



Solar ATMs: Banking for all

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Abstract

The unique patented technology used in ATMs has been developed to help banks reach out to rural areas and the financial inclusion of the unbanked population. A company focused on developing sustainable products for rural India decides to develop an ATM to meet this segment's banking demands. It is now on the verge of transforming banking services through its unique ATM. The ATM is powered by solar energy and consumes just 4 per cent of total energy that is required by a conventional ATM to function. It can operate in the temperature range of 0°C to 50°C, which will help in reducing CO₂ emissions at least 18,500 kg per year. This unique ATM has the capability to serve Indian Villages – indicating an opportunity for over half a million ATMs across the country.

Keywords: Solar Power ATMs, 24x7 Working, Environment free, Customer Satisfaction.

Introduction

Mahatma Gandhi's famous saying that "India lives in villages" is still strongly relevant with, 70 % of the population resident in rural regions - nearly 30% of India's more than 930 million people in 6, 30,000 villages that contribute to over 50% of India's total gross domestic product (GDP). The problem is that they have the same needs as that of urban India but unreliable electricity and minimal ability to pay for services. Businesses seeking new strategies are looking to rural markets, especially those for which it was believed that doing so made little economic sense. Village residents with bank accounts and their numbers are steadily increasing,

welcome not having to travel to a nearby town to withdraw cash. India's banking industry has in recent years identified the potential of the rural market, but logistics and associated costs have hindered full-scale expansion. Solar energy, in a limited way, has started powering telecom towers, bank branches, data centre's and ATMs in power deficient rural India and areas faced with erratic supply of grid power. Companies providing equipment for power back-up and solar power producers have confirmed that this trend is catching up with support from government as well as telecom companies and banks which are opting for clean and uninterrupted energy. A small startup, a frugal mindset



and a disruptive technology are shaking up the rural banking scene in India, giving 300 million dwellers a chance to get a bank account. India's rural economy has been growing with disposable incomes rising, especially in rural areas where spending power accounts for 57 percent of the \$780 billion spent annually compared to 43 percent in urban areas. However, 60 percent of India's rural population, compared with 40 percent overall, does not have a bank account. In spite of a robust banking infrastructure and a government aim to include the rural economy into the mainstream, only 5 percent of 600,000 villages have a commercial bank branch and just 2 percent of people living in rural India have a credit card. The simplest and most cost-effective way to reach out to this huge untapped market is through ATMs. At present there are only 150,000 ATMs deployed in the country and are expected to reach 400,000 by 2017. But the cost of setting up bank branches or ATMs is still too high and there are still a lot of red tape and conservative attitudes in the banking business itself.

Vortex, a young Chennai-based company, could be adding new energy to India's rural economic growth with its award-winning solar-powered automatic teller machines (ATMs) Called "Gramateller Indi" ("graamam" means "village" in Tamil), the low-power consumption machines operate at one-tenth the cost of conventional ATMs. Rural India, considered the backbone of the national economy, is expected to overtake the urban market in size by

2017. For many villagers in rural areas of India, personal banking is pricey in ways American could never imagine. First, there is the cost of reaching the nearest branch. Bus fares are expensive, and a day's labor is lost in the journey. Simply installing ATMs in villages that don't have reliable electricity (or don't have at all) is problematic, while building bank branches in every hamlet is out of the question. Indian engineering company Vortex has taken on the challenge by creating solar-powered ATMs. Superficially similar to the cash dispenser in your corner convenience store, these rugged little bank tellers are a distant species altogether. These rugged little bank tellers are a distant species from the cash dispenser in the convenience store. The Grama teller ATM is lean, efficient and designed to live almost anywhere humans do. It carries its own solar panels, alongside four to eight hours of battery storage. Despite the ability to operate in temperatures as high as 122 degrees Fahrenheit, it never needs cooling, unlike most ATMs. Clever engineering also means it's 90% more efficient than conventional machines, consuming about \$10 of electricity per month in India. The ATM also comes with a fingerprint identification system, making it easy for those unfamiliar with digital devices to withdraw cash. So far, Vortex has deployed about 450 across almost every state in India, mostly in small towns about 60 kilometers from bank branches, reports Yale Environment 360. Vortex officials say they plan to install about 10,000 more within the next two years, while an



international expansion is also underway. Convenience cash may never be far away. The poor living in far flung locations just need to be able to earn enough of it to withdraw.

Review of Literature

James Shoba Kamala (2008) in her study entitled - A study on customer's satisfaction on ATM in Tirunelveli city of Tamil Nadu has made a detailed survey regarding the customer satisfaction towards ATM services. She observed that the respondents were conscious about more innovative techniques in ATM services.

Business Line (2005) entitled - Customers want more personalized ATM services', the survey conducted for NCR by AC Nielsen ORG-MARG, revealed that more than 50 percent of those surveyed preferred the ATM channel for communication or information on products and services, while 32 percent voted it as the preferred method of basic information. Another 21 percent said that they would even take pre-approved, personalized offers directly from the ATM.

