

Operationalizing SPEED

The SPEED concept has two dimensions: (a) a national program dimension where it is playing the role of an ecosystem developer and an enabling portal; (b) a local project dimension where at the village level, SPEED will test the ability of Energy Service Companies to operate across a range of technologies, scales and business models.

National Program Activities: Ecosystem Development	Local Project Activities: Rural Energy Service Companies and Micro-enterprise
Partner with cellular tower companies and ensuring anchor demand.	Local demand estimation to estimate commercial viability and prioritize location.
Coordination on policies and regulation to support rapid utility franchising and/or license exempt operations.	Entrepreneur / local project manager identification.
Providing a collaborative mechanism for communities, entrepreneurs, technology providers, micro-enterprises.	Investment, capitalization and contract negotiation; and Implementing employment generation programs.
Identifying appropriate technology options in grid and non-grid scenarios.	Testing different context specific technologies on the ground.
Facilitating right structures for capital flows and attracting investors. Actions for encouraging domestic and foreign companies to be more involved in rural electrification, such as developing and implementing new financing models (e.g. risk guarantee funds).	Capacity building for Energy service companies and microenterprises; and ensuring their bankability and viability. Facilitating access to subsidies.

The way ahead for the next 3 years

In its scoping period that began towards the end of 2009, a variety of stakeholders have started to engage with SPEED. The stage is now set to further test this concept on a larger scale through a sustainable business development approach.

The next 3 year goal for SPEED in India is to establish the model as a widely replicable mechanism for local economic development through delivery of reliable, affordable and clean electricity; thereby creating a more conducive environment for investment in sustainable rural electrification.

SPEED can take different forms which will be decided at the end of SPEED Phase-II. Current considerations include:

- SPEED as a Franchise model
- SPEED as a Program

Over a three year period, commencing in April 2011, the SPEED work in India will:

- Establish validation pilot projects in 30 to 50 villages of India to demonstrate the sustainability of the model and create

verifiable conditions for its scaling up by aligning interests of different actors to drive the SPEED concept and agenda.

- Support field-building around the SPEED concept by promoting favorable policies and regulation, engaging critical industry players, creating financing models, supporting the spread of scalable, sustainable implementation models and promoting increased channels for affordable technology dissemination.

Get engaged

SPEED seeks to connect with the following key constituents that are integral to the roll-out over the next 3 years:

- **Entrepreneurs** that want to set-up rural energy service companies in un-electrified and under-electrified regions in rural India.
- **Local government and community representatives** seeking to engage and invest in SPEED project activities/ Rural energy service companies.
- **Policy players and government agencies** that are driving rural electrification, distributed renewable energy and economic development mandates.
- **Community development agencies and NGOs** that are promoting rural economic development and livelihoods; where progress can be accelerated through electrification.
- **Technology providers** that have renewable energy solutions with capacities ranging between 20KW and 100KW. Must have an ability to service the set-up in remote regions.
- **Cell-tower companies** that seek to be early adopters for SPEED enabled rural energy service companies and provide sites that can be anchor loads.
- **Donor agencies** seeking to provide capacity building and training support, output-based-aid, loss-default guarantees to lenders.
- **Lenders** seeking to provide loans for capital infrastructure for and working capital: both for rural energy service companies and rural enterprises.
- **Impact investors** looking to make investments: either at the project level or at the program level: both for rural energy service companies and the rural enterprises.



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Partners engaged with SPEED

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¹The Indian Telecommunication Industry Performance Indicators 2002-03, Telecom Regulatory Authority of India, July 2003

²Press Release No. 11 /2011, Telecom Regulatory Authority of India, dated 9th February, 2011

³Consultation Paper on Encouraging Telecom Equipment Manufacturing in India, Telecom Regulatory Authority of India, 28th December 2010

