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Envirofit International: Cracking the BoP Market

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> Energy to meet our basic needs is essential . . . Making cleaner fuels and improved stoves available to millions of poor people in developing countries will reduce child mortality and improve women's health. In addition to health gains, household energy programmes can help lift families out of poverty and accelerate development progress.
>
> Dr. Jong-Wok Lee,
> Director-General, World Health Organization (WHO)
> in Foreword to *Fuel for Life* (2006)

As Tim Bauer raced down the highway on April 2, 2011, his gaze drifted off to the distant snow-capped peaks of Mount Evans. Bauer and his passenger, Harish Anchan, were on their way back from the airport where Anchan had arrived from India to attend Envirofit International's upcoming Board meetings. The drive through the meandering hills in northern Colorado had lulled Anchan to sleep, but Bauer's mind was preoccupied with the challenges that Envirofit, the company he had co-founded eight years ago, faced in the Indian market. The dark clouds hanging low in the morning sky signaled the storm ahead. He could not help but ruminate about the slumping sales and how they might affect the sustainability of the company's Indian operations. Profits generated in India were insufficient to meet ongoing product R&D work undertaken in the U.S., as well as administrative overhead incurred at headquarters to support the Indian operations.

In 2007, Envirofit, a non-profit enterprise from Fort Collins, Colorado, USA, teamed up with the Shell Foundation to reduce indoor air pollution (IAP) in India by selling high-performance cookstoves designed to reduce carbon emissions by at least 50 percent. IAP was deemed to be a silent killer and was recognized as a major environmental hazard in developing countries like India. According to the World Health Organization, IAP caused the death of one person every twenty seconds and was the leading cause of death for women and for children under the age of five. In addition, globally, the two million tons of firewood burned per day to cook meals led to rapid deforestation, depleted water tables, global warming, and the melting of glaciers. One simple solution to this worldwide problem was a low or zero emissions cookstove.

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Yet, the solution did not appear to be that simple to Bauer, VP of Operations at Envirofit, Anchan, managing director of Envirofit India, and Nathan Lorenz, VP of engineering, as they gathered around the table at company headquarters the next day. See **Exhibit 1** for detailed biographies of the executive team.

Exhibit 1: Envirofit's Top Management Team

(in alphabetical order by last name)

Harish Anchan, Managing Director of Envirofit India Pvt. Ltd. Harish Anchan graduated with a B.E. in electronics and telecommunication from the Regional Engineering College, Srinagar, India. As Managing Director of Envirofit India, Mr. Anchan's overall responsibilities include exploring new opportunities for Envirofit across the Asia Pacific region and creating awareness about indoor air pollution and cookstoves.

Tim Bauer, Vice-President of Operations, Director, and Co-Founder. With over fourteen years of international experience, Tim Bauer, a co-founder of Envirofit, managed Envirofit's foreign subsidiaries, and was responsible for overall sales and operations activities and international sourcing. Mr. Bauer received the William E. Morgan Alumni Achievement Award from Colorado State University, its highest alumni honor, in 2010, *Time* magazine's "Heroes of the Environment," honor in 2009, and the Rolex Award for Enterprise for commercialization in 2008. He holds B.S. and M.S. degrees in mechanical engineering at Colorado State University, with emphasis on appropriate technology development and internal combustion engines.

Ron Bills, Chief Executive Officer and Chairman of the Board. Ron Bills, an award-winning engineer and visionary leader, sought to transform Envirofit into a scalable and sustainable social enterprise focused on energy, pollution reduction, and health and economic improvement. He believed that it was a basic duty of free enterprise to deliver high quality, durable, and aspirational products to emerging consumer markets at the lowest possible cost—while at the same time energizing local economies and developing local entrepreneurs. Since 2004, Mr. Bills served Envirofit in the capacity of CEO and chairman of the board. Prior to Envirofit, he was president and CEO of Segway. His work experience included Polaris Industries, Yamaha Motor Corporations, Bombardier, and Martin Marietta Aerospace.