The Role of Green Banking in Sustainable Growth, 2012 India's growth account and obligation to cut its cards can be created by banks in the form of small carbon intensity by 20-25 percent from 2005 levels by charitable donations as a percentage of on-line banking 2020 provides tremendous opportunities for Indian activity to help the environment banks from funding sustainable projects to offering innovative products and

services in the areas of green. Initially, these commitments to environmental and social guidelines will cause a huge financial burden for Indian banks. For effective green banking, the RBI and the Indian government should play a pro active role and formulate a green policy. The survival of the banking industry is inversely proportional to the level of global warming. Therefore, for sustainable banking, Indian bank should adopt green banking as a business model without any additional postponement.

Objectives of the Study

Many Scholar and organization have studied the ATM services towards the urban area but they did not focused on solar ATMs which provide services to urban and rural areas. To fulfill the research gap, this area was selected. The objectives of the study are given below.

1. To achieve energy security in banking sector.
2. To reduce carbon emissions in the banking sector.
3. To evaluate the attitude of customers towards ATM services.
4. To achieve grid party in banking sector.
5. To encourage solar energy facilities by all the banks
6. To attract villagers to ATMs.

Global Solar Scenario in Banking

The global solar market is expected to have and installed capacity of 227 to reach 46.8 GW per annum in 2016, up from 19.8 GW in 2011, with a



Compounded Annual Growth Rate (CAGR) of 18.7 GW during the same period. The installed capacity of solar energy has grown at a rate of 40 percent per year over the last decade. As the industry has grown, the prices have seen cost reductions of 22 percent for each doubling of cumulative capacity over the last few decades.

Experience of solar energy in India

India has high solar isolation and being a tropical country receives adequate solar radiation for 300 days, amounting to 3,000 hours of sunshine equivalent over 5,000 trillion Kwh. Almost, all the region receive 4-7 Kwh of solar radiation per sq. meter with about 2,300-3,200 sunshine hours/year, depending upon the location. In July 2009, the Government of India unveiled a plan solar power by 2020 under the Jawaharlal Nehru National solar mission

(JNNSM). Solar energy is undergoing a silent revolution in India. The falling prices of solar panels are on the verge of coincidence with the growing cost of grid power in India. The contribution of foreign banks to the total number of on-site ATM's in the country has been 0.5% whereas to that of total number of off-site ATM's has been 1.7% in FY'2013. It has been observed that in FY'2013, the contribution of financial transactions through solar ATMs in India is around 77.1%, whereas in case of non-financial transaction which consists of taking out mini statements and checking balance inquiry, the share is around 22.9% as of FY'2013. The market size of ATM cash management system in India was around INR 2,000 crores in FY'2011 which inclined to INR 2,105.3 crores in FY'2013, thus showcasing a CAGR of 2.6% from FY'2011- FY'2013.

Comparison between Regular & Solar ATMs costs and operational expenditure

Particulars	Regular ATM	Solar ATM
Cost	3,50,000-5,00,000	3,00,000+1,50,000 (Solar panels)
Operational cost per month (Units fed)	12,000	Below 6,000
UPS (3-4 hours back-up)	60,000-80,000	Built-in UPS
Air conditioner	70,000-100,000	No need for AC
Diesel Generator Sets	(1,50,000-2,00,000)+expenses (10/unit)	Nil (not required when solar panels are used)

Figures in INR



Below picture shows how the solar energy processes to bank ATMs.

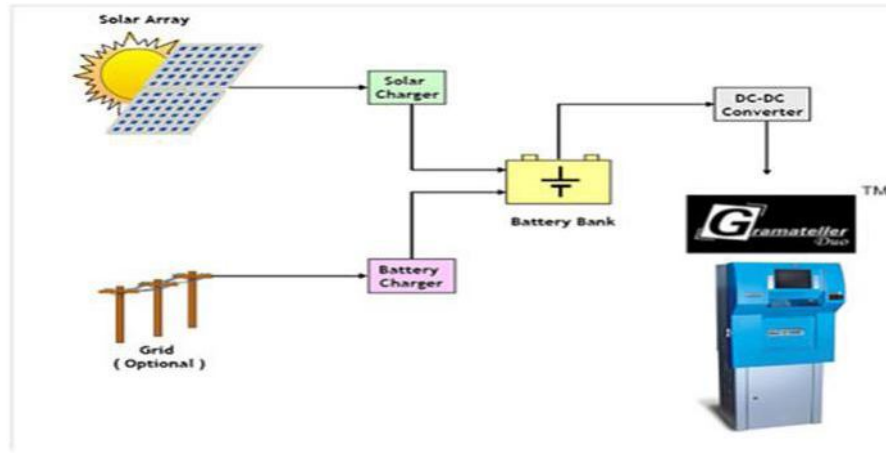


Image Source: Simpa Networks website

India's First Solar Powered ATM

As part of its Green Office Project campaign 'Hum aur Hariyali' IndusInd Bank inaugurated Mumbai's first solar-powered ATM as part of its Green Office Project campaign 'Hum aur Hariyali'. It also unveiled a 'Green Office Manual - A Guide to Sustainable Practices', prepared in association with the Centre for Environmental Research And Education (CERE).

