

Government of Gujarat: Jyotigram Yojana

*Awardee in the Public Service Innovations Category
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Let there be light:

Light has always been the first source in creation. According to Hindu mythology, for example, before the birth of the cosmos, only the “brahman” or divine essence existed in darkness. In order to create the universe, the brahman dispelled the darkness and then proceeded in the act of creation. So the first act brought light to the universe.

In fact, light is considered a universal service obligation to be provided by governments, and this promise was made by the state governments of India to their people in the 1960's.

Cut to the 21st century and this need for light- like a fundamental right; it is still an aspiration for many Indians. At least 12 states in India claim a 100% electrification of their villages. In the fine print lies the truth. 100% electrification does NOT translate to a light in every house. Even if there is an electrical connection in the house it does NOT translate into 24/7 electricity. India's power problems are acute and growing. In fact, come summer and most Indians can only pray 'Let there be light'.

Raysan is a village exactly like any other of the 6.3 lakh odd villages in India. Population: 1700. Agriculture based families. Living in semi-thatched houses. Rearing cows and goats. Worried about the rain and their children's education. Nothing to put Raysan on the forefront of our national psyche. Except every household in Raysan gets 24/7 electricity, 365 days a year. Enabling people to pursue small-scale industries or buy TV's and refrigerators which actually work rather than just act as show pieces; allowing students to study late into the night. Just like every one of Gujarat's 18,000 odd villages. Just like every one of Gujarat's 10 million households. 'Let there be light' is a reality here.

How did this miracle happen?

Power supply is a tinderbox issue. It has been caught in a vicious political cycle for years across the country. Governments win elections with promises of free power to the electorate. A majority of this free power is used by farmers to run pumps in order to access groundwater for irrigation of crops. In fact, agriculture consumes close to 85% of a state's power supply. This overuse by agriculture leaves very little power for domestic and industrial purposes resulting in crippling power outages. Consider this: if most of the power is subsidised or free, it is no wonder then, that many state electricity boards are bankrupt. Therefore, most electricity boards have neither the funds nor the motivation to provide good quality power to the farmers. The result: power supply is erratic, the quality of power is low, and the expensive irrigation pump equipment often gets damaged.

However, no one is willing to break this vicious cycle by charging for power or by rationing supply. Because history shows, governments that tried to charge for power, lost power instead. So this became a sacred covenant: to stay in or to win power, give

away free or subsidised power to agriculture, and cut the power of the domestic and industrial sector.

Until Jyotigram:

The power supply chain from power plant to point-of-use travels through stations, transformers and wires. Traditionally, this transmission system is a SINGLE UNIT from which power is fed to various sectors for agriculture, industry and domestic use. The Government of Gujarat SPLIT the agriculture power supply chain from the domestic and industrial power supply chain. In essence, it constructed a whole new parallel transmission system to feed and monitor electricity to agriculture. As a result, the Government of Gujarat began to:

- Intelligently ration power supply to farmers. For the first time in the country, farmers in Gujarat received 8 hours of electricity of guaranteed voltage and timings, whereas previously they received 13-14 hours of irregular and unreliable supply.

- Charge farmers for power.

- Provide households 24/7 power through dedicated domestic feeders.

What made it happen?

From imbalance of power to the balance of power + irrigation:

Gujarat saw light when the government recognized an imbalance that went unnoticed. Most governments are trapped in the power struggle; farmers hold them ransom for more power and governments continue to pander to their needs. Everyone recognizes power is needed for irrigation. And therefore they provide power *for* irrigation. However, the Government of Gujarat saw it a little differently. And this little difference began the journey towards a whole new power game. Rather than power *for* irrigation, it recast the situation as a power *and* irrigation

problem. Never before had anyone consciously created this link-both power *and* irrigation, as one. For the first time, Jyotigram as a solution, would focus on the equation, power + irrigation for reform. And a workable solution began to emerge.