Alan Campbell, Director of Supply Chain. With an MBA from Arizona State University, Alan Campbell managed the global and local supply chains at Envirofit. He was responsible for the planning, procurement, and logistics functions. Mr. Campbell's professional experience included more than fifteen years managing supply chains in the high-tech electronics and biopharmaceutical industries. He was professionally certified by the Association for Operations Management (CPIM and CSCP), Institute for Supply Management (C.P.M.), and International Supply Chain Education Alliance (CSCM).

Nathan Lorenz, Vice-President of Engineering, Director, and Co-Founder. Nathan Lorenz, co-founder of Envirofit, oversaw R&D, product development, manufacturing, and supply chain management for Envirofit. Mr. Lorenz received his B.S. and M.S. in mechanical engineering from Colorado State University. He had extensive experience in managing the product development cycle from concept drawings and prototype performance testing through market acceptance testing to final production. Mr. Lorenz was honored as one of *Time* magazine's "Heroes of the Environment" in 2009 and received the William E. Morgan Alumni Achievement Award from Colorado State University (its highest alumni honor) in 2010.

Randall Monson, Vice-President of Finance and Chief Financial Officer. Randall Monson, a licensed Colorado CPA, had extensive overseas experience in China, France, and Cote d'Ivoire. Mr. Monson's previous positions included director of financial reporting for Transamerica, CFO at Harlyn Products Inc., director of operations at ITI, Hai Lian, and controller for operations with Boise Cascade and Container Corp. of America. He received an MBA in operations and information systems from UCLA's Graduate School of Management.

Source: www.envirofit.org

The Board of Directors meeting was only a few days away. The estimated sales figures for the first quarter in 2011 lagged behind first quarter 2010 sales. Anchan was ready to speak about the extensive information he had gathered from his discussions with retailers in the four southern states of India where they operated (see **Exhibit 2**). He was concerned about the quick tapering off that was evident in the Indian sales data for 2010 that persisted in the first quarter of 2011. Both Anchan and Bauer knew that they had to reverse the course quickly in order to sustain the company.

Exhibit 2: Map of India*

*Envirofit operated in the four southern states of Andhra Pradesh, Karnataka (where its headquarters was in Bangalore), Kerala, and Tamil Nadu.

Source: maps.google.co.in

ENVIROFIT

Envirofit was founded in 2003 as a nonprofit organization; its goal was to bring cleaner technologies to the developing world. It attained a 501(c)(3)[1] status a year later, which meant that the organization could receive tax-deductible donations to fund development of products that fit with its mission of reducing pollution in developing countries. Envirofit's mission encompassed three core components: 1) technology development and transfer; 2) energy efficiency and environmental preservation; and 3) pollution reduction and end-user health benefits.

The organization had evolved from research conducted at the Colorado State University's (CSU) Engines and Energy Conversion Laboratory (EECL), a world leader in designing energy-efficient, low-emissions engines. Dr. Bryan Willson, a professor of mechanical engineering, was the head of the EECL. He co-founded Envirofit in 2003 along with two of his graduate students, Bauer and Lorenz, as well as Paul Hudnut, who taught a course on social enterprises at CSU's business school. The inspiration behind the focus on attacking chronic environmental problems such as air pollution came from the realization that worldwide, an estimated 3.6 million people died annually as a result of indoor air pollution. Willson, Hudnut, Bauer, and Lorenz were keenly aware of the chronic nature of indoor air pollution, and the fact that it disproportionately affected the poor.