IndusInd Bank has a comprehensive plan to reduce its carbon footprint. Some of the initiatives being undertaken under this plan are solar-powered ATMs. Though many private banks are now coming forward to set up solar powered ATM's. The IndusInd Bank Limited has the privilege of being the first private bank in India for having set up the first- solar powered ATM in 2009. The bank has installed a solar powered Automated Teller Machine (ATM) at a place called Lamington Road @ Mumbai. The solar panels are spread

on a roof top of a four -storey building. The ATM is supported by two solar panels containing a controller that feeds the system as well as the charge the batteries. There is a meter behind the ATM that measures the solar powered consumed. Sources reveal that the system will save 1980 kW hrs every year.

The ATM industry in India is among the fastest growing industries in Asia-pacific region. State Bank of India in a unique advancement in ATM technology has led to newer and better versions of ATM hardware and software to support differently abled people to transact over ATMs. State of Bank of India introduced a novel channel for banking in a unique way by starting floating ATM on 9 February 2004 on a Jhankar Ferry boat plying between Ernakulum and Vypeen. Union Bank of India installed first biometric ATM as 'Kisan ATM' at Sivanganga branch in Tamil Nadu. Dena bank in Gujarat, Andhra Bank in Twin cities of Hyderabad



and Corporation Bank introduced talking biometric ATMs which can talk to the farmers in their local language.

Table 1 Banking Limited Solar ATM

Project site	Lamington road
District Name	Mumbai
State	Maharashtra
Location	Longitude 72°8'N, Latitude 18°95'E
Shade free area required	150 Sq Ft
Capacity of system	1 KVA
Solar Module Capacity	1000 Wp
Autonic i-Power UPS	1 KVA
Battery Capacity	320 Ah
Estimated annual energy generation in WH	1200000 WH / Year
Carbon Emission Reductions (Annual)	1,642 Tonnes

Benefits of Solar Energy

Solar energy provides the best viable solution to ensure long term energy sustainability with the following advantages.

Solar resource is much more evenly distributed across all the banks available during day time, helping in peak demand, reduced transmission, distribution losses,

no fuel cost, E-archiving, e-learning, e-waste management, paperless fax, energy conservation, CNG cars and also supporting finance programs with incentives to go green.

Low power usage:

Because of the conventional CDM system, ATM machines require a lot of power to dispense cash. The system also requires air conditioning, as it consists of a processor and operating system that consume a lot of energy. Generally, a conventional ATM requires around 2,500 watts of power per day (that is, about 700 watts for the ATM and another 1,800 watts for the air conditioners).

Redesigning the CDM helped to reduce power usage by 80 per cent. This was due to the absence of motors and a convey or belt, which are required in conventional ATM machines to propel notes to the dispensing system. Moreover, the new machine uses an Atom processor and Linux operating system, which help in reducing the power usage further. It has a single computer, as opposed to the two computers required in conventional ATMs. Its low power consumption allows it to be operated with solar energy instead of conventional power supply. The ATM also allows biometric authentication of users' identities.

Energy savings:

The new ATMs do not require air conditioning. It is powered by solar energy, due to which it consumes less than 72 units per month. This is just 4 per cent of the total energy that is



required by a conventional ATMs to function, and indicates a saving of 1,728 units per month.

Lowered cost: The design changes have reduced the cost of the new model by a fourth of the cost of a conventional ATM machine, helping save at least Rs 1, 20,000 per year.

Increased uptime: The ATM can operate in spite of power fluctuations and failures, as it has an inbuilt battery which provides four hours of backup.

Cleaner environment: This unique ATM will help reduce CO2 emissions by at least 18,500 kg per year.

Conclusions

This product has become a point of focus not only in India, but also across other key emerging geographies, such as Africa, South East Asia, and so on. For instance, one of the African countries has an ATM penetration as low as 17.5 ATMs for every 1, 00,000 people. Regions such as Sub Saharan Africa (SSA) have a banking penetration so low that only one in five households have access to formal banking services.

Therefore, this product has large potential in geographies such as Africa, which face infrastructure and fiscal constraints similar to India, helping them minimize cost while maximizing energy efficiency. With the wide range of benefits it offers, new ATM is poised to revolutionize banking all over the world. Indian customers have not only become technology savvy today, but also have started demanding more and more of

quality and personalized services. With more of innovative or "high-tech" banking services provided to customers there has been growing concern for "high-tech" banking services, seeking involvement and interaction among various stakeholders. Majority of customers are aware about the Cash withdrawal services of ATMs. Balance enquiry service is ranked on second position on awareness scale. In the same manner majority of customer prefers ATMs for withdrawal purpose while second preference is given to mini statement facility. There is no significant difference between the satisfaction level of public & private bank customers towards the ATM service. The awareness level about ATM services is affected by demographics of customers.

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