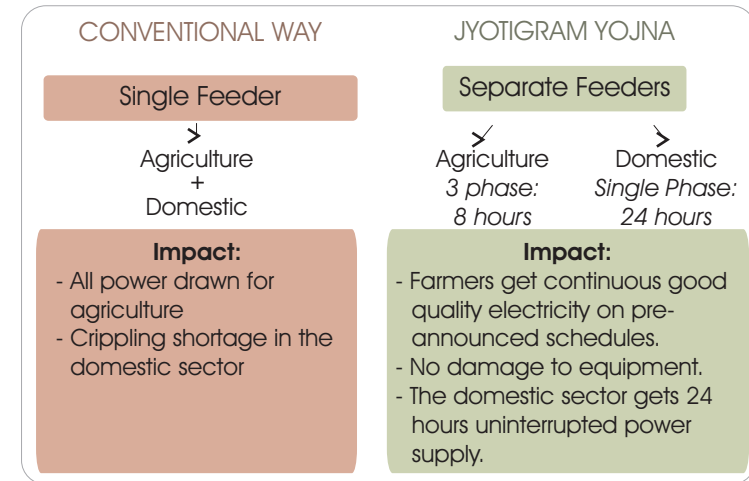
Within the power + irrigation equation, the Government of Gujarat had one more realisation: free power without rationing did not guarantee irrigation. The poor quality and the interrupted power created a bigger headache; Every time there was an unscheduled power cut, the irrigation process went back to zero and had to restart all over again. The farmer had no way of knowing when the power would return, which means he wasted much of his time anxiously waiting for the power to come on. And poor quality electricity resulted in damage of expensive equipment. So whereas in theory he was getting unlimited power supply, in reality this power supply was of little help to him in irrigation.

So how does the government charge for what was free, and cut the amount of time it is supplied for, and still get farmer buy-in?

From the above scenario, a promise to the farmers was born- 8 hours uninterrupted, 440 volts, and pre-announced power supply. The benefit for farmers: uninterrupted power supply, allowed for water to be drawn and fed with maximum force to crops, without a cease in water flow. 440 volts is the quality of electricity required to run pumps, so farmers did not have to contend with damage to equipment. And a pre-announced 8 hour schedule allowed for farmers to plan their work without wasting time praying for the electricity to come.

The farmers protested at first, especially as the project rolled out. After all, nobody likes the thought of rationing what was unlimited or paying for what was free. But when they saw the

actual benefit on ground, their protests turned to praise and acceptance. And so, with intelligent rationing, there was electricity for farmers and light for all.



From insight to implementation: in a record 1000 days!

The Government of Gujarat set up a complete alternate transmission system of power feeders: the heavy duty agricultural feeders that would provide 440 volts for 8 hours a day for agricultural needs and regular feeders for 24/7 domestic and industrial purposes. Where farms and homes existed together, they provided special 'switch over' feeders called SDT's to switch from 3 phase 440 volts to 2 phase 220 volts

Work executed under Jyotigram ¹	
New High Tension Lines	56,307 Kms
New Low Tension Lines	22,146 Kms
New Transformers	18,724 Nos.
Poles erected	17,00,000 Nos.
SDT's Installed	3,101 Nos.
Jyotigram Feeders	1,888 Nos.
Project Cost	Rs. 1290 Crores
Government Grant	Rs. 1115 Crores
State Population	5.07 Crores
No. of Days	1000

¹ *Beyond State Boundaries, Jyotigram Yojana, Mr. S. Jagadeesan, Principal Secretary, Energy and Petrochemicals Department*

after 8 hours, for domestic supply. It called for a significant investment at the beginning. In the record time of 1000 days, the new infrastructure was set up.

Further work on irrigation:

Rather than rest with the implementation of the separation of feeders, the Gujarat government remained true to the insight that this had to be a power + irrigation reform. As Shah et. al. comment in their insightful study on the state of Gujarat's agriculture:

*“So they simultaneously introduced the construction of 5 lakh groundwater recharge structures. Over 1.13 check dams, 56,000 bori bunds, and 2.4 lakh farm ponds besides 62,000 other structures were constructed under the aegis of the Water Resources Department of the Government of Gujarat”.*²

This balance of the equation was now complete. While the availability of high quality continuous power allowed for farmers to draw on groundwater, the groundwater recharge structures allowed for replenishing, resulting in a continuous supply for healthy agriculture.

Let's take a look at Jyotigram's multiple impact:

Impact on people:

As a result of the dedicated domestic feeders, Gujarat is the first state with 100 % domestic electrification, 24 hours a day, 365 days a week. It means that computers can run, students can study late into the night, people have alternatives for entertainment, small scale industries can flourish. It means there is light. On demand. All the time. In fact, this has completely

² 'Secret of Gujarat's Agrarian Miracle after 2000', Tushaar Shah, Ashok Gulati, Hemant P. Ganga Shreedhar, R C Jain. *Economic & Political Weekly*, December 26th 2009.

changed expectations of the people of Gujarat. Whereas in the rest of the country, people are resigned to power cuts for long durations, not so in Gujarat. As one citizen from Ahmedabad said, “Power never goes in Gujarat. If it does, it is only for 10-minute periods, where a transformer is down and it gets repaired. Actually, if the power goes off for more than 20 minutes you can expect a riot”. So used are people to continuous power supply, that a cut of more than 20 minutes is newsworthy, unusual and unacceptable!

The benefits are plenty. A study by CII and by IRMA has revealed:

<p><u>Economic impact on households:</u> Increase in employment. Decrease in migration from the rural areas by 33%.</p>	<p><u>Impact on rural women:</u> Increase in time spent of rural women on: Education by 90% Entertainment by 88% Social activities by 43% Income generating activities by 18% Time spent on performing household chores reduced by 26%.</p>
<p><u>Impact on Education:</u> Drop out of girl children reduced by 80%. School absenteeism reduced by 13%. Average duration of study for girl and boy at home has gone up by 92% and 81% respectively.</p>	<p><u>Impact on Rural Industries:</u> Enabled 53% of families in rural areas to work during night times. Increased momentum in industrial activities such as diamond polishing, toiletries, agro processing, etc. Improved load management resulting in no load shedding in the state.</p>
<p><small>Source: Impact Assessment of Jyotigram Yojana in Gujrat, CII, author, IRMA, 2005</small></p>	

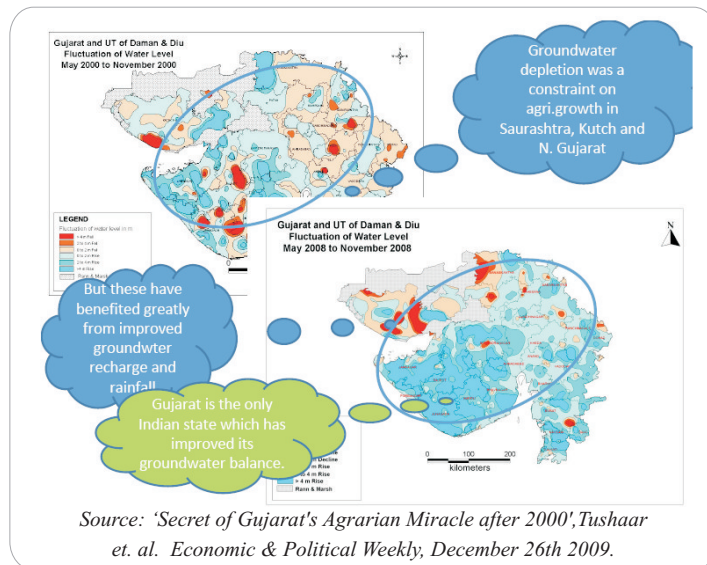
Impact on agriculture:

Contrary to the belief that restriction on electricity would restrict agriculture, the agricultural output of Gujarat has gone up, and Jyotigram is a key driver. Quoting from Tushar et. al. “A reform that has had by far the most far-reaching impact on Gujarat's agriculture is Jyotigram Yojana...Rationing of farm power supply post-Jyotigram brought about a certain order and discipline in the extraction of groundwater, but the improved quality and reliability of farm power supply also made it possible for farmers to make ambitious plans to grow Bt. cotton and wheat

on a large scale”.³ In fact, Gujarat's agriculture output has bucked all trends and predictions. The 10th plan predicted a growth rate of 4.0%; instead Gujarat grew at 9.6%, the highest in the country and way above the average of 2.9%.

Impact on groundwater:

Gujarat is the only state in India to have turned groundwater positive in recent years. This is a significant achievement given that Gujarat is known to be a drought prone state with 70% of its geographical area classified as semi arid and arid land types!



Impact on the state electricity board:

Investing Rs.1115 crores upfront in infrastructure development in the form of a parallel transmission system, takes

³'Secret of Gujarat's Agrarian Miracle after 2000', Tushaar Shah, Ashok Gulati, Hemant P. Ganga Shreedhar, R C Jain. *Economic & Political Weekly*, December 26th 2009.

both courage and a peculiar ability to predict the future: that the money will be made back in a given period of time. And how well that prediction has worked for Jyotigram. As a result of the separate feeders designed to restrict power with a switch over for domestic purposes only, power theft came down significantly. On the other hand, 95% of the households (out of 8 districts surveyed by IRMA) noted an increase in electricity expense. Consumers also ended up buying more electric gadgets. Therefore the entire Rs.1115 crores was made back in 2.5 years. So it is not just the supply side of power and irrigation equation that was balanced. The electricity board benefited with never before revenues, as well. Once bankrupt, it was revitalized, as revenue collection increased from 850 crores in 2004-05 to 1231 crores in 2007-08 to 1473 crores in 2008-09. Today, the Gujarat Electricity Board sits on a happy surplus of 126 crores. Lessons in sick industry revival anyone? And all this without a single increase in electricity tariffs for 7 years!

From providing power to trading power: the next big power game:

Jyotigram is like a gift that never stops giving. Further benefits have come to light. For the first time the government was able to track electricity supply due to the separation of feeders. Under the previous system of common feeders, the power grab by agriculture was a black hole. It was simply sucked out and nobody knew how much went where or how: and what cannot be tracked, cannot be managed. In Gujarat however, the Minister of Power receives a daily SMS update on his mobile phone of exactly how much power is to be rationed region-wise, how much is available and how it has been used. So not only is Gujarat in a position to monitor and predict future electricity needs; it is in a position to trade electricity with other states. A recent quote from a Times of

India article states, “Today, Gujarat has a surplus of 600 MW of power and it will be sold through exchange directly or through the Power Trading Corporation. It is already sending 220 MW of power to Tamil Nadu and will soon send 200 MW to Karnataka”.⁴

And so, Jyotigram grows from strength to strength.

In the meanwhile, the rest of the nation can only look towards 10 million brightly lit homes and hope that the light that started in Gujarat, will one day light 200 million homes across the nation, 24/7, 365 days a year. Truly then, there *will* be light.

⁴Times of India, Bangalore Edition, April 13th 2010.

A note...

on Marico Innovation Foundation

A significant CSR initiative by Marico - the “Marico Innovation Foundation” was founded in 2003 with an objective to fuel Innovation in India. Under the leadership of stalwarts like Dr. R A Mashelkar, the Foundation focuses on providing the country with a belief that Innovation is a crucial way to leapfrog into the center stage of global business leadership.

Over the last five years the Foundation has been playing a catalytic role by disseminating knowledge through cutting edge research on breakthrough innovations. Its reach is first envisioned to cover the business community, both professional and entrepreneurial. Going forward the reach will expand to future business leaders and the general public. The Marico Innovation Foundation is steered by an eminent governing council that oversees both its vision and direction.

on Erehwon Innovation Consulting

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Erehwon has been successfully spearheading the innovation drive across the country and internationally and across multiple forums. As the architects of the awards, Erehwon conducts the necessary search and audit of all nominations filed for the awards in an equal and unbiased manner using its pioneering innovation methodology.