a bank guarantee from the POs to ensure its loan repayments. None of the POs agreed to this.

As the government's free SHS programs distorting IDCOL's market, it convinced the government that IDCOL and its POs could better handle their free SHS distributions.

At the same time, the beneficiaries of free SHS started complaining about their poor-quality systems.[3] To mitigate the problem, the government agreed to IDCOL's proposal and instituted a system whereby eligible people would get SHS from IDCOL-approved POs.

The measure allowed POs some fees for installation of free SHS. To help the struggling POs further, IDCOL restructured their loans and aligned their debt service obligations with cash collections from the free

[3] FFW and TR Operation Manuals provided detailed guidelines regarding implementing the traditional FFW and TR programs. However, no such policies were available for implementing the solar (and biogas) projects. This absence meant that the local officials had to sort out all the solar projects' implementation issues.

SHS program. It also reduced their interest rates from 6-9% to only 4% per annum in 2017.

All these measures improved the cash flow of the POs marginally, and they were able to repay a small part of the loan, but they were not enough to resurrect the SHS market. IDCOL's total unsecured loan of US$205 million in June 2018—1.86 times of its paid-up capital of US$110 million—weakened its financial position, making it vulnerable in the event it failed to recover the amount from the POs.

Therefore, the SHS program, which was IDCOL's magnum opus, seemed to be heading for an unhappy ending from a financial perspective, threatening its future sustainability. In terms of providing access to electricity to the unserved population, however, its contribution remains unparalleled. Other IDCOL programs, such as solar irrigation pumps, mini-grids, and improved cookstoves, can still contribute to its future success. However, as discussed in chapter 7, a lot remains to be done to achieve success in these programs.

The Sky is Blue on the Other Side

While cloud gathered over the solar home systems program, it seemed to clear up over medium and large infrastructure projects finance. As discussed earlier, IDCOL's SHS program ran into difficulties as the market matured, competition emerged from private and government sources, and POs defaulted in loan repayments. Fortunately, though, the Company's program of financing medium and large infrastructure projects recovered from earlier setbacks. Out of US$220 million initially allocated by the World Bank, it was able to invest only US$ 80 million in a 450 MW power plant, and the unutilized balance was diverted for the rehabilitation of flood-damaged infrastructure. As mentioned in chapter 3, the main reasons for this tardy performance were:

1. Rigidities of Bank procurement rules.
2. Limitations on financing instruments and sectors.
3. Short supply of private infrastructure projects for financing.

Withdrawal of the World Bank funds for medium and large infrastructure projects created a vacuum. During this uncertain period, newly injected government equity of US$ 4.5 million and reflows from large power plant loans were the only resources available for the purpose. Luckily, due to the reputation that IDCOL earned as an institution and, as Aristotle has said, 'nature abhors a vacuum,' other donors stepped in. Foremost among them was Asian Development Bank (ADB). In 2008

ADB approved US$ 165 million for medium and large infrastructure projects. Although not as concessional, it was free from procurement restrictions and limitations on financing instruments and sectors that characterized the earlier World Bank loan. Technical, commercial, and environmental viability of projects instead became the criteria for lending. Subsequently, ADB approved an additional US$ 110 million in 2013 and US$ 526 million in 2018 for the same purpose. With a total approved amount of approximately US$ 804 million in loans and grants, ADB has emerged as the largest creditor to IDCOL.

In 2009, the newly elected government embarked on an ambitious electrification program that included many private sector power generation projects. With a view to 'quick disposal' of contracts aimed at meeting the country's dire power shortage within a short time, the government, in 2010, introduced the "Speedy Supply of Power and Energy (Special Provisions) Law." The law allowed contracting power and energy projects to bypass the open competition requirement and provided indemnity to officials regarding decisions made by them from future legal challenges.

The availability of unrestricted funds in tandem with these new opportunities enabled IDCOL to invest in private power generation and other energy projects.

Power and Energy Sector Projects

IDCOL continued to invest in the power sector and made an aggregate investment of US$ 538 million in 28 power projects, ranging from rental to medium and large power plants by the Independent Power Producers; Engine-based to combined cycle; high-speed diesel to natural gas with a combined installed generation capacity of 3,200 MW. In the energy sector, IDCOL financed one offshore LNG Terminals by a Singapore-based locally owned Summit LNG Terminal Co. (Pvt.) Ltd. with a capacity of 500 MMCFD (million cubic feet per day) and a medium-sized LPG storage, bottling, and distribution plant by a private business wing of the Armed Forces.

Other Infrastructure Projects

Free of restrictions of the earlier World Bank fund, IDCOL now shifted its focus to growing and diversifying its infrastructure portfolio at an accelerated pace. It started utilizing the ADB money by investing US$ 5 million in two information and communication technology projects promoting a fiber-optic network, providing dedicated high-speed voice and data connectivity to deploy nationwide Broadband Wireless Access

(BWA). IDCOL also extended US$ 10 million towards financing the country's first private sector river terminal with 120,000 TEU (Twenty-Foot Equivalent Unit) capacity in Munshiganj near Dhaka and two Bonded Warehouse, Inland Container Depot (ICD) and Container Freight Station (CFS) located in Chittagong with a cumulative handling capacity of 306,700 TEUs annually. Furthermore, it invested US$51 million in a syndicated facility in mobile telecom operator Robi Axiata Ltd. for optimization of the core network, including payment, reimbursement of capital expenditure, and payment of 4G spectrum/technical neutrality fees (license fee) to Bangladesh Telecom Regulatory Commission.

Social Infrastructure Projects

Considering the potential of investing in social sectors in a densely populated country like Bangladesh, IDCOL expanded its portfolio to include social infrastructure, hotel and tourism, and environmental services. To that end, it extended US$1.15 million for setting up two outpatient hemodialysis centers, which is the first public-private partnership project in the healthcare sector. It invested US$32.82 million for constructing a 139-149-room hotel and US$ 2.9 million for setting up the largest Central Effluent Treatment Plant at Chittagong Export Processing Zone (CEPZ).

Non-fixed Infrastructure and Backward Linkage Projects

IDCOL further diversified its portfolio by investing in non-fixed infrastructure and backward linkage projects, which play a crucial role in reducing lead time and offering a competitive price for Bangladesh's manufacturing sector. From its resources, IDCOL extended US$ 51.28 million for procuring twenty marine cargo vessels and US$ 38.46 million for setting up a billet manufacturing plant with a capacity of nearly 0.5 million MT per annum.

Investment in Equity

In December 2019, IDCOL, for the first time, invested US$ 6 million in preference shares issued by Summit LNG Terminal Co. (Pvt.) Ltd. It is one of the two offshore LNG Terminals supplying imported LNG to the national grid and US$ 2.5 million in preference shares issued by Link3 Technologies Limited for expansion of its internet service network coverage. IDCOL invested US$ 19 million in bonds issued by two of the

largest telecom operators of the country Grameen and Robi, for expansion of their existing network coverage.

Investment Promotion and Finance Facility

In August 2018, IDCOL signed an agreement with the Bangladesh Bank (Central bank) to avail funds from the Investment Promotion and Financing Facility under the World Bank. It utilized US$ 6.4 million from this facility to finance the development of a 110-acre private economic zone at Sonargaon, near Dhaka. IDCOL is planning to avail the IPFF II fund for upcoming prospective infrastructure projects such as economic zones.

Other Donors

In April 2017, Japan International Cooperation Agency (JICA) approved US$ 50 million for Energy Efficiency and Conservation Promotion Financing to promote industrial energy efficiency. From this fund, IDCOL invested US$ 30 million in five projects. Notable among them include procurement of energy-efficient vertical roller mill for two cement manufacturing plants with a capacity of 8,000 MT and 4,320 MT per day, respectively. It also extended US$ 10.26 million to a sportswear company for procurement of energy-efficient equipment. In January 2020, IDCOL signed Phase 2 agreement with JICA amounting to US$ 85 million in Energy Efficiency and Conservation Promotion Financing.

Funded by Agence Française de Développement (AFD), SUNREF will provide Euro 100 million long-term, concessionary financing for investment in energy efficiency, renewable energy, and environmental services. The investment will cut energy/water consumption by at least 20% and pollution by 50% in the selected sectors.

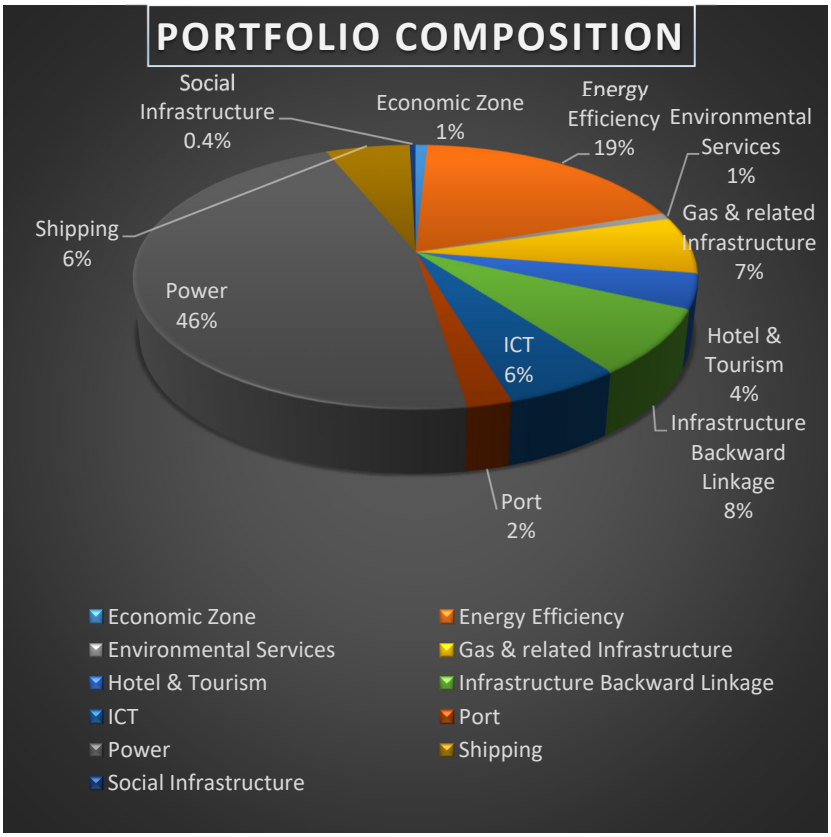
In July 2017, Green Climate Fund (GCF) approved IDCOL to become the 1st Direct Access Entity (DAE) from Bangladesh. The fund can be channeled to private/public sector entities or private sector banks and financial institutions. IDCOL is accredited for GCF funding and can receive up to US$ 250 million for each GCF project.

As of the writing of this book, IDCOL was negotiating with Asian Infrastructure Investment Bank for a credit line of US$ 200 million for the financing of medium and large infrastructure projects.

Total Investments in Medium and Large Infrastructure Projects

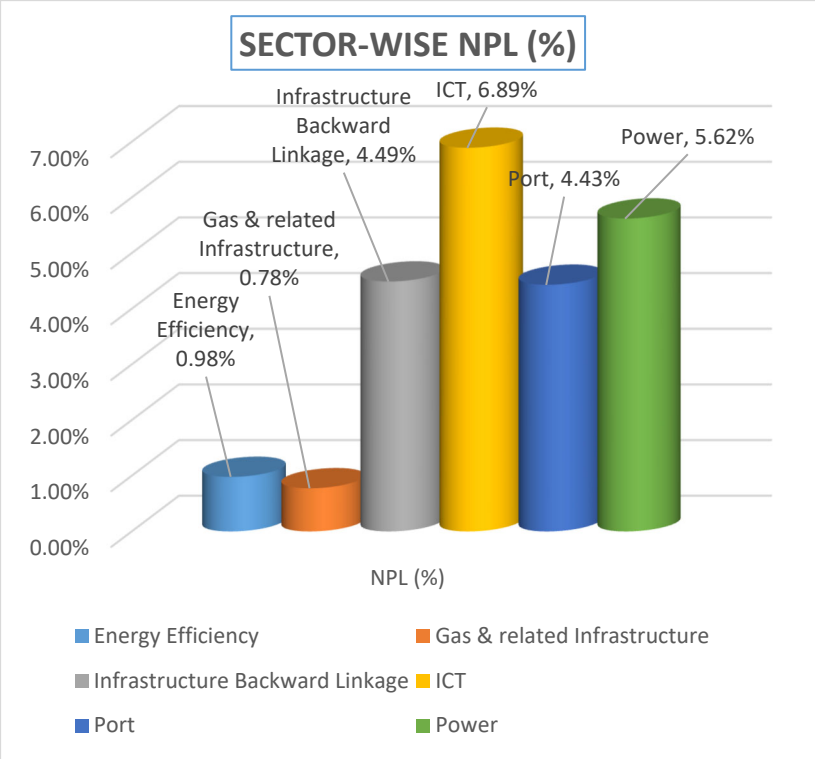
IDCOL's involvement in financing power projects dates back to 2001, by investing US$ 80 million in the country's first Independent Power Producer (IPP) project. Its aggregate investment has grown to US$538 million over the past two decades, which accounts for 52% of the total portfolio. Emboldened by its growing success, IDCOL's infrastructure financing has expanded to include other sectors such as telecommunications, information and communication technology, ports, social infrastructure, gas, and other fuel-based infrastructure, hotel, tourism, and environmental services. Aggregate investment in these sub-sectors now stands at US$ 434 million, which holds 42% of the total portfolio. In 2017, with support from Japan International Cooperation Agency, IDCOL embarked on financing the energy-efficient equipment for industries. To date, it has invested US$67 million in this area, which accounts for 6% of the portfolio.

The sector-wise loan portfolio is shown below.



As depicted in the above pie chart, investment in the power sector accounts for almost half (46%) of the current infrastructure portfolio. There is a growing share of other infrastructure and energy efficiency sectors with 35% and 19%, respectively.

IDCOL's Loan performance by sector is shown below.



Overall classified loan of only 3.7% (Including written-off loans) reflects a healthy loan portfolio, reiterating IDCOL's expertise in managing and financing infrastructure projects. However, as depicted in the above bar chart, sector-wise percentages of the non-performing loan in the power and ICT sectors are comparatively higher due to the increased investment concentration in those sectors.

Future Challenges and Prospects of Medium and Large Infrastructure Projects Finance

Accelerated growth in terms of increased investment brought new challenges and amplified the existing ones. Dependency on multilateral

funding agencies can prove risky if they start to dry up as Bangladesh matures into a more developed economy. Besides, the absence of a robust framework for developing high-quality, bankable projects might hinder IDCOL's growth. One of the most crucial challenges will be to mitigate the credit risk associated with the investment. Efficient and effective risk management at the Company will be vital to strike the right balance between risk and return. IDCOL's growing share of investment in the power and energy sector might spawn new risks in the future. Due to increased exposure to a particular borrower, a single borrower exposure limit also needs to be meticulously monitored so that the Company can operate sustainably and absorb any future shocks.

Over the years, IDCOL positioned itself as a credible infrastructure financier. Institutional credibility has opened up future funding opportunities. Already, it has lined up projects valued somewhere between US$ 800 million to US$ 1 billion. With the help of consistent funding from the Asian Development Bank and others, IDCOL aims to further diversify its portfolio. It can also directly access the UNs Green Climate Fund for any climate change mitigation/adaptation projects in Bangladesh as an accredited entity. Overall, the effectiveness and efficiency of the budgetary allocations and private investments depend on how the fund is utilized. Thanks to our institution-building efforts, learning experience from the first World Bank loan, many multilateral finance institutions have flocked to work with IDCOL. The World Bank has also returned with its Investment Promotion and Financing Facility. None of the restrictions shown in chapter 3 are now applicable. IDCOL has financed social infrastructure projects, captive or inside-the-fence infrastructure, and upgradation projects. It is providing local currency loans and making equity investments. Highly restrictive International Competitive Bidding guidelines of the World Bank no longer apply for financing projects. All these developments have made us feel that our position has been vindicated.

The discussion above highlights two things: Firstly, without continuous vigilance and effective remedial measures, success may lead to setbacks, as IDCOL's solar home system program proved. Secondly, setbacks could be translated into success, with serious efforts, as illustrated by its medium and large infrastructure finance program.

CHAPTER 12

EPILOGUE

It is not in the stars to hold our destiny but in ourselves. - William Shakespeare

Back in 1996, when people living outside the national grid got the first taste of solar technology, there was no market for it. The concept of 'light at night' was the stuff of a fairytale for most of the rural folks. In the evening, as darkness fell, they had nothing but to rely on the rudimentary lighting methods: kerosene lanterns, oil-lamps, and candles. Still, some who could not even afford that cost finished all their activities, including cooking, before dusk! In that forbidding scenario, IDCOL's appearance in 2003 was nothing short of a Godsend. Furthermore, it quickly swung into action, introducing its Solar Home System (SHS) to the power-starved rural population. In no time, the program turned out to be a quick success, attributed to a combination of all stakeholders—the World Bank, enthusiastic customers, risk-taking participating organizations (POs), and IDCOL's wholehearted financial and technical support.

The POs played a pivotal role in delivering, installing, and after-sale services to ensure that the consumers get uninterrupted, hassle-free service, with free maintenance for the first three years. Besides, the customers' families received training on using the system and fixing it in case of an emergency. However, IDCOL and its POs were perhaps too focused on chasing the numbers and revenue generation, leaving them unprepared to anticipate the impending crisis that hit hard in 2015.

To address the issue, IDCOL is now actively working towards a strategy that would not only salvage the program but ensure its continued survival and progress. First and foremost, to recover its bad debts, IDCOL has stopped sales of SHSs through the POs, but the company is still involved with the government social safety net program providing free SHS to the poor. It is also rescheduling the outstanding loans to POs, which currently stands at close to US$200 million.[1]

A Fork in the Road

[1] Part of this outstanding loan from POs, approximately US$40 million, has been recovered through IDCOL's participation in FFW and TR.

Further exacerbating its headache, IDCOL also came to realize that it made some bad decisions in terms of making loans to medium and large infrastructure projects, forcing it to fix some wrongs. For instance, IDCOL is rescheduling and moderating its loan terms for defaulting projects, commuting interests on bad debts, and separately pursuing loan defaulters through Court cases. For the SIP program, the business and financial models have been changed from 'fee-for-service model' to 'ownership model,' and more liberal lending terms such as increasing grants and reducing debt amounts have been introduced. For the SMG program, the grace period on loans has been extended.

In 2016, IDCOL's total classified loans[2] outstanding climbed to a high 6.56% (9.25% for renewable energy projects; 8.67% for power projects; and 2.48% for other projects such as ports, LNG terminal, and auto-bricks manufacturing). IDCOL has approached the government for defaulting projects, seeking a waiver of the interest payments on loans to POs from 3% to 0%. The government has approved IDCOLs proposal of interest rate waiver. IDCOL also requested the Central Bank for time to build its loan loss provisions. The Central Bank has conveyed their agreement-in-principle.

IDCOL is now endeavoring to move to the next renewable energy product phase, promoting rooftop solar panels in urban and semi-urban areas, primarily focusing on industrial units. Encouraged by its potential for generating 4,000 MW of electricity, IDCOL has already made loans to specific industries, including the Paragon Poultry Ltd. in Gazipur, near Dhaka, for 723 kWp project and Far East Spinning Industries in Madhavpur, Habiganj for 1.1 MWp. However, its top management believes that IDCOL's future lies in syndication, investment banking, mergers and acquisitions, and moving in that direction. Thankfully, though, it is still involved in socially beneficial programs. As discussed in chapter 7, its improved cookstoves program is doing well and meeting its revised targets. Also, IDCOL is still involved in the solar irrigation and mini-grid programs, both of which have started to perform well and moving in the right direction after difficult starts, as explained in chapter 7.

As a windfall, the solar program's success has also led to the creation of various spill-over assets, including small- and medium-scale

[2] A classified loan is a bank loan that is in danger of default. Classified loans have unpaid interest and principal outstanding but don't necessarily need to be past due. As such, it is unclear whether the bank will be able to recoup the loan proceeds from the borrower.

entrepreneurs and around 200,000 trained engineers scattered around the country.[3] However, the immediate challenge is to find a way to unite and mobilize these 'assets' to make a useful contribution in the future. One option could be export of energy access services to power starved countries of Africa, under the leadership of IDCOL.

Like IDCOL, the POs have looked for new ways to stay afloat, and in some cases, exit the market. Many of them have found diversification as a useful way to cope with the declining demand of SHS. For instance, they have started offering various solar-powered fans, color TVs, and household appliances. Along with product diversification, the POs have also looked into the possibilities of market diversification. Considering the rising electricity tariff prices and unreliability of grid electricity, some have ventured into the urban market. The practice of using solar lights as a backup during power failure is increasing among the urban people, which offers a promising alternative for them.

Similarly, private sector institutions have had to find ways to survive in this changing environment. Rahimafrooz, and other private companies, for instance, have moved away from selling SHSs on credit[4]. They now offer a wide range of distributed renewable energy (DRE) solutions, such as market grids, mini-grids, irrigation pumps, cold storages, thrashers, rooftop solar PVs, and EV charging facilities. Energy-efficient appliances (televisions, fans, and stoves) are also imported and sold.

All these developments indicate that IDCOL is on the verge of losing its fundamental role as a promoter of alternative energy. Furthermore, it is perhaps not entirely unjustified for some to argue that since IDCOL has fulfilled its original purpose (commercializing renewable energy), it should now devote its attention elsewhere. But it is truly hard for someone, who has nourished and nurtured IDCOL since its birth for more than a decade, nine years as its CEO and later as a Director of the Board, and has seen its worst and best days– to remain indifferent and worry-free. No longer in a position to shape its future course of action, I can only hope that IDCOL finds its footing again and reaches new heights. Let us not be oblivious that IDCOL succeeded mainly because of its rural focus and passion associated with its work. I am not sure if expanding in traditional investment banking and investment advisory is the solution. I believe that going back to its roots of *financing of medium- and large- infrastructure projects* and renewable energy is still the way forward. I am not sure the current steps taken to steady the ship may lead to the resurrection of IDCOL's past glories, or it may end up as other limping public financial institutions in

[3] Interview with representatives of the PO Committee, April 2019

[4] Open market sales and distribution under FFW and TR are still on-going

Bangladesh. In the face of adversities, IDCOL showed remarkable resilience to bounce back. Will it succeed again? I do not have the answer.

As discussed in chapter 9, one of the success factors for IDCOL was the seamless relationship between IDCOL Board and its management. While the board members' composition changed several times, IDCOL management earned and retained their trust and enjoyed wholehearted support. In the days ahead, this trust and support will continue to remain critical.

Meantime, I will keep my fingers crossed.

APPENDICES

Appendix 3.A: Court Strikes Down Procurement of SSAB Container Terminal Port

With the phenomenal growth in imports and exports in the mid-nineties, Chittagong Port, Bangladesh's largest, faced daunting challenges in handling incoming and outgoing vessels. Against this background, SSAB, a joint venture company comprising Orient Maritime Limited, a Bangladeshi company, and Stevedoring Services of America (SSA) Netherlands BV, in December 1997, submitted an unsolicited proposal to the government for setting up two container terminals on Build Own Operate (BOO) basis. The terminals would be located in Patenga in Chittagong and Pangaon in Dhaka with the long-term lease of more than 100 acres of government land. The idea was a large ocean-going ship will first unload their cargo at their Chittagong facility. The containers would be then carried to Dhaka in barges using river routes, thus relieving congestion both at the existing port and limited road infrastructure. Although unsolicited, the authorities decided to go ahead, ostensibly for its urgency of dealing with port congestion. Following government approval of the Project, IDCOL issued a Preliminary Letter of Support to the sponsors for financing between US$40 million and US$60 million, hoping that procurement of the Project would be regularized using a method discussed below.

Despite being unsolicited, the proposal generated considerable interest among other investors from countries like UK and Singapore, encouraging them to submit offers. However, they were not entertained. At this point, I thought the other sponsors should be given a chance to yield better terms and conditions for the government. Accordingly, I met the top bureaucrat at the Ministry of Shipping, suggesting to him the use of 'Swiss Challenge,' a globally-accepted method, under which a better proposal, submitted formally, is allowed to take precedence over an unsolicited offer/proposal. However, if no better offer is received, the unsolicited proposal is awarded the contract. The bureaucrat seemed to agree, and he sent a summary, but the government higher-ups appeared reluctant. Because of intense lobbying by other sponsors, the government set up a high-powered committee to examine their bids. It, too, decided to go ahead with the unsolicited offer based on the Project's urgent need.

The unsolicited offer drew intense criticism from informed quarters such as civil society, present and former port officials arguing that the proposed terminal would severely impair the existing port's functioning. They also raised questions about transparency, insisting the speedy approval process failed to consider certain critical aspects, like the proposers' experience in operating such a project, their financial and management capability. Furthermore, the SSAB offer did not include any feasibility study, nor was there any specific mention about royalty, deposits, license fees, and revenue payable to the government. Not surprisingly, the whole award process– done secretly and fast–, smacked of underhand dealing. More importantly, in the absence of any existing laws and rules, the approval was thought to be unlawful.

No wonder, public-interest litigation was filed in 2000 on the grounds of "violation of the principles of equity and transparency enshrined in the Constitution." However, it was contested by the government on technical grounds that the petitioners had no locus standi meaning, no right or capacity to bring an action or to appear in a court. The country's High Court dismissed the challenge. Being the guardian of the Constitution, the Court was obliged to correct and remedy any illegality done in handling state property or largess by government officials by misuse or abuse of power or in violation of the Constitution. No matter how or who brought that irregularity to its notice was immaterial – said the Court.

The government's Attorney General further challenged the writ petition because he argued that the State's Executive organ had full powers to decide matters like setting up container terminals. The Court held that the executive authorities' decisions in implementing such decisions are liable to be challenged before a court of law. Particularly when such decisions are taken without due diligence or application of mind or are unjustified, or unfair, or arbitrary, or favoring private interest against the public interest. When the government makes any agreement, leases out any property, or awards any target, such actions are subject to the test of reason and public interest. If such measures fail these tests, it is tantamount to violation of articles 27, 31, and 40 of Bangladesh's Constitution.

On the question of the requirement of open competition in government procurement and disposal of its largess, the Court held that any government decision to allocate state resources to private parties through negotiation without any open advertisement deprives others the opportunity to compete is a violation of the Constitution. The High Court subsequently declared the approval given to SSAB and subsequent actions that followed as illegal.

Appendix 4A: Risk and Mitigation Matrix for VSAT Project

Risks	Issues	Mitigation
Technology risks	Reliability of equipment and its operation.	The main equipment would come from iDirect or ViaSat, and both companies were renowned and reliable suppliers of hub station equipment. The borrower would engage one of the satellite service providers as the Operations and Maintenance (O&M) operator. The Project would also hire a foreign expert with prior experience in managing the hub station and product development for one year.
	Appropriateness of technology.	The Project Company had decided to install a "C band" hub station that provides 99.96% guaranteed uptime in a sub-tropical climate like Bangladesh. However, when operating at a higher frequency, the satellite signal's strength might be temporarily reduced under severe rain conditions. Therefore, earth stations in heavy rain areas were designed with more transmission power. C-band transmissions were virtually immune to adverse weather conditions.

	Ever-changing Technology.[1]	The Technical Adviser reviewed the VSAT technology trend and confirmed that the chosen technology was unlikely to become obsolete within the loan life period.
Sponsor risks	No previous experience of running VSAT hub station.	The sponsors had good track records of implementing IT projects and had an impressive client list comprised of national and international organizations.
	Sponsor not being a corporate entity.	It was a family-based company. The sponsors had indicated their plans to go public shortly. Furthermore, this risk was further mitigated by what was widely regarded as competent staff.
	Project costs were too high, and weak contracts will hamper project implementation.	The TA verified the appropriateness of cost and proposed equipment concerning the borrower's services, the track record of the equipment manufacturers, and the O&M operator of the VSAT hub station.
Market risk	Insufficient revenue.	A project without a purchase agreement from prospective clients was the major risk in the market. For the DNS project, their existing client-base largely mitigated this risk. Besides, BDNet, another sister concern of DNS SatComm, an ISP company, was expected to consume 20% of the first year's projected

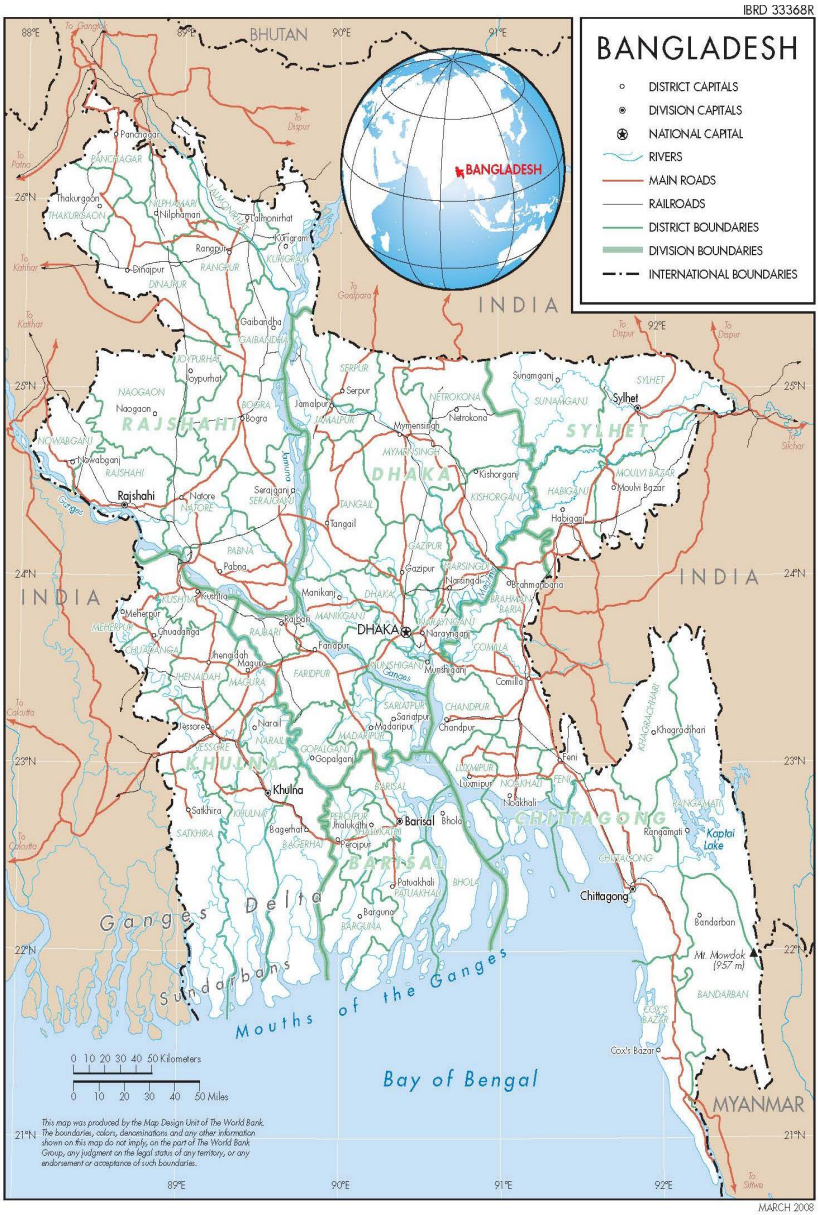
[1]This kind of technology usually had a very short life-span. The technology might become obsolete, even before the recovery of the project costs.

		sales. Instead of offering only one product (data connectivity to ISPs and corporate houses), the Project had planned to provide a wide range of products, thereby mitigating the demand risk. Independent verification of the market, including existing demand and prices charged by similar data communication services, was made.
Operation and maintenance risk	Lack of experience in running a VSAT hub station.	The sponsors had eight years' experience in the ICT sector and three years as a data communication service provider. The Project's success would largely depend on negotiating a sound construction and O&M contract with a credible supplier and O&M operator. These contracts should have adequate penalty and incentive provisions. Therefore, legal due diligence on these contacts was carried out to ensure the integrity of both agreements. The Legal Counsel vetted examination and review of the Project agreements, such as land lease agreement, agreement with satellite companies for transponder services, engineering, and O&M contracts.
Foreign exchange risk	If the financing plan went through, there would be a currency	The borrower would pay the satellite companies in foreign currency to use their transponders, whereas it would earn in local currency. The

	mismatch between revenue and expenditure. If the local currency depreciated against the dollar, the borrower would face problems in servicing debt and retaining profit margin.	sponsors were advised to explore the option of indexing their service price to the changes in foreign currency exchange rate to protect the cash flows integrity, which they did. Central Bank also confirmed the availability of foreign exchange to pay the satellite companies.
Equity infusion risk	The inability of the sponsors to provide committed equity in the Project.	The consolidated balance sheet constructed from the sponsors' audited statements did not demonstrate adequate liquid assets that could be injected into the Project as equity capital. Sponsors planned to approach the Equity and Entrepreneurship Fund (EEF) of Bangladesh Bank and Industrial Promotion and Development Company (IPDC) for equity participation. They were requested to provide proof of the above and additional fund infusions from other sources.
Regulatory risk	Inability to provide the proposed services due to failure to secure permits.	Procuring additional licenses - Some of the borrower's proposed services, e.g., payphone services, and VOIP would require additional telecom licenses, which were new in Bangladesh. Telecom Authority had

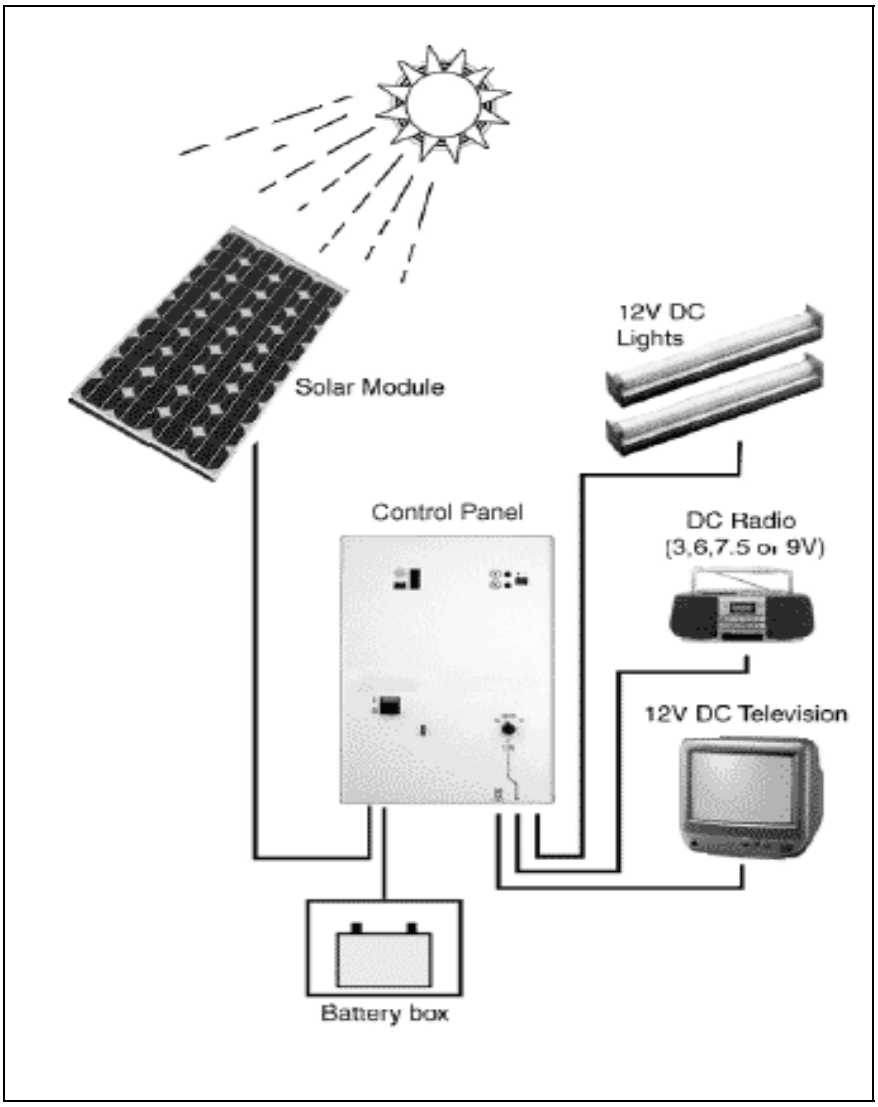
		not issued such licenses in the country. DNS SatComm would provide payphone services, VOIP to the license holders only. It would also attempt to procure some licenses on its own to provide the above services.
Security risk	Recourse for lenders in the event of default.	The Project would be implemented on a project finance basis and secured by the Project's assets, assignment to the lenders of all agreements, and lien on cash flows. Appropriate security arrangements were entered into between IDCOL and the sponsors.