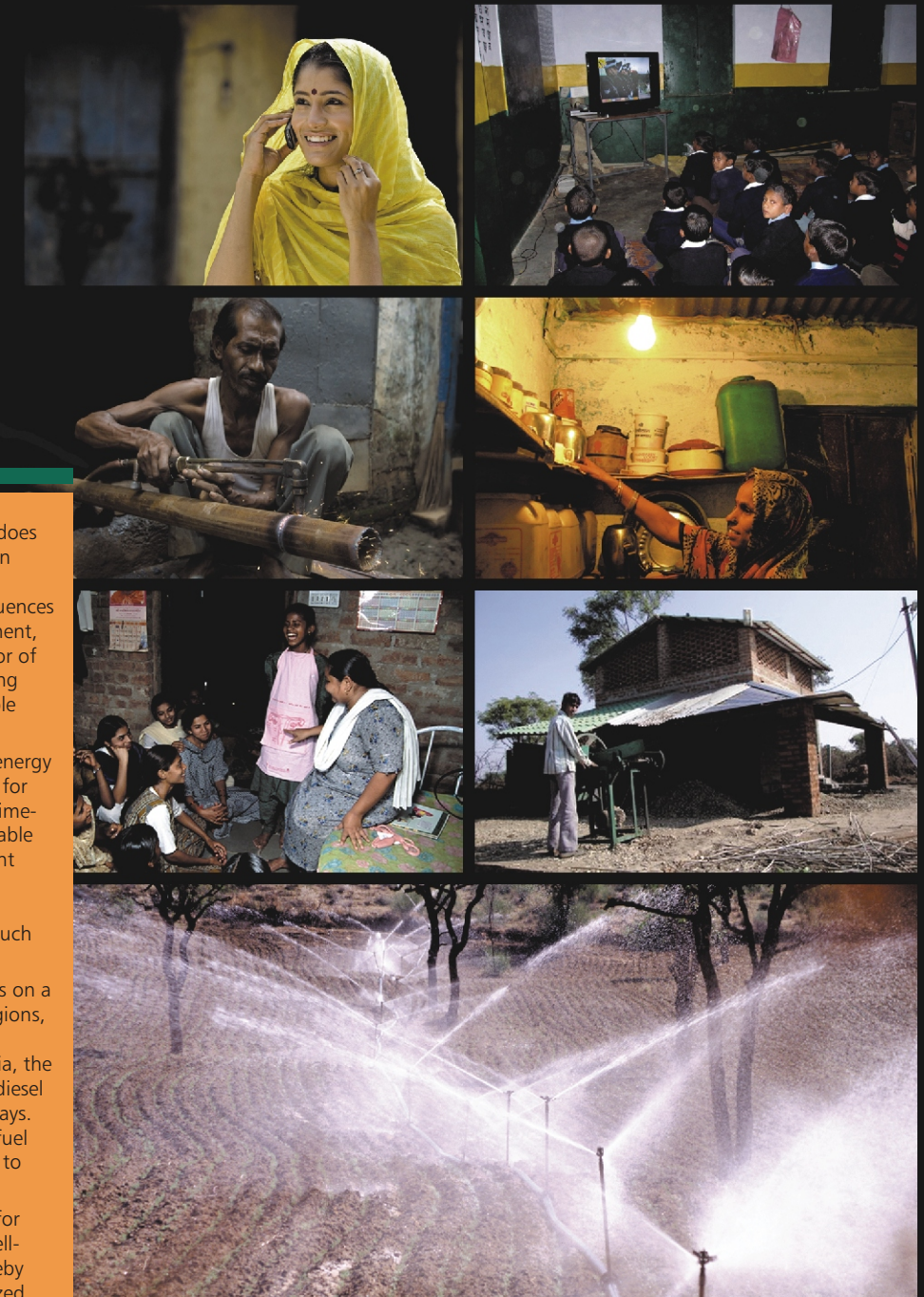
⁴Based on inputs received from Bharti-Infratel

⁵Power to the people – Investing in clean energy for the base of the Pyramid in India, IFMR and WRI

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SPEED

Smart Power for Environmentally-sound Economic Development



Approximately one-third of the world does not have access to electricity (1.6 billion people). This lack of access to modern energy services has staggering consequences for human health, economic development, political stability and is a major inhibitor of achieving equitable growth and building greater resilience of poor and vulnerable communities.

For many such regions, decentralized energy solutions are the only realistic solution for obtaining power within a reasonable time-frame. Additionally advances in renewable energy (RE) technology and government initiatives around them are making RE solutions competitive (or competitively marketable) with locally utilized fuels such as diesel, kerosene and wood.