The first product Envirofit developed was a two-stroke engine, which when retrofitted on the auto rickshaws used in developing countries like the Philippines, slashed air pollution by 50 percent. It was marketed and sold in the Philippines and remained a small part of Envirofit's business. The second product developed by the company was an efficient cookstove. Willson explained the events that motivated him to work on designing low-cost, high-performance cookstoves:

> I went to India as part of my Fulbright fellowship and had the opportunity to travel extensively throughout the country. It was there that I observed how the poor people lived. Families in the poor neighborhoods lived in small spaces, in small huts or tents with tarp and plastic roofing. Inside this modest space was the woman who cooked in pots placed over an open fire coming out of an open pit or a very primitive stove. The pots as well as the walls of the single-room house were covered with soot from the black smoke that drifted from the burning wood and engulfed the house. The woman coughed, wiped her eyes with her sari, but continued to cook and tend to the young children, who tugged on her sari. Women cooked this way for generations. They were constantly exposed to the toxic fumes that spewed from the burning wood, cow dung, or other biomass fuels used in the simple act of cooking food or boiling water. What I saw inspired me to develop an inexpensive cleaner-burning cookstove that would significantly reduce indoor air pollution and improve the health of these rural poor.

In 2007, Envirofit successfully applied to the Shell Foundation's Indoor Air Pollution (IAP) program in response to its solicitation of proposals to bring high-performance cookstoves to India. With this grant from the Shell Foundation in India, Envirofit's founding team developed cookstoves based on the low-emissions technology Willson had developed for the automotive industry. These cookstoves were meant for sale to the poor households in India earning $2–$7 a day, also known as the working poor of the BoP[2] (base of the pyramid).

Envirofit's newfound opportunity in cookstoves became its core business. According to Bauer, "Black carbon accounts for 18 percent of greenhouse gas emissions globally . . . If we could convert 100 percent of the developing world's 500 million cookstoves

to energy-efficient models, it would save 750 million tons of carbon dioxide (CO_2) annually. This is equivalent to taking 134 million cars off the road (approximately all passenger cars registered in the United States)."

Collaborative Governance

Executive leadership at Envirofit headquarters in Fort Collins included Ron Bills (CEO and Chairman), Bauer (VP of Operations), Lorenz (VP of Engineering), Randall Monson (VP of Finance and CFO), and Alan Campbell (Director, Supply Chain). Co-founders Willson and Hudnut were members of the Envirofit Board of Directors. Envirofit's Board met every quarter and held business review meetings on a regular basis to track progress. Board members included funding partners such as the Bohemian Foundation and the Shell Foundation. The Bohemian Foundation, which provided grants and support to organizations in local communities, including CSU, had provided initial proof-of-concept and multi-year grants to support Envirofit's efforts to develop the two-stroke engine and the retrofit business. The Shell Foundation provided substantial initial funding and continued assistance for the cookstove project.

The Indian Market

According to the World Health Organization, in 2003 approximately 92 percent of India's rural population falling in the poorest quintile used biomass fuels for cooking.[3] The rural poor cooked on primitive stoves or open fire pits using biomass fuel (dung, farming waste, and wood) inside their modest makeshift homes. This cooking practice resulted in environmental pollution that was linked to death and severe illnesses, such as cancer, tuberculosis, and respiratory infections. Cooking using traditional methods was not endemic to India alone but was widespread among the poor worldwide. Those who were at risk, mostly women and children, were exposed to the flying embers and nauseating fumes on a continuous basis and were at high risk of burns, death, and prolonged sicknesses caused by IAP.

According to the World Bank, CO_2 emissions from India grew from 1.1 metric tons per capita in 2000 to 1.2 metric tons per capita in 2003, and 1.5 metric tons per capita in 2008. This rapid growth in carbon emissions coupled with the population growth did not bode well for India and its neighbors in Asia. In India alone, 500,000 deaths annually were attributed to IAP. Indian scientists also predicted that the Himalayan glaciers would disappear in less than three decades due to the rising CO_2 emissions primarily contributed by the heavy consumption of biomass fuels by the rural population in Asia.

The rural poor usually obtained the wood needed from public lands and forests in the vicinity. As the stoves were inefficient, they used a lot of energy needing large quantities of fuel causing rapid deforestation. A published report indicated that about 304 million cubic meters (≈10.7 billion cubic feet) of wood was hacked annually from forests in India alone.[4] The ensuing deforestation, depleted water tables, global warming, and the melting of glaciers were major concerns for governments around the world, including the Indian Government.

Scientists had a simple solution to this daunting problem: provide enhanced biomass cookstoves engineered specifically to reduce CO_2 emissions, as this would provide a potent yet simple solution to the enormous environmental problem. This solution

caught the attention of foundations like the Shell Foundation, the nonprofit arm of Shell Oil, which was committed to eradicating IAP in developing countries.

The Shell Foundation[5]

The Shell Foundation had operated in India since 2000 and provided funding to Non-Government Organizations (NGOs) through a number of programs, one of which was the Indoor Air Pollution program, later renamed the Breathing Space program. In 2000, the foundation had expected that this capital funding would serve as a catalyst to long-lasting positive change. Since the cookstove was hailed as a simple yet powerful tool to curb indoor air pollution, the Shell Foundation supported nine pilot projects in seven countries during the period of 2002 to 2007. These projects were solely focused on issues relevant to indoor air pollution. As a result of these investments, the foundation gained a wealth of knowledge in areas of consumer cooking habits, technologies, fuels, and production/distribution methods.

Managers from the foundation learned that biomass fuel was the most used fuel in the BoP households affected by indoor air pollution. Biomass also happened to be the most affordable in the BoP communities as it was widely available throughout the country. Pilot programs funded by the foundation that focused on other fuels were not very popular among customers because it meant that they would have to alter cooking habits that had been ingrained in their culture generation after generation. The conclusion, therefore, was not to force change upon these households. This fine-tuning in the foundation's attitude meant that new efforts did not have to include supporting programs involving the creation of parallel (alternative) fuel supply chains.

The foundation also learned that pilot programs that were done in partnership with NGOs did not result in a sustainable impact on a large scale because of the limited funding available to NGOs operating with a donor-based model. As opposed to this traditional philanthropic model, the Shell Foundation deemed a market-driven approach a better solution. What this meant was embracing a for-profit business model incorporating a customer-centric organizational culture, due diligence, and a profit orientation to promote financially sustainable operations. In other words, serving the BoP was seen as an economic opportunity rather than philanthropy. With an enterprise model, organizations receiving funding from the foundation could make a long-lasting, economically sustainable, large-scale impact without depending on donors for funding in perpetuity.

The cookstoves used in the pilot programs were already available in the local market or models newly developed by organizations that received funding in the program. Inconsistencies in cookstove quality and the inability to produce the product en masse were impediments to achieving scale. The model used in the pilots was inadequate to make the large-scale impact that was anticipated by the IAP team. However, it seemed that centralized production would deliver the promise. Local production could be achieved at a later stage through assembly operations in host countries.

Another lesson from the pilots was that without consistent performance and a high level of fuel efficiency, consumers could not be swayed to make the purchase. Since cookstoves were a consumer-durable product requiring a sizeable investment on the part of the consumer, attention had to be focused away from artisan-made stoves toward developing durable high-performance, engineered cookstoves. The prerequisite to achieving this "new" cookstove was significant investment in research

and development (R&D) with acknowledged performance benchmarks (such as desired fuel efficiency, carbon emission standards, and engineering for durability and affordability).

The pilot programs also taught IAP managers that monitoring the results and evaluating them systematically were essential for achieving the desired outcomes.

Experience from the field indicated that the BoP households lacked awareness of the issue of indoor air pollution and its connection to the health and safety of their families. This cultural problem proved to be a major challenge for the foundation's efforts to curb IAP through cookstoves. Thus, another lesson learned from investments in the pilots was the need to raise awareness of the IAP problem through educational campaigns.

As a result of this field-based knowledge, in 2007, the Shell Foundation was prepared to radically depart from the traditional way it granted funding to becoming entirely market-driven. In the meantime, there was a paradigm shift in the citizen sector[6] as well. The rise of the social enterprise changed the landscape and gave new meaning to impact investing. The notion of expecting social ventures to be profitable was no longer blasphemous to mission-driven entrepreneurs and donors alike.

Envirofit India

Envirofit's subsidiary in India, Envirofit India Pvt. Ltd., was registered as a for-profit company in 2008 since Indian laws prevented non-profit organizations from engaging in trading activities (buying and selling products). Additionally, Envirofit had a second subsidiary in India, which was a non-profit entity that could receive grants from anywhere in the world to build awareness of the IAP issue and promote the cookstove solution. Anchan, an experienced engineer who was fluent in eight Indian languages as well as English, was hired as managing director of the Indian subsidiary. His knowledge of the rural customer base in the host country, as well as their customs and culture, was a plus. Anchan, who reported directly to Bauer at headquarters, worked closely with the Shell Foundation IAP managerial team in Bangalore (also known as Bengaluru).

High-Tech Product Design

Envirofit India was located in Bangalore, a cosmopolitan city in the southern Indian state of Karnataka (see Exhibit 2 for a map of India and **Exhibit 3** for basic facts of the country). It initially sold local cookstoves made available by the Shell Foundation. A few months later, the first generation of high-performance Envirofit cookstoves produced in China was brought to the Indian market.

Exhibit 3: Summary of Basic Facts of India

Population	1,205,073,612 (July 2011 est.)
Local languages spoken	Hindi 41%, Bengali 8.1%, Telugu 7.2%, Marathi 7%, Tamil 5.9%, Urdu 5%, Gujarati 4.5%, Kannada 3.7%, Malayalam 3.2%, Oriya 3.2%, Punjabi 2.8%, Assamese 1.3%, Maithili 1.2%, other 5.9%
Religions	Hindu 80.5%, Muslim 13.4%, Christian 2.3%, Sikh 1.9%, other 1.8%, unspecified 0.1% (2001 census)
Age structure	0–14 years: 29.7% (male 187,450,635/female 165,415,758) 15–64 years: 64.9% (male 398,757,331/female 372,719,379) 65 years and over: 5.5% (male 30,831,190/female 33,998,613) (2011 est.)
Labor force	487.6 million (2011 est.)
Labor force by occupation	Agriculture: 52% Industry: 14% Services: 34% (2009 est.)
Agricultural products	Rice, wheat, oilseed, cotton, jute, tea, sugarcane, lentils, onions, potatoes; dairy products, sheep, goats, poultry; fish
Industries	Textiles, chemicals, food processing, steel, transportation equipment, cement, mining, petroleum, machinery, software, pharmaceuticals.

Source: https://www.cia.gov/library/publications/the-world-factbook/maps/maptemplate_in.html

"A clean efficient cookstove," according to CEO Bills, "is a simple idea, but designing and producing hundreds of thousands of cookstoves that are both durable and efficient is very complicated. It requires the best science and technology on the planet." A cookstove was not a novel idea. However, Envirofit's cookstoves used a revolutionary design, including an ultra-efficient combustion chamber that cut down emissions by 80 percent, doubled fuel efficiency, and reduced cooking time significantly. The stoves used the same biomass fuel (wood, dry coconut and palm leaves, twigs, dung etc.,) that Indian BoP households had used for generations, as it was free and abundant in rural communities, although urban BoP families spent as much as 10–20 percent of their earnings on fuel.

In collaboration with the Oakridge National Laboratories in the U.S., Envirofit developed the patented alloy used in the combustion chamber. This alloy made the Envirofit cookstoves inexpensive and durable with the best-performing combustion chamber in the cookstove industry. The consumer benefitted from the lightweight, low-cost, high-performance stoves that came with an unprecedented five-year manufacturer warranty and a 50 percent savings in fuel used. As Envirofit expanded into the neighboring states of Tamil Nadu, Andhra Pradesh, and Kerala in south India, it developed a suite of products compatible with the cooking habits of its target BoP population earning $2–$7 a day. See **Exhibit 4** for the portfolio of products offered by Envirofit.

Exhibit 4: Envirofit's Portfolio of Cookstoves

 M-5000 Wood	 Z-3000 Wood	 M-3300 Wood
 B-1200 Wood	 G3T Turbo Wood	 Double Pot Attachment

Source: http://envirofit.org/products/?sub=cookstoves

These products were designed in Dr. Willson's lab (EECL) at CSU. The prototypes underwent rigorous stress testing in the lab for quality, durability, fuel efficiency, and emissions. The stress tests simulated multiple lifetimes of use. This successful partnership with CSU later resulted in the development of the world's foremost cookstove emission-testing facilities housed in EECL.

Production and Distribution

Production of the cookstoves did not take place in India for several reasons. Sourcing the patented alloy from the local Indian market was cost prohibitive because Envirofit had not yet achieved the scale needed to locally source the alloy at a competitive price. Therefore, keeping in line with its mission of providing high-quality cookstoves at affordable prices, the company's executive team decided to subcontract all production to a producer in China, which subsequently received an award for producing high quality products. The centralized production model permitted Envirofit to run an efficient, integrated supply chain management system and achieve economies of scale that ultimately were passed on to the customer in the form of low cookstove prices. Selected financial data along with average product prices are displayed in **Exhibit 5**.

Exhibit 5: Selected Financial Data* for Envirofit India

	2008	2009	2010
Sales Volume (in units)	29,505	75,168	82,246
Sales in USD	286,719	881,284	1,137,182
Sales in INR	14,335,955	44,064,183	56,859,100
Unit prices (average)			
USD	9.72	11.72	13.83
INR	486	586	691
Operation Costs**			
USD	582,297	589,206	646,018
INR	29,114,871	29,460,301	32,300,882
Net Margins***			
USD	(295,578)	292,078	491,164
INR	(14,778,916)	14,603,882	24,558,218

USD = US$; INR = Indian Rupee

Values in brackets denote negative numbers (i.e., losses)

* Envirofit used an exchange rate of 1 USD = 50 INR for each of the three years. The exchange rates were: 1 USD = 48.435 INR at closing on 12/28/2008; 1 USD = 46.475 INR at closing on 12/28/2009; 1 USD = 45.095 INR at closing on 12/28/2010. (*Source*: www.xe.com) The exchange rate of 1 USD = 50 INR used by Envirofit was an average based on exchange rates for the entire year.

** Includes import costs of cookstoves, a 20% value-added tax (VAT) imposed by the Indian government on imported stoves, administrative costs of operating in India, and educational campaigns aimed at promoting social awareness of the IAP and the cookstoves.

*** Net margins do not include product R& D undertaken in the U.S. and administrative overhead incurred at headquarters to support Indian operations.

Envirofit India sold its products directly to consumers as well as through retail distribution outlets that carried a wide range of products, from cookstoves to pressure cookers.

Reaching the BoP Consumer in India

In 2005, the BoP consumer market in India using biomass and other solid fuels was estimated to be about 160 million households out of an estimated total of 225 million households in the country.[7] The market for the cookstoves was a multibillion-dollar opportunity. However, cracking the BoP market in India was no easy task.

India was a multi-cultural country with fifteen official languages, including English, and more than 300 dialects. The Indian population was the epitome of diversity as people of diverse religions and ethnic descent coexisted. It was the same for their diet and cooking methods. For example, people in the north consumed different types of handmade flatbreads made from wheat, whereas rice was a staple in the south. However, in some southern Indian communities, millet was the preferred grain. This

diversity in food and cooking habits meant that different types of cookstoves had to be designed to fit the needs of the end-user.

With the help of the Shell Foundation, Envirofit engaged in educational programs and campaigns aimed at generating consumer awareness about indoor air pollution and its associated health issues. Envirofit developed product videos in the local language of the region customized to the local culture, lifestyle, and cooking practices of the households in each community where the stoves were marketed. Videos in Kannada aired in the state of Karnataka, in Tamil aired in Tamil Nadu, in Telugu aired in Andhra Pradesh, and in Malayalam aired in Kerala. For example, a promotional video showed a woman cooking on a stove using wood while she suffered with watery eyes and a cough induced by the smoke in which she was engulfed. The cooking pot and walls were black with soot. However, when the woman used an Envirofit cookstove, she appeared pleased and there were neither fumes nor soot to deal with. Additionally, the pot she used was spotless.

This theme of convenience and a healthy kitchen environment for the woman of the household was culturally adapted to each state as it became central to the educational campaigns undertaken by Envirofit in local languages. These educational videos aired on local networks and were made to appeal to the wife who was the homemaker. Envirofit India raised consumer awareness through extensive village demonstrations and infomercials developed with professional actors. Frequent visits to customers enabled Anchan and his sales force of over 100 employees to ensure the proper use of the stoves as well as to collect detailed customer feedback. During visits to retailers in the four southern states of Andhra Pradesh, Karnataka, Kerala, and Tamil Nadu, Anchan and his sales team accumulated critical information about consumers and competing products in the market.

The BoP consumers that Envirofit targeted spent about 80 percent of their earnings on food, clothing, and fuel.[8] Fuel costs alone constituted 10–20 percent of household incomes, depending on where they lived. The BoP also spent a "surprisingly large" percentage of their income on alcohol and tobacco, and about five percent on average on entertainment and festival celebrations.[9] After healthcare and education costs were factored in, the BoP households had little additional disposable income that, in turn, translated into weak buying power. Hence, the BoP was considered less likely to be eager to make purchasing decisions. They were price sensitive and not "value conscious consumers."[10] Lack of resources[11] in the form of access to credit and financing alternatives further constrained their ability to make purchases.

Key Competitor[12]

The cookstove industry in India was highly fragmented. There were stoves of all sizes and quality available to Indian consumers. "Three stones put together constituted a substitute," according to Bauer. However, the Envirofit cookstove was not only the most fuel efficient, but it was the only one in the Indian market that came with a five-year product warranty. Envirofit's dominant direct competitor was First Energy, a private company that was a former subsidiary of British Petroleum (BP) from 2006 to 2009. The Oorja stove, which was launched by First Energy in January 2007, used biomass fuel pellets. Sales of these pellets declined when the company increased the price of the pellets by 60 percent in mid-2008. Introduced in 2008 at a price of Rs. 675, the First Energy stove's price more than doubled to about Rs. 1,500 in 2011.[13]

By 2011, First Energy had sold approximately 450,000 cookstoves in five Indian states through a network of 3000 village (micro) entrepreneurs and dealers. However, since its multinational parent had spun it off in July 2009, First Energy faced financial problems. Lacking access to the deep pockets of its former parent, First Energy changed its strategy to selling its stoves to commercial customers like restaurants and caterers instead of the individual households earning more than $2 a day. The Oorja cookstove had a complex product design, which made using the stove difficult as consumers were unaccustomed to using pellets and firing up the stove was cumbersome. By April 2011, First Energy had reportedly lost over half of its household customer base and continued to be in retrenchment mode since its privatization in 2009.

The Challenge

Anchan found his visits with retailers in Bangalore and neighboring markets in 2009 and 2010 to be invaluable: "During my personal visits, I observed that retailers did not enthusiastically push our product to the BoP households. They (retailers) were more interested in selling other high-margin products, such as pressure cookers, to affluent consumers who were more willing to pay cash than the BoP households."

However, the feedback he had received from the retailers provided insights about selling to the BoP households. Retailers were enthusiastic in reporting the attention Envirofit's cookstoves received from potential customers. As Anchan learned, "Women in the urban areas liked the TV infomercials. The message was clear and the actors made a favorable impression on them." Feedback suggested that women in the households that Envirofit targeted were captivated by the cookstoves. Anchan noted:

> The bright colors of our stoves were a big draw. Women were ready to purchase the stove, but the husband [who typically controlled the purse strings in a BoP household] did not understand why they had to spend Rs. 2000[14] to buy a cookstove. He, in fact, was opposed to the purchase. Men would typically argue that they already had a stove in the kitchen that was functioning just fine and felt that the expensive yet beautiful stove would only be sitting on the shelf gathering dust. So, they were not going to engage in whimsical shopping.

Anchan reported to Bauer that this was not an isolated occurrence, but that stories about the typical husbands' resistance to buying the cookstove were widespread. Retailers in rural areas shared similar anecdotes. Marketing at the village level appeared to be successful in conveying the message that the cookstove will improve one's health and the environment; there was a growing interest shown in the product during the village demonstrations. Men also were among those who watched the videos shown in village communities from start to end. They enjoyed the "show," but the shows did not culminate in sustained sales. There was only a trickle-down effect from the expensive investments Envirofit regularly made in the TV infomercials and rural social marketing campaigns. These marketing investments generated sales while promotions remained in place but tapered off when they ceased. In other words, sales increased as long as the TV ads were aired, but stopped if they were pulled off the air. The marketing strategy was not paying off as planned.

"Perhaps we could offer a free cell phone[15] with the purchase of the cookstove. That should get the man's attention," Anchan chuckled. "Sure, it would!" laughed Bauer. "A free cell phone campaign may push our sales up, but what about our margins? And what about achieving our sales benchmarks in the long run? Do we have to keep

providing special deals like a cell phone to sell our cookstoves? Buying promotional gifts like cell phones to give away is expensive. We should come up with a way to grow our sales profitably!" The big question that Anchan and Bauer faced was how to increase sales of the Envirofit cookstove without the burden of incurring additional incremental costs that would distress profit margins[16] and affect the company's sustainability in the long run.

Notes

1. For a detailed description of Envirofit history and growth, see Bauer, T., "Enabling Market-Driven Technology." *Innovations*, September 2011, 121–130.
2. In 2014, the International Finance Corporation (IFC) of the World Bank group defined households earning under $8 a day as the BoP (base of pyramid). The BoP was divided into two segments; the first segment earning under $2/day was considered as living in extreme poverty. This segmentation is consistent with Kasturi Rangan et al., (2011), who also classified those earning $1 a day as extremely poor. The second segment earning $2–$8 per day was considered by the IFC as the "working poor." For additional details, see: http://www.ifc.org/wps/wcm/connect/as_ext_content/what+we+do/inclusive+business/news+and+highlights/defining+the+base+of+the+pyramid; and Kasturi Rangan,V., Chu, M., and Petkoski, D., (2011), "The Globe: Segmenting the Base of the Pyramid," *Harvard Business Review*, June. Downloaded from: http://hbr.org/2011/06/the-globe-segmenting-the-base-of-the-pyramid/ar/1.
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13. At the average exchange rate of 1 USD = Rs. 50 used by Envirofit in Exhibit 5, the prices of First Energy stoves were $13.5 in 2008 and $30 in 2011.
14. Price of approximately 40 USD for the high-end Envirofit stove on the market available in vibrant colors. Consumers were drawn to the vibrant colors of this design.
15. In 2011, the cell phone market in India differed significantly from the U.S. Numerous brands of unlocked cell phone devices were sold in the market place around the country at competitive prices. Consumers bought a cell phone device of their choice in the open market and purchased a pre-paid SIM card from a cell phone service retailer of their choice. This SIM card could be recharged at a retail outlet designated by the cell phone service provider at amounts that were affordable. As such, the cell phone promotion deal proposed by Anchan would be attractive to men in the BoP households. The cheapest cell phone devices available in India in 2011 were about Rs. 600 (≈$12).
16. Having strong positive net margins (difference between revenues and operating costs) on the cookstoves was essential to Envirofit's sustainability. Operating costs (shown in Exhibit 5) included import costs of cookstoves, a 20 percent value-added tax (VAT) imposed by the Indian government on imported stoves, administrative costs of operating in India, and educational campaigns aimed at promoting social awareness of the IAP and the cookstoves. The for-profit Indian subsidiary was subject to taxes on income earned whereas the non-profit subsidiary was not as the latter could not engage in profit-seeking activities.