Appendix 4B: Location Map of Bangladesh



Source: The World Bank

Appendix 5A: A Solar Home System



Appendix 6A: Indicative Term Sheet

Please note that the terms set out in this term sheet are indicative only and do not constitute an exhaustive, full, and final list of all the terms and conditions that should be incorporated in a term-sheet for any similar project facilities. The indicative sheet is subject to loan markets, the political or economic situation of the home country, or the legal and financial condition or prospects of the borrower/PO and/or Sponsor before the execution of final legal documentation.

Name of the Project	Rural Electrification and Renewable Energy Development Project Part-C IDCOL Renewable Energy Program.
Name of the Agreement	Participation Agreement or "PA".
Parties	Infrastructure Development Company (IDCOL) and XYZ (the "Participating Organization" or "PO").
Recitals	Describes the reasons for the execution of the Participation Agreement between the Parties.
1. Definitions and Interpretations	Defines the Capitalized Terms used in the Agreement and Interpretation Protocols.
2. Participating Organizations (POs)	Three types of POs: *2.1 Supplier PO.* A PO that supplies Approved Solar Equipment to Households in the Subproject Areas. *2.2 Lender PO.* A PO that extends Loans or micro-credit to Households in the Subproject Areas under Section 3. *2.3 Supplier and Lender PO.* A PO that supplies Approved Solar Equipment

	and extends Loans or micro-credit to Households in the Subproject Areas under Section 3.
3. Loans to Households	Lender PO and Supplier and Lender PO extend Loans or Microcredit to eligible Households to purchase Approved Solar Equipment.
4. Terms of the Loan to Households	a. IDCOL and the PO will agree upon the interest rate and tenor of Loans or micro-credit to Households under Section 3 to render the installment payments of such loans affordable to Households. b. The PO shall use the loan or lease agreement format or substantially in the form acceptable to IDCOL while making a loan or microcredit to the Households under Section 3.
5. Households' Down payment	Before each application for the Loans to Households as per Section 3, the Household will make a down payment equal to a minimum of 10% of the Total Capital Cost of each SHS.
6. Grant-A	(a) IDCOL will provide Grant-A as per Schedule below, per system per Household, to the PO referred to in Sections 2.01 and 2.03 to lower the Total Capital Cost of the Approved Solar Equipment supplied by the PO in the Subproject Areas.

<table>
<tr>
<td></td>
<td>
Schedule for Grant-A
<table>
<tr><td>SHSs</td><td>Amount of Grant
per system per Household</td></tr>
<tr><td>Up to 200,000 SHSs under the Project</td><td>Taka equivalent to US$</td></tr>
<tr><td>For further SHS under the Subproject</td><td>To be determined</td></tr>
</table>
(b) IDCOL, from time to time, will notify the PO about the availability of Grant-A amount, per system per Household, under paragraph (a) above.
</td>
</tr>
<tr>
<td>7. Grant-B</td>
<td>
a) IDCOL will provide Grant-B as per Schedule below, per system per Household, to the PO referred to in Section 2.02 and 2.03 for its Institutional Development if the PO extends Loans to Households as per Section 3.

Schedule for Grant-B
<table>
<tr><td>SHSs</td><td>Amount of grant
per System per Household</td></tr>
<tr><td>Up to ... number of SHSs under the Project</td><td>Taka equivalent to US$</td></tr>
</table>
</td>
</tr>
</table>

	For further SHS under the Subproject — To be determined b) IDCOL, from time to time, will notify the PO about the availability of Grant-B amount, per system per Household, under paragraph (a) above.
8. Refinance	The PO referred to in the Agreement extends Loans or microcredit to Households. It will receive from IDCOL up to 80% Refinance of that loans or microcredit and following the eligibility criteria set forth under the PA.
9. PO Investment	After IDCOL Refinance, the remaining 20% of PO Loans or micro-credit to Households under Section 3 will be the PO's investment in each SHS.
10. Amount of Grant and Refinance	a) Amount of Grant-A not exceeding US$ … b) Amount of Grant-B not exceeding US$ … c) Amount of Refinancing not exceeding US$ … (all equivalent in BDT) Provided Refinancing amount per SHS shall not exceed US$ equivalent in BDT. d) Amount of Grants and Refinancing will be revised periodically based on the availability of fund and POs performance against the target. e) Grants and Refinancing may be canceled if the PO fails to draw the first disbursement within 60 days of signing the PO.

	f) The exchange rate of Taka against US$ or EUR, as applicable, shall be reviewed every six months to establish the applicable exchange rate for the following six months.
11. Eligibility Criteria of different POs	a. Supplier PO – 1. it validly exists in Bangladesh for at least two years with proven experience in Subproject activities; and 2. it has minimum equity (including capital fund) of Taka 1,000,000. b. Lender PO, and Supplier and Lender PO- 1. it complies with all criteria under a) above; 2. IDCOL has approved its business plan; 3. it segregates its SHS microfinance operating activities into a Special Project Vehicle ("SPV"), the operating result of which are detailed in the audited financial statement; 4. its loan recovery rate is at least 80%; and 5. it maintains a debt: Equity ratio, which under no circumstance will exceed 4.0, to be certified annually by an auditor.
12. Target	IDCOL will set a target of installation of SHSs of different sizes based on the approved business plan submitted by the PO.
13. Disbursement	a) Disbursement Request has to be made in the form to be attached with the PA at least 21 Business Days before the

	proposed Disbursement Date. b) IDCOL will make the disbursement of applicable Grants and Refinancing after meeting Conditions Precedents to Disbursement by the POs to the satisfaction of IDCOL. c) The number of Disbursements shall not be more than 12 in a Year.
14. Interest	The PO shall pay interest at the rate of six percent (6%) per annum on the refinanced amount calculated on the outstanding balance with effect from the First Interest Payment Date. Default Interest Rate 2.00% higher than the interest rate on the overdue amount.
15. Accounts	At least thirty (30) days before the first disbursement date, the PO will open and maintain the following bank accounts **(Subproject Accounts)** with a bank acceptable to IDCOL **(Account Bank):** a) Proceeds Account i. A proceeds account to which all IDCOL Grants and Refinance, PO investment, Households' down payment, and Instalment Payment proceeds, and all other receivables under this Agreement or Transaction Documents including Performance Liquidated Damages (PLDs), Delay Liquidated Damages (DLDs), and insurance proceeds will be deposited. ii. Subject to the terms and

	conditions of this Agreement, all monies deposited in the proceeds account will be used to – a. refinance Loans to Households. b. make payments to the supplier of Approved Solar Equipment. c. meet operating expenses of the PO, including its institutional development. d. repayment of the Refinancing amount. iii. The PO will be required to have its cheques countersigned by IDCOL before making any withdrawal from the proceeds account if IDCOL delivers to the PO – A. any Events of Default Notice; or B. any Suspension or Cancellation Notice. Provided that IDCOL may waive this right if the PO delivers an adequate guarantee to the satisfaction of IDCOL regarding the smooth operation of the PO and scheduled debt service under this Agreement. b) Debt Service Reserve Account i. A Debt Service Reserve Account (**"DSRA")** up to its required balance equal to one repayment installment under this Agreement, as shall be

	determined by IDCOL, two months before First Repayment Date. ii. The PO may use the balance in the DSRA on providing an adequate guarantee to the satisfaction of IDCOL; and until IDCOL delivers any Events of Default Notice or Suspension or Cancellation Notice.
16. Repayments	a) The PO will repay each principal Refinanced amount on each Interest Payment Date and including the First Repayment Date semi-annually in … equal installments. b) In case of Refinancing made from the World Bank Credit, all repayments of principal Refinanced amounts under this Agreement shall be made by the transfer of immediately available funds in Taka to – (Insert details of the Bank Account).
17. Prepayment	(a) The PO giving not less than thirty (30) days' prior notice to IDCOL may prepay the IDCOL Refinance amount on an Interest Payment Date in whole or in part (but, if in part, in a minimum aggregate of Tk. 200,000 (Taka two hundred thousand) and integral multiple of Tk 50,000 (Taka fifty thousand). (b) The PO shall prepay IDCOL Refinance amount by Performance Liquidated Damages, Delay Liquidated Damages, and insurance proceeds receivable or received under this Agreement or any Transaction Documents. Provided subject to the approval

	by IDCOL of any restoration plan submitted by the PO, the insurance proceeds receivable or received under any Transaction Documents may be used to restore the damaged systems under the Subproject. (c) The amount prepaid shall be applied against the Repayment Instalments in inverse order of maturity.
18. Late Payment charge	2% per annum on the unpaid amount.
19. Suspension and Cancellation of Grants and Refinance	a) If the Credit Agreement/Financing and Program Agreement/Agency and Administration are suspended or canceled. b) It becomes unlawful for IDCOL to give effect to any of its obligations under this Agreement. c) The GOB suspends or terminates the right of the PO to use the proceeds of the Grants and Refinance, as applicable, upon the failure by the PO to perform any of its obligations under this Agreement. d) IDCOL evaluates PO's performance to be negative. e) IDCOL will provide the PO a notice **("Suspension or Cancellation Notice")** in writing within 15 days of the occurrence of any events above. f) All outstanding amounts under the PA will become immediately payable by the PO to IDCOL if IDCOL suspends or cancels Grants or Refinance.
20. Termination of the PA	*a) Termination by the PO.* - The PO may, by not less than thirty (30) days'

	prior notice in writing to IDCOL, terminate this Agreement, provided that it will immediately pay all outstanding amount under this Agreement. *b) Termination by IDCOL.* - Without prejudice to any provisions in this Agreement, IDCOL may, by not less than fifteen (15) days' prior notice **("Termination Notice")** in writing to the PO, terminate this Agreement. *c)* All outstanding amounts under this Agreement will become immediately payable by the PO to IDCOL on delivery of Termination Notice under paragraph (b) above.
21. Taxes on payment	All payments by the PO under this Agreement shall be made without any deduction and free and clear of any taxes.
22. Computation of Interest	Interests on the Refinance amounts and other charges, if any, shall be computed based on the actual number of days elapsed and three hundred and sixty (360) days a year.
23. Security	a) Mortgage of land, if applicable. b) Hypothecation of all fixed and floating assets, including but not limited to, machinery, book debts, furniture, fixture, and equipment on first ranking pari passu basis, creating present and future charge with the Registrar of Joint Stock Companies. c) Establishment of Escrow Account and Debt Service Account with appropriate cash waterfall arrangement to the lenders' satisfaction.

	d) Co-payee of benefits under all insurance policies insuring the relevant moveable and immoveable assets of the issuer. e) Sponsors' undertaking to remain the majority shareholder of the Project during the tenor of the loan. To be in control of the management of the company, and to inject necessary equity funds to finance any cost overrun of the Project and to maintain all the covenants (e.g., maintain financial ratio within the acceptable range as stated in the covenant section), unless otherwise mutually agreed between the investors and issuer. f) Personal guarantee of the sponsors. g) Corporate guarantee of the parent company and other business concerns of the sponsors. h) Assignment of benefits under Project Agreements. i) Lien on shares.
24. Conditions Precedent	Standard Conditions Precedent, including but not limited to: a) Constitutional documents of the PO. b) Board of Directors/governors resolution. c) All governmental approvals and authorizations. d) Legal opinion in the prescribed form. e) Request for Disbursement in the prescribed form. f) Bank statement/receipt showing

	deposit of Household's down payment. g) Copy of Loan/Lease agreement with the Households. h) Creation of Lien on Project Accounts in favor of IDCOL. i) Representations and Warranties should be valid as of the date of Disbursement. j) No change in the condition of PO that might materially affect its operation. k) No litigation shall have been pending that, if adversely determined, might affect POs operation.
25. Representations and Warranties	Standard Representations and Warranties including, but not limited to: a) Status; b) Corporate power; c) Corporate authority; d) Dedicated staff; e) Validity; f) No conflict with the constitutional documents of the PO; g) Authorizations and approvals; h) Immunity; i) Proceedings; j) Accounting principles; k) Environmental compliances; l) Funding from others, if any.
26. Covenants and Undertakings	General undertakings, including but not limited to: a) Record keeping and right to audit. b) Furnishing of information – audit report, periodical financial statements, notice of any event of

	default. c) Maintenance of operating revenue to operating expenses of at least 1.5. d) Operations and Maintenance – diligently maintain and operate the project activities in a safe, efficient, and business-like manner. e) Furnishing of draft annual operating budget for IDCOL's approval. f) Shall not change its business during the loan tenor. g) Legal and Environmental Compliance. h) Providing after-sales services to the Households. i) No further finance without IDCOL's prior approval. j) No further encumbrance on the assets and receivables. k) Shall not abandon the project activities. l) Shall maintain management control. m) Shall take necessary action(s) to mitigate material adverse change/effect, if any. n) No distribution of profit if IDCOL issues any event of default notice. o) Anti-money laundering and countering terrorist financing measures shall be taken.
27. Events of Default	General Events of Default, including but not limited to: a) Non-payment; b) Breach of Representations and Warranties; c) Breach of Undertakings;

	d) Government actions; e) Failure to achieve installation target; f) Declaration of Insolvency by the court; g) Insolvency proceedings by the PO; h) Insolvency proceedings by the Creditors; i) Material adverse change in the PO's financial position; j) Cross-default occurs; and k) Force Majeure Event continues for more than – (-----) days rendering the Subproject or any material part thereof fully or partially inoperative without restoration or repair.
28. Remedies upon the Events of Default	IDCOL may: (a) suspend or cancel its commitment to provide any undisbursed Grants and Refinance under this Agreement; (b) declare all amounts outstanding due and immediately payable; (c) require the PO to have its cheques countersigned by IDCOL before making any withdrawal from Subproject Accounts; (d) enforce Security; and (e) exercise of any or all of its rights, remedies, and powers by IDCOL under PA.
29. Cure period	(a) If IDCOL becomes aware, or is notified by the PO, of occurrence or likelihood of any Events of Default that IDCOL determines to be curable, it will send to the PO a notice in writing **("Notice of Events of Default")**

	requiring the latter to cure the relevant default within 30 days of its occurrence. (b) If the PO fails to cure the default referred to in paragraph (a) above within the Cure Period, IDCOL may exercise specific remedies or any other available remedies.
30. Savings of rights	No course of dealing and no delay in exercising, or omission to exercise any right, power or remedy accruing to IDCOL upon any Events of Default of the PO, shall impair any such right, power or remedy or be construed to be a waiver thereof or any acquiescence therein, nor shall the action of IDCOL in respect of any Event of Default, or any acquiescence therein, affect or impair any of its right, power or remedy in respect of other Events of Default.
31. Negative Pledge	PO will undertake not to create or permit to be created (other than those already in existence at the time of signing Agreement) over any of its properties or assets, any mortgage, or other encumbrances, except as permitted by IDCOL.
32. Miscellaneous Provisions	a) Governing Law and Jurisdiction; b) Dispute Resolution – mediation, arbitration; c) Successors and Assigns; d) Consultancy, training, SHS tools, publicity materials; e) Monitoring and random verification of SHSs by IDCOL;

	f) Evaluation of POs performance by IDCOL; g) Amendment and Waiver; h) Confidentiality; i) Set-off; j) Indemnity; k) Authorized signatory; l) Survival of the Agreement; m) Subrogation of POs rights to IDCOL; n) Recycling of Batteries; o) Extension of Availability Period; and p) Force Majeure Event.

Appendix 7A: Solar Irrigation Pump Financing and Approval Process

The Fee-for-Service Model

IDCOL did Solar Irrigation Plants (SIP) financing in two ways. In the initial years, a *fee-for-service* model was used. The sponsor received 40% of the project cost as a grant and 40% as a loan from IDCOL for eight years. The loan had to be repaid through 29 quarterly installments at an interest rate of 6% per annum. The sponsors would also receive nine months of grace period, during which only interest (not the principal amount) is payable. The remaining 20% of the project cost was delivered as the sponsor's equity.

The Ownership Model

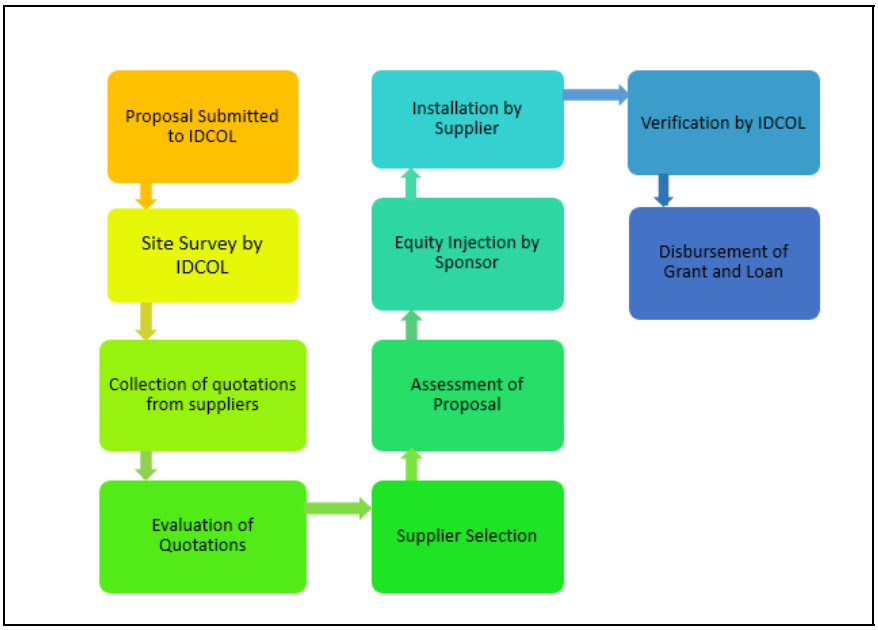
In later years, starting from late 2014 and early 2015, IDCOL abandoned the fee-for-service model, and an entrepreneurial *ownership model* was introduced. Under the ownership model, 40% of the total project cost was received as a grant. The farmers paid 20% of the equipment price (12% of the total project cost) to the participating organizations (POs) as the down payment. The remaining 80% (48% of the total project cost) was given as a loan from PO to a farmer. The loan was repayable in 5 years at an interest rate of 15% per annum. The PO, on the other hand, would receive 40% of the project cost from IDCOL as a loan for eight years at an interest rate of 6% per annum. The remaining 8% of the project cost was PO's contribution to the program. In the ownership model, the PO is the sponsor, and the farmer is the owner and operator of the plant. Hence, the risk is distributed among the stakeholders. The ownership model also strategized to reduce water wastage and ensure a smooth collection of revenue.

Approval Process

For both models, the common practice is that the sponsor must submit a project proposal following which the IDCOL inspectors survey the site. The sponsor then collects and evaluates quotations from various suppliers and finalizes one. The equipment supplied must fulfill the standards set by the Technical Standards Committee (TSC). IDCOL then assesses the project proposal considering the sponsor's capability and the project's

technical, financial, legal, and environmental feasibility. After receiving approval, the sponsor injects equity, and the supplier installs the system. The grant and loan would then be disbursed following a performance evaluation upon commissioning. After installation, IDCOL's monitoring team checks whether the sponsor had installed the system as per the approved design and laid pipelines as planned. Pro-rata shares of grant and loan are disbursed accordingly. This process is shown in the figure 7.1 below.

Figure 7.1: Approving a Solar Irrigation Plant



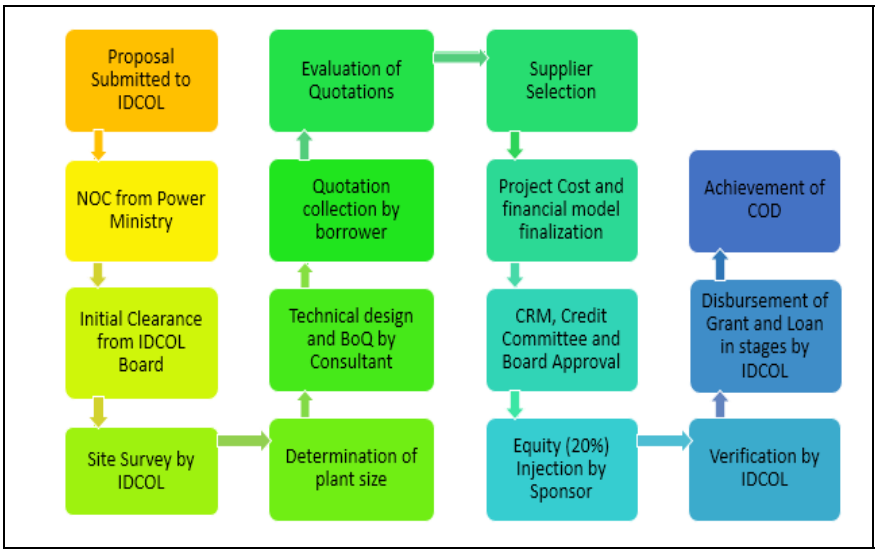
Source: Author

Appendix 7B: Solar Mini-Grid Financing and Approval Process

Solar Mini-Grids (SMG) are installed by a sponsor who is also the operator. Unlike the solar irrigation plants, the SMGs have been financed through a uniform model. The sponsor receives 50% of the project cost as a grant and 30% as a loan from IDCOL. The loan, repayable in 10 years at an interest rate of 6% per annum, has to be repaid in 32 quarterly installments with two years of grace period. The remaining 20% of the project cost is the sponsor's equity. To install an SMG, the sponsor submits a proposal to IDCOL. After receiving a no-objection certificate from the Ministry of Power, Energy, and Mineral Resources and initial approval from IDCOL's board, IDCOL inspectors conduct household surveys at the proposed site covering potential consumers, energy requirements, and willingness to pay. Based on the demand and willingness to pay, the plant's size is finalized, and the distribution network is designed. The sponsor prepares the technical design, collects quotations from equipment suppliers, and selects a supplier. The project cost and financial model are then finalized in consultation with IDCOL. IDCOL's credit committee approves the credit, and the sponsor initiates the project by injecting equity. The sponsor also receives a share of the loan and grant from IDCOL.

IDCOL follows a fund utilization-based model for further disbursement of grants and loans. The sponsor's excess amount is reimbursed, and the unspent amount is adjusted during subsequent payments. IDCOL monitors construction work and project progress until the project obtained Commercial Operation Date, as scheduled. This process is shown in figure 7.2 below.

Figure 7.2: Approving a Solar Mini-Grid



Source: Author

Appendix 7C: Threat of Grid Expansion to SMGs

Grid electricity, as the cheapest source of electricity, represents the greatest threat to the viability of a Solar Mini-Grid (SMG) project, and that makes the site selection for an SMG a critical step in ensuring that a project would be successful. Guidelines for the Implementation of Solar Power Development was adopted in 2013, which stated that if the utilities extended national grid in an off-grid area where an SMG had been operational for at least 5-years, the project operator would be allowed to feed the electricity to the grid at a negotiated price. This Guideline undoubtedly helped strengthen the project pipeline. However, problems remained. The 2013 Guideline needs to be applied with a Feed-in-Tariff (FIT) Policy. The FIT policy has been approved but yet to be put in effect.

The situation would be more complicated if the grid arrived before completing five years of operation.

Appendix 9A: Technical Standards Committee

The tasks performed by TSC.

Technical Standards Committee (TSC) of IDCOL was primarily entrusted with setting the SHS Program's technical components standards. Later, it took the responsibility of setting the technical standards for solar irrigation pumps, solar mini-grids, and government-sponsored solar PV-based street lighting programs for rural areas. The technical standard was set for individual components and overall systems. The standards were set forth considering two essential elements: to ensure the quality of the components and the systems funded under IDCOL programs and to ensure smooth operation.

To make sure that both the elements are appropriately addressed, TSC set forth the standards so that both local and international products could penetrate the market. Participation of the local producers was vitally important for the sustained smooth operation of the programs. Ensuring this was a challenging task as the local producers' participation generally means that the components' quality was not as high as those of the international products. So, TSC relaxed the standard only to the extent that the overall program's quality is not affected. For example, when the SHS first started, the lamps' luminous efficacy and efficiency of the inverters for fluorescent lamps were set by the TSC to enable local manufacturers to compete. These were gradually brought at par with international products. However, the standard was never set very low so that the end-users would suffer.

Higher quality products had higher energy efficiency and higher longevity, but one had to pay the price for the right quality product. On the other hand, some of the local products were much cheaper, but their quality was marginally lower than the high-quality international products. The standards committee used to calculate the life cycle cost involved with the local products and ensured that the quality compromise benefitted the end-users, the poor rural Bangladeshi people.

Challenges faced by TSC

A test report from a recognized lab was mandatory for all IDCOL approved products. There was no facility in the country to test solar panels or battery life in the beginning. The standards committee relied on foreign lab reports. However, it ensured that other tests like battery capacity, the lamps' luminous efficacy, quality, and efficiency of the charge controllers

were tested locally at Bangladesh University of Engineering and Technology (BUET). At the initial stage, tests were conducted in BUET to ensure that the test reports are reliable. However, the testing charges of BUET were very high, and many of the local manufacturers complained about that. Therefore, the committee invited proposals from different universities and institutes to be enlisted with IDCOL as testing institutes. They selected those with well-equipped labs and an experienced workforce for the tests later. The committee had to remain vigilant about human resources, test reports' quality, point out any anomaly whenever it occurred, and suggest remedial measures. If the anomalies were found to be due to a lack of ethical or moral standards of the testing labs, they took serious steps against them. They had to take a stand and blacklist at least one testing lab due to its unethical approach.

Keeping transparency of the product approval process was a challenge, and the committee openly discussed every issue. In many situations, the stakeholders were invited. TSC sought their opinions. One problem faced was the poor-quality products penetrating the market because good quality samples were tested while applying for product approval. However, the quality of the product was not maintained after getting approval from IDCOL. So, IDCOL decided to audit the quality of the components already in the field. The committee did not hesitate to penalize even renowned companies for their failures. Although initially causing jitters within IDCOL considering its possible adverse effect on the SHS program's growth, this bold step proved to be very useful.

Appendix 11A: The Integrated Development Foundation (IDF) Story

IDCOL's solar market did not wane only because of outside forces. Participating organizations (POs) had their internal crises to deal with, along with competing for rapidly declining off-grid solar market share. Inside management issues affected some POs more than outside forces. Corruption started inside a few POs and spread. Such is the story of the Integrated Development Foundation (IDF).[2] However, unlike other POs, IDF went through internal corruption and took corrective measures before becoming a successful PO.

In 2003, IDF was one of the first microfinance institutions to join IDCOL as a PO. Being the only PO and serving the remote tribal areas of Chittagong Hill Tracts, IDF proved its capabilities. Initiating solar business on that secluded hilly areas was challenging for the founder, Zahirul Alam. Villages in those desolate hills were remote and distant and could take over a day to reach a single customer in those days. What made business more difficult was language, cultural diversity, and the village headmen's influential role. Alam managed to turn these difficulties into strengths, had even a headman on the company board, and readied his company to explore solar business opportunities in the hills.

Alam started his expedition of providing SHS to the remote hill people by setting up a new solar unit in his company. Like most successful business ventures, Alam's journey towards building a successful solar unit in his company faced some initial hurdles. The first hurdle came at the time of recruiting a capable manager for the newly created solar unit. To accelerate the time-consuming head-hunting process to recruit a trustworthy manager with proven efficacy on board, Alam appointed his assistant from the microcredit program as the solar unit manager. Things were going well until IDF's solar program faced another hurdle: the second batch of POs joined IDCOL, increasing the number of total POs from 5 to 10. With the rise in the number of POs, there was a sudden surge in demand for capable managers. Alam lost his experienced and competent manager, who was poached by a competitor PO by offering better pay and benefits.

Alam filled the vacant position with another staff from his microcredit program. The new manager was not as capable as the first one, but Alam thought he would learn on the job. Ironically, Alam was proved to be more than correct in his assessment! The new manager set up his own company secretly by stealing solar equipment from the IDF warehouse and

[2] Please see Wimmer, Nancy. *The Market Makers: Solar for the Hinterland of Bangladesh,* for the same story.

transporting the equipment to his new company warehouse using IDF's trucks! By the time Alam figured this out, the company had lost millions of Takas. The manager persuaded five other IDF staff to join him. Alam's mistakes were in not giving much attention to the solar program, at the beginning, the period when a newly established unit required the most attention and trusting his manager without overseeing his works.

When Alam finally looked into the solar unit carefully, he found everywhere traces of his lack of attention and the past employees' trust-breaching activities. The accounts were filled with false numbers, sales figures were manipulated, and the customers had been supplied with cheap and sub-standard solar products. Alam replaced those substandard solar products free of charge and tendered apologies to regain the customers' trust.

Learning from the mistakes, Alam started repairing the damages. He hired a new Manager–Mohammad Ishaque– one of Alam's best microcredit managers. Under Ishaque's guidance, the solar unit of IDF took a new turn. Ishaque hired new staff members, opened new branch offices, intensified training and monitoring. Steadfast support from IDCOL in the form of financing, as it financed 75% of the customer training, was there, but Ishaque's leadership helped IDF mend the past damages and improve the company's prospects.

By 2013, IDF's solar operations were going on in full swing. IDF installed software for monitoring and evaluation purposes and developed a customer call center. IDF also built its manufacturing unit for mobile phone charge controllers (E-bike). IDF surveyed and mapped the remote off-grid regions to find the locations where there was less concentration of other POs with the help of IDCOL's map, showing the location of all the POs and their branches. IDF set up solar branches in remote and impoverished regions and also expanded its solar operations to its microfinance branches in the delta. IDF maintained a list of customers with their telephone numbers to check regularly if the branch staff had collected the installments or not. Despite being time-consuming, this practice ensured efficiency. IDF could spot immediately if branch staff had collected installments but had not deposited those. Such a prudent monitoring system helped IDF maintain a loan recovery rate of 99.23%.

Attention to details enabled IDF's solar division to install over 70,000 SHS and large systems for banks and commercial businesses in 22 districts of Bangladesh. Although IDF's solar unit successfully overcame the hurdles imposed by the corrupt employees in its initial years of operation, the journey toward success was prolonged. Other POs failed to take such remedial actions and suffered as a result.

GLOSSARY OF TERMS

BOO Model: Build, Own, Operate. A public-private partnership project model in which a private organization builds, owns, and operates some facility or structure under a government/utility concession.

BOT Model: Build, Operate, Transfer. A form of project financing, wherein a private entity receives a concession from the private or public sector to finance, design, construct, own, and operate a facility for a period stated in the concession contract. The arrangement enables the project proponent to recover its investment, operating, and maintenance expenses in the project.

BPDB: Bangladesh Power Development Board. The organization is responsible for planning and developing power infrastructure and operating much of its power generation facilities. BPDB is also responsible for a significant portion of the generation and distribution of electricity, mainly in semi-urban areas of the country.

BRAC: Bangladesh Rural Advance Committee. An international development organization based in Bangladesh, one of the largest non-governmental development organizations in the world. BRAC was selling SHSs in off-grid rural areas before IDCOL's SHS program; however, their installation numbers were moderate. They were one of the first POs of the SHS program. Their performance was below par under the SHS program.

BRACU: BRAC University. A leading private university in Bangladesh, an undertaking of the BRAC organization. See also, BRAC.

BREB: Bangladesh Rural Electrification Board of Bangladesh, established in 1977, is a major power distribution entity in Bangladesh. It primarily works on the electrification of rural areas. See also, REREDP.

BUET: Bangladesh University of Engineering and Technology. A public university in Bangladesh founded in 1912, offering specialized education in engineering and architecture. Distinguished professors of BUET played their parts at different stages of IDCOL's success.

Buy-down Grant: A consumer subsidy directly provided to the POs from IDCOL for selling SHS. This grant was fixed per SHS (i.e., limited). It helped reduce the initial purchasing cost of SHS for households and other consumers, making these products affordable amongst the rural population.

Combined-cycle: A type of thermal power plant that combines two types of turbines: combustion turbine and steam turbine. Primary Fuel is burnt to run the combustion turbine and produce electricity. The exhaust heat released from the combustion turbine is used to heat water at a waste-heat-recovery boiler and produce steam. This steam is used to run the steam turbine and produce additional electricity.

Complementary Financing Scheme: A type of financing arrangement in which different lenders agree to fund under similar yet parallel documentation and a proportional security package.

Corporate Finance: The more traditional financing method where the sponsoring company (the company building the project) procures capital by demonstrating to lenders that it has sufficient assets on its balance sheets to use as collateral. In case of default, the lender will be able to foreclose on the sponsor company's assets, sell them, and use the proceeds to recover its investment. This financing method is different from project finance. The repayment of debt in project finance is not based on the assets reflected on the sponsoring company's balance sheet but on the revenues that the project will generate once it is completed. See also, Project Finance.

Corporate Guarantee: A corporate guarantee is an agreement in which one party, called the guarantor, takes on the payments or responsibilities of a debt if the debtor defaults on a loan. This guarantee benefits the debtor and the lender. The loan is more secure for the lender since the guarantor assures that they will repay the money. A debtor can become eligible for a loan that they would not have otherwise qualified for.

CP: Conditions Precedent. An event, or state of affairs, that is required before something else will occur.

Cure Period: A time frame during which a company has gone into technical default on a contractual payment is permitted to submit payment without further prejudice and without being considered to have defaulted.

Debt: Debt, or loan, is simply the amount of money that is owed. In project finance, the total project cost not put up by the sponsor (see also, equity) is considered debt. Debts can be broadly divided into two parts: senior debts and subordinated debts. In the event of default or liquidation, the claims of a senior lender (providing a senior debt) are satisfied first, followed by claims of a subordinated lender (providing a subordinated debt).

Direct Agreement: A form of an agreement entered into by the lenders and each of the contract counter-parties. It enables the lender to step in as and when a project runs into trouble to: a) operate it for purposes of getting debt repaid, and b) sell the project wholly or piecemeal.

Dividends: Distribution of a portion of a company's profit to its shareholders.

Donor Organizations/Agencies: Organizations that donate voluntarily for development.

DSCR: Debt Service Coverage Ratio. The ratio of cash available to debt servicing for interest, principal, and lease payments.

Due Diligence: Due diligence is the investigation or exercise of care that a reasonable business or person is expected to take before entering into any agreement or contract with another party or an act with a certain standard of care. It can be a legal obligation, but the term will more commonly apply to voluntary investigations.

Economic Relations Division (ERD): One of the four divisions of the Ministry of Finance of Bangladesh. It mobilizes external resources for the country's socio-economic development, works as the Government's focal point for interfacing with the development partners, and coordinates all external assistance inflows.

Electricity Tariff: Another term for electricity pricing.

EPC: Engineering, Procurement, and Construction contracts. Sometimes called turnkey contracts, they are similar to design and build contracts in that there is a single contract for the design and construction of the project. Generally, with an EPC contract, the client has less say over the project's design, and the contractor takes more risk.

Equity: In project finance, equity refers to the total project cost contributed by the owner/sponsor (the remaining cost is raised through loans). For example, for a project worth US$100 million, if the sponsor

contributes US$25 million and the remaining US$75 million is raised through loans, the project has an equity to debt ratio of 25:75.

Exposure: The amount an investor stands to lose if the investment fails.

Fee-for-Service Model: A payment model where services are unbundled and paid for separately. Under this model, solar irrigation plants are owned by the PO, and the farmers pay a service charge for the water consumed at a fixed tariff. See also, Ownership Model.

Financial Close: Occurs when all project and financing agreements have been signed and all the required conditions have been met. It enables funds (e.g., loans, equity, grants) to start flowing so that project implementation can begin.

Financial Modeling: The task of building an abstract representation (a model) of a real financial situation. A mathematical model designed to represent (a simplified version of) the performance of a financial asset or portfolio of a business, project, or any other investment and used in investment decision making and monitoring progress of projects. Usually represented by linked EXCEL worksheets.

FIT: Feed-in-Tariff. Payments made to households or businesses generating their electricity through methods that do not contribute to the depletion of natural resources, proportional to the amount of power generated.

GEF: Global Environment Facility. GEF addresses global environmental issues while supporting national sustainable development initiatives. GEF grants helped lower the cost to consumers of purchasing an SHS under the program.

Grace Period: A grace period is a provision in most loan and insurance contracts that allows payment to be received for a certain period after the actual due date. During this period, no late fees are charged, and the late payment does not result in default or cancellation of the loan.

Grameen Shakti: A not-for-profit rural power company founded in 1996. Grameen Shakti was selling SHSs in off-grid rural areas before IDCOL's SHS program; however, their installation number were moderate. They were one of the first POs of the SHS program and installed the highest SHSs. They won the Ashden Award in 2006 for their work in bringing electrification to rural Bangladesh.

Grant: Grants are non-repayable funds or products disbursed or given by one party, often a donor, government department, corporation, foundation, or trust, to a recipient, usually a nonprofit entity, educational institution, business, an individual.

Greenfield Projects: A project that lacks constraints imposed by prior work. There is no need to work within the constraints of existing buildings or infrastructure for construction on Greenfield. See also, Non-greenfield Projects.

Grid Area: Parts of the country connected to the national electricity grid. See also, Off-grid area.

IBA: Institute of Business Administration. Part of Dhaka University, IBA has been one of the leading Business Schools in Bangladesh since its inception in 1966.

ICB: International Competitive Bidding. A bidding process is required in financing arrangements involving the World Bank. The World Bank requires its borrowers to follow specified procedures for awarding mandates on services procured to develop World Bank loan funded products. The stringency of the process-driven ICB was one of the leading causes IDCOL was able to invest only US$80 million out of available US$225 million under PSIDP. However, without burdened by ICB, IDCOL was highly successful under REREDP.

IDA: International Development Association. An international financial institution and member of the World Bank Group offers concessional loans and grants to the world's poorest developing countries.

IDCOL: Infrastructure Development Company Limited. To support infrastructure projects' financing through PSIDP, the Government created two institutions respectively styled the Infrastructure Investment Facilitation Center (IIFC) and the Infrastructure Development Company Limited (IDCOL). The coordinating institution for infrastructure project development would be IIFC, a core advisory services unit equipped to work with various government agencies to work with the Government to identify desirable projects while validating commercial sustainability through feasibility studies. IDCOL, a non-bank financial institution, would partner up with private developers and commercial lenders to mobilize the finance required for these projects. IDCOL would later go on to finance 4.13 million SHSs in Bangladesh.

IIFC: Infrastructure Investment Facilitation Center. See also, IDCOL.

Inside-the-Fence Project: Also known as captive power projects, these projects serve a private user (for example, power plants built to serve one specific factory), as opposed to public infrastructure projects that feed the generated power into the grid that can be used by anyone.

Invested Capital: Total money raised by a company through issuing stocks and bonds.

IPFF: Investment Promotion and Financing Facility. A World Bank project in Bangladesh makes partial debt financing available through private sector financial intermediaries (i.e., IDCOL and other private sector banks and non-bank financial institutions) for eligible, government-endorsed infrastructure projects developed by the private sector. See also, the World Bank.

IRR: Internal Rate of Return. The internal rate of return is a measure used in investment decision making. The term internal refers to the fact that the internal rate excludes external factors, such as inflation, capital cost, or various financial risks. It is the discount rate that makes a project's net present value equal to zero. A higher IRR is desirable.

kWh: kilowatt-hour. A measure of electrical energy equivalent to the power consumption of one thousand watts for one hour.

Leverage: Also known as Gearing. The use of borrowed capital for (an investment), expecting the profits made to be greater than the principal amount and interest payable.

LIBOR: London Inter-Bank Offered Rate. An interest-rate average is calculated from estimates submitted by the leading banks in London. Each bank estimates what it would charge were it to borrow from other banks.

Lien: A right to keep possession of property belonging to another person until a debt owed by that person is discharged.

Limited Recourse Debt: A limited recourse debt is a debt in which the creditor has limited claims on the project's sponsors in the event of default. See also, Non-recourse Debt.

Loan Tenor: The length of time until a loan is due. For example, if a loan is taken out with a two-year tenor, the loan's tenor is one year after one-year passes.

Loan: The lending of money by one or more individuals, organizations, or other entities to other individuals, organizations. The recipient (i.e., the borrower) incurs a debt and is usually liable to pay interest on that debt until it is repaid and to repay the principal amount borrowed.

Lowest Evaluated Bid: Qualified bidder with the lowest or best bid price.

Maturity: Date refers to the final payment date of a loan or other financial instrument, at which point the principal (and all remaining interest) is due to be paid.

MFIs: Microfinance Institutions. Institutions that provide small (micro) loans and other financial services without collateral to low-income people who may not have access to traditional banking services.

MW: Megawatt. A unit of power equal to one million watts is usually used to measure power stations' output.

NBFI: Non-bank Financial Institution. Financial institutions that offer some form of banking services but do not hold a banking license and are not allowed to accept customers' deposits. Examples include leasing and insurance companies and microfinance institutions.

Net metering: An electricity billing mechanism that allows consumers who generate some or all their electricity to use that electricity anytime, instead of when it is generated.

NGOs: Nonprofit organizations that operate independently of the Government. These organizations usually have social and humanitarian objectives. The primary funding source of NGOs is often donations.

Nominal Paid-up Capital: The issued capital represents the portion of the nominal capital that has been issued to shareholders. The shares that have been issued and subsequently paid for representing the paid-up capital of the nominal capital.

Non-greenfield Projects: Also known as brownfield projects. There is a need to work within the constraints of existing buildings or infrastructure for construction on brownfield land. See also Greenfield Projects.

Non-recourse Debt: A type of loan secured by very little collateral, which is usually property. If the borrower defaults, the issuer can seize

the collateral. Still, it cannot seek the borrower for any further compensation, even if the collateral does not cover the full value of the defaulted amount. See also, Limited Recourse Debt.

Off-grid Area: Area not connected to the national electricity grid of a country. As a result, people of these areas usually lack access to traditional electricity sources. These are usually areas with poor socio-economic conditions. See also, Grid Area.

Ownership Model: A payment model where the solar irrigation pumps are installed by a PO and purchased by an individual farmer(s). The farmer(s) operates the plant, sells water to other farmers, collects the revenue, and pays back to the PO. See also, Fee-for-Service Model.

PAD: A Project Appraisal Document (PAD) includes the complete project design and serves as the reference document for Project Authorization and subsequent implementation.

Palli Bidyut Samity: Subsidiary of BREB that acts as a rural consumer electricity cooperative.

Parastatal: An organization or industry, under some state control, directly or indirectly, having some political authority and serving the state indirectly.

Partial Risk Guarantee: A guarantee from the World Bank/Asian Development Bank covering private lenders or investors against the risk of a government (or government-owned entity) failing to perform its contractual obligations in a private project. Commercial risks are not covered and hence the name partial risk guarantee.

Performance Guarantee: A business agreement between a client and a contractor to perform all obligations under the contract. It might also include a clause to protect the client against losses incurred if the contractor fails to perform and enforcement action is required, or an alternative contractor needs to be engaged.

PO: Participating Organizations. The POs were grassroots organizations that worked with IDCOL in its SHS program. They were buying SHSs on behalf of consumers, installing the equipment, and collecting the monthly payments. The POs were responsible for monitoring the credits, collecting payments, and paying off the loans IDCOL had made to them.

PPA: Power Purchase Agreement. A legal contract between an electricity generator (provider) and a power purchaser (buyer, typically a utility or large power buyer/trader).

Primary Fuel: Fuels found in nature can be extracted, captured, cleaned, or graded without any energy conversion or transformation process. Coal and oil are examples.

Private Sector: Part of the economy not under direct government/state control. See also, Public Sector.

Project Finance: The long-term financing of infrastructure and industrial projects based upon the project's projected cash flows rather than its sponsors' balance sheets. See also Corporate Finance.

PSIDP: Private Sector Infrastructure Development Project. See also, World Bank.

PSIF: Private Sector Infrastructure Fund. A project implemented in Pakistan by the World Bank, similar to PSIDP in Bangladesh.

Public Sector: Part of the economy that is controlled by the government/state. See also, Private Sector.

PwCS: PricewaterhouseCoopers Securities Limited from the United States. Initially selected both as IDCOL's investment advisors and IIFC's transaction advisors. PwCS was asked to choose one due to a conflict of interests, and they selected IDCOL's contract.

Refinance: The replacement of an existing debt obligation with another debt obligation under different terms.

REREDP: Rural Electrification and Renewable energy development program. See also, World Bank.

Rights of Acceleration: An acceleration clause is a contract provision that allows a lender to require a borrower to repay all outstanding loans if specific requirements are not met. An acceleration clause outlines the reasons that the lender can demand loan repayment and the repayment required.

Senior Debt/Lender: See also, Debt.

SHS: Solar Home System. Stand-alone systems that use solar PV technology to provide electricity. Each system can meet the basic needs of lights, fans, and TV of an off-grid family.

Sovereign Payment Guarantee: A promise by the Government to discharge a third person/institution's liability in case of his/their default.

SPV: Special Project Vehicle. A legal entity created to fulfill narrow, specific, or temporary objectives. Typically used by companies to isolate the firm from financial risk.

Step-in-Rights: Enable one party to 'step in' to the shoes of another party concerning the rights and obligations of a contract. Typically, this happens in case of a severe breach of contract. Step-in rights are used to enable a project to continue with one party being replaced by another.

Subordinated Debt/Lender: See also, Debt.

Swiss Challenge: A form of public procurement operated in some jurisdictions requires a public authority that has received an unsolicited bid for a public project or services to be provided to the Government to publish the offer and invite third parties to match or better it.

Technical Assistance: Non-financial assistance is provided in the form of sharing information and expertise, instructions, skills training, the transmission of working knowledge, and consulting services. Either local or international experts can provide it.

Tendering Process: Tender usually refers to the process whereby governments invite bids for large projects that must be submitted within a finite deadline. Tendering is the process of making an offer, bid, or proposal, or expressing interest in response to an invitation or request for tender.

Term Loan: A monetary loan that is repaid in regular payments over a set period.

Turnkey Technology: A product or service designed, supplied, built, or installed fully complete and ready to operate. The term implies that the end-user has to turn a key and start using the product or service.

Waqf: Also known as hubous or mortmain property, is an inalienable charitable endowment under Islamic law, which typically involves donating a building, plot of land, or other assets for Muslim religious or charitable purposes with no intention of reclaiming the assets.

World Bank: An international financial institution that provides loans to countries for capital projects. It was created to provide loans

to low-income countries that were unable to obtain loans commercially. The Bank may also make loans and demand policy reforms from recipients. In 1996, World Bank provided a US$225 million loan to the Government of Bangladesh under PSIDP to encourage the private sector to invest and participate in financing and implementation of infrastructure projects. In 2003, World Bank initiated the REREDP (later supported by other donors), which installed 4.13 million SHSs in rural, off-grid Bangladesh. In 2016, World Bank started Investment Promotion and Financing Facility Project (IPFF) to assist the Government in facilitating new infrastructure projects with potential for private sector participation and developing the financial sector's capacity for the ongoing provision of infrastructure finance.

Wp: Watt-peak. This value specifies the solar module's output power under full solar radiation (under set Standard Test Conditions). Solar radiation of 1,000 watts per square meter is used to define standard conditions.

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PRAISE FOR THE BOOK

"Win is the heartening story of one of the world's most successful development projects ever. The secret sauce in bringing electricity, solar-powered, to the millions of the poorest of poor was unleashing the power of accountable, dedicated public entrepreneurship. Read Win to get the long-sought recipe for lifting the world's poor out of endemic poverty."

- Laurence J. Kotlikoff, A William Fairfield Warren Professor of Economics, Boston University

"Electrification is an issue of central importance to most developing countries, as billions remain without access to reliable energy. It is also a complex and expensive undertaking. We, therefore, require innovative approaches to solve this central challenge. As such, the story of public entrepreneurship to solve that challenge in Bangladesh would be of interest to public administration and development students."

- A. Mushfiq Mobarak, Professor of Economics, Yale University

"Your insightful new book chronicles a remarkable era of public entrepreneurship spearheaded by Infrastructure Development Company Limited of Bangladesh (IDCOL). Your unique, firsthand account, including as founding CEO of IDCOL, brings to life more than a decade of challenges and successes. Your stories, vividly described with wit and wisdom, provide valuable lessons for today's readers.

You and your colleagues at IDCOL changed countless lives by facilitating economic development and contributing directly and indirectly to dramatic improvements in safety, health, and education. I admire your dedication to IDCOL and the citizens of Bangladesh. I applaud your gift in sharing IDCOL's story."

- Joseph A. Bevash, Partner, Latham & Watkins, Japan

"I got to know that you are about to publish a book about the emergence and success factors of the Infrastructure Development Company Limited of Bangladesh (IDCOL). I find this topic highly interesting and relevant today: the institution's challenges in the infrastructure space and the management task to develop projects and programs amongst conflicting ideas and objectives by stakeholders with limited means. As a development finance practitioner, the 'perspective from the trenches' is highly relevant – and to be able to learn from the example of the Solar Home Systems goes

beyond IDCOL and Bangladesh because of the description of the institutional interplay that will enlighten us to assess and improve our projects. Please let me know when the book goes to press."

- Dr. Hubertus Pleister, Director Corporates Asia Loans, DEG – Deutsche Investitions- und Entwicklungsgesellschaft mbH, Corporates Asia Loans, Germany

"There are many books written about successful companies and their rise from a humble start to becoming multi-billion enterprises. However, there are a few books that chronicle spectacular accent for a company which was established in Bangladesh! Dr. Khan's book walks the reader through the Infrastructure Development Company Limited (IDCOL) evolution since its start in the late 1990s to become the largest and most successful state-owned enterprise in the country. I had the privilege of having made the acquaintance of Dr. Khan and his talented team back in 2005 when IDCOL was a relatively small institution. At that time, IDCOL had financed one large power plant and struggled to establish itself in Bangladesh's infrastructure finance market. Through Dr. Khan's leadership, I witnessed the growth of IDCOL throughout the years and, in particular, the expansion of its highly successful solar home system program that provided access to electricity to more than 4 million households in Bangladesh's rural areas. The book details the success stories of IDCOL and provides insight into some of its failures and how the company overcame those and emerged stronger than before. The book is a must-read for anyone interested in development finance and how domestic players can make a substantial impact in the daily life of millions of people."

- Peter Marro, Principal Financial Sector Specialist, Asian Development Bank, Manilla

"I am delighted to know that you are going to publish a book, Win. I find the topics of the book extremely fascinating and timely. It is fascinating because the book is based on your firsthand experience as the founding CEO of the Infrastructure Development Company Limited (IDCOL). The book narrates Public Entrepreneurship's story through IDCOL in promoting private sector infrastructure financing and renewable energy in Bangladesh. This book provides a new perspective in development economics beyond the traditional view based on the private sector versus public sector dichotomy.

I look forward to reading the book for myself. I will also recommend this book to those who teach development economics and public finance."

- Dr. Sadequl Islam, Professor & Chair, Department of Economics, Laurentian University, Ontario, Canada

"I have come to know about your forthcoming book on public entrepreneurship based on your extensive experience. I look forward to reading the book, especially the enablers and barriers of public entrepreneurship in a developing country context. I would love to use the case of IDCOL in my MSc Global Supply Chain Management course to show my students how public entrepreneurship can orchestrate successful supply networks."

- Dr. Fahian Anisul Huq, Senior Lecturer and Programme Director MSc Operations, Projects & Supply Chain Management, Alliance Manchester Business School, UK

“I am delighted to know about your upcoming book titled Win. I believe this will be an interesting read to learn about the most successful renewable energy program of Bangladesh to date- solar home systems and the journey of IDCOL. I would be keen to disseminate your firsthand findings and experience on Bangladesh’s renewable energy industry in one of my teaching modules. I hope the book will be a good reference for students interested to learn about stakeholder management, project finance, project life cycle, and sustainability issues in the renewable energy context. I look forward to getting a copy of the book once it is published.”

- Dr. Rishad Ahmed, Assistant Professor of Power Electronics, Electrical and Electronic Engineering, University of Nottingham

“I am quite excited to learn about your book on the development of public entrepreneurship. I am keen to understand how public financing works in developing countries through the success stories of IDCOL.”

- Sara Falke, Arbeitgeber-Service/ Agentur für Arbeit Domstr. 68, 63067 Offenbach am Main, Germany

“Very glad to hear the news about your upcoming book, Win. It will be great to learn the insights of IDCOL’s success stories- how innovative financing can help develop infrastructure and ensure rural development. This book will be an excellent reference for me in my professional works as I am closely dealing with public/private energy infrastructure projects in developing countries.”

- Hirak AL-HAMMAD, Project Manager - Energy Economics and Planning, Tractebel Engineering GmbH, Germany

"I am excited to learn about your forthcoming book, Win.

I also think that the book will generate interest among development and business professionals across Africa and a few countries of Asia (such as Cambodia).

In my work, I have needed to study the IDCOL model to derive insights to address the problem of having many people without electricity access in Africa and Asia.

The story of IDCOL must be told, as Win does, in a manner that can be accessed by a broad audience. Lessons from this program will be interesting to business people, development, and public finance professionals."

- Sanjoy Sanyal, Founder Regain Paradise, Mumbai, India

"I am delighted to know about your forthcoming book, Win. I am keen on learning more about the nuts and bolts that made the IDCOL model work. What makes IDCOL's business model so successful for renewable energy expansion is something solar practitioners should know. The book will therefore be a good point of reference, not just for me but even other people looking for financing solutions for large clean energy programs in developing countries."

- Shuvajit Mandal, Advisor & Country Representative, Business and Project Development
Deutsche Gesellschaft für, Internationale Zusammenarbeit (GIZ) GmbH

"It is with great interest to learn that Dr. Khan has written a book documenting the journey of IDCOL. I believe the book Win will offer invaluable lessons about renewable energy and infrastructure financing."

- Ariel Pinchot, Associate, Sustainable Finance, World Resources Institute, USA

"I am glad to know about your new book Win and am interested in purchasing a copy of the book. I am keen on learning more about the nuts and bolts that made the IDCOL model work. While some financing models are being tested in Africa, none has come close to what was achieved in Bangladesh. Therefore, the book will be a good point of reference, not just for me but even other people looking for financing solutions for large clean energy programs in Africa."

- Esther Kahinga, Knowledge Manager, Africa Clean Energy. Tetra Tech, International Development
Nairobi, Kenya

"Being in IFC's FCS unit, I can foresee the demand for such books in all African countries where we are operating. Of course, some countries are trying to test their business model but yet to reach a conclusion, where Bangladesh's experience would help them resolve the puzzle nicely."

- Muhammad Taif Ul Islam, Operations Officer, FCS Africa, IFC

"IDCOL's journey as a financial institution for medium and large infrastructure development in Bangladesh is fascinating.

Moreover, the story of IDCOL's Solar Home Systems program becoming its flagship revival project based on the inherent clean energy potential and the existing network of micro-financing institutions in Bangladesh is worth learning from.

Your cost comparisons of keeping households in the dark for 60 years the cost of US$ 1.5/kWh of SHS (in those days) is quite thought-provoking. It confirms an excellent line I had heard many years ago: "The price of inaction is often higher than the cost of action!"

I am sure the path of IDCOL was not easy and must have been fraught with challenges and difficulties of all proportions. How IDCOL tided over these to emerge successfully would be fascinating reading. Particularly interesting on how such institutions elsewhere in the developing world could emulate some of these examples."

- Rahul Datar, Principal Consultant, Environment Matters, Mumbai, Maharashtra, India

“I read the book and found the story fantastic. It is a story worth knowing for every public sector official in the world. Win narrates the gripping real-life adventure of a young state-run infrastructure lender and how it lit up millions of homes in some of the remotest backwaters of a poor South Asian nation. In essence, Win captures in just below 300 pages the story of Bangladesh’s solar revolution. The writer was one of the architects of that revolution. After leading state-run IDCOL, whose innovative infrastructure financing ushered in one of the world’s largest renewable energy programs, for eleven years, he is now giving a first hand account as to how the job was accomplished. Fascinating story! A must-read for development economists, lenders, and public sector officials.”

- Shafiqul Alam, Bureau Chief, Bangladesh, Agence France-Presse (AFP)

ABOUT THE AUTHOR

M. FOUZUL KABIR KHAN has experienced a 3-dimensional view in his career: First, as a Secretary to the government, he has closely seen the public realm. Second, as the CEO of IDCOL in Bangladesh, he has witnessed and practiced public entrepreneurship in a government-owned institution run as a private business. Third, observed from the cerebral world as an academic in the United States, Singapore, and Bangladesh. He is the co-author of the book Financing Large Projects published by Pearson-Prentice Hall. Pearson and Tsinghua University, Beijing jointly published the Chinese translation of the book.

"The amazing success of Bangladesh in providing solar electricity access to 5 million households is little known to the world community. This compelling narrative about institution building, wading through difficult country circumstances, negotiations with donors, working with NGOs, private business and academics, deserves to be read widely."

Jin Liqun
President, Asian Infrastructure Investment Bank

"Win is the heartening story of one of the world's most successful development projects ever. The secret sauce in bringing electricity, solar-powered, to the millions of the poorest of poor was unleashing the power of accountable, dedicated public entrepreneurship. Read Win to get the long-sought recipe for lifting the world's poor out of endemic poverty."

Laurence J. Kotlikoff
A William Fairfield Warren Professor of Economics, Boston University

Fouzul Khan demonstrates that one man with a vision and dedication can transform the lives of millions. The book shows that decentralized energy services are critical at the community level to enable sustainable livelihoods and jobs, efficient health service delivery, and access to water and sanitation. A must read for development practitioners interested in designing institutions that can foster horizontal cross-sectoral collaboration for achieving the sustainable development goals.

Dr. Kandeh Yumkella
Former UN-Undersecretary General, Founding CEO, Sustainable Energy for All (SEforAll)

"Win is an amazing success story that the whole world should learn about and learn from. It is a personal, approachable, and popular account of the challenges, opportunities, and the technical and social innovations that led to the world's largest solar home system program in a country that few associates with global leadership in solar energy, energy storage, and institutional capacity."

Professor Daniel Kammen
Chair, Energy and Resources Group, University of California, Berkeley

"Infrastructure development is a key priority of all developing economies, often hampered by bureaucratic and self-serving interests. IDCOL has however been a notable exception, and its success holds many useful lessons for developing economies in general. As CEO, Fouzul Khan displayed a profound, hands-on, familiarity with all aspects and intricacies of the organization's role and how skillfully he dealt with the many stakeholders. Not only does the book yield many valuable lessons, it is also a testimony to what a dedicated, enlightened, skillful, humane, and resolute leader can achieve."

Basant K Kapur
Emeritus Professor, Economics, National University of Singapore

"A page turner: Win reads like a novel on economic transformation. A story of blending technological and financial innovation to improve lives of the underprivileged."

Chris Burtch
Managing Director, Standard Chartered Bank, New York.

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