At the same time the mobile industry is on a dramatic growth path in these very regions, rapidly rolling out towers powered by captive diesel based generators. In India, the cell-towers consume 2 billion liters of diesel a year, second only to the Indian Railways. Given the anticipated increases in the fuel costs, cell-tower operators are seeking to reduce their dependence on diesel.

SPEED seeks to integrate the demand for rural electrification and the need for cell-tower operators to get off diesel; thereby creating an opportunity for Decentralized Renewable Energy providers. This presents an opportunity for the mobile tower industry to cut costs while at the same time creating a positive impact on rural economic and social development and on the environment.

The long-term goal of SPEED is to contribute to positive impact on the lives of poor and vulnerable populations by providing clean energy to rural communities, thereby improving the quality of life and enhancing livelihood security.



Defining SPEED

SPEED seeks to test the potential of business models and implementation plans that deliver electricity from renewable fuel sources in energy deficient regions of the developing world. It aims to leverage the power needs of cell-towers in electricity-starved regions as an anchor load to create a cleaner power infrastructure that would serve the larger needs of poor and vulnerable people in these regions, thus catalyzing economic and social development.

The SPEED Mission

SPEED is currently in a design phase and aims to:

- Develop ground level demonstrations (of rural energy service companies) that test the provision of affordable clean power and energy services in un-electrified and under-electrified regions and catalyze the development of micro enterprises to spur economic development in these communities, with a particular focus on the poor and vulnerable.
- Catalyze an enabling environment that encompasses a broad range of stakeholders, including government ministries, private investors, local entrepreneurs, bilateral and multilateral institutions, mobile phone companies, technology enterprises, local business schools, research institutes and civil society organizations.
- Mobilize financing for these rural energy service companies so that there is a significant flow of commercial, government, and donor funding for these projects.

SPEED in India

SPEED operates at the confluence of three key market forces:

- Proliferation of cell-tower infrastructure: The mobile network in India has exploded from 6.4 million subscribers in 2002¹ to 752 million subscribers in 2010². The supporting cellular tower infrastructure has grown to more than 300,000³. Most of the future growth of this infrastructure and consequently, energy requirement is going to be in rural regions.
- Latent demand for energy in rural regions needs a catalyst for activation: As the Indian GDP grows at 8-10% per annum, economic development in rural regions continues to become an increasing priority to ensure equitable development. Capital is available for development, but energy which is a precursor for economic activity, is not, as yet.
- Falling costs of small-scale distributed clean energy technologies: Enhanced affordability of small-scale, renewable energy technologies are creating viable business opportunities for private enterprise.

Key stakeholders and aligning with their drivers


- **Local rural communities** are the direct and immediate beneficiaries of SPEED. Key drivers for them include:
 - Increased and affordable availability of energy supply
 - Employment opportunities including participation in fuel supply chain
 - Ownership role in the energy service companies
 - Greater economic activity and overall development

SPEED also aligns with the needs of other key stakeholders:

- **Cellular tower operators** Energy forms ~40% of the operating expense of cell-tower operators. Bharti-Infratel spent approximately INR1,000 crore (USD220 million)⁴ on diesel fuel in 2010 alone. Renewable Energy (RE) solutions, while still building market presence, have a lower operating expense. In the long term, RE solutions have an ability to be more cost effective than diesel.
- **Distributed Rural Energy Service Companies and Distributed Generation Technology Providers** see un-electrified and under-electrified regions as business opportunities. A 2010 report by IFMR and World Resources Institute demonstrated the potential annual market value of this segment to be INR 94.06 billion (USD2.04 billion)⁵.
- **Government** is a key stakeholder in electrification and development. 2 key drivers that align SPEED with the government are:
 - engaging private enterprise to leverage government policy and attract private capital thereby creating a multiplier effect for government capital;
 - By involving private enterprise and capital, longer term operations and maintenance are expected to be better assured.
- **Utilities and State Distribution Companies** are stakeholders when SPEED operates in a grid-connected region. SPEED helps them overcome 2 key imperatives:
 - The average retail tariff realized does not cover for the costs to provide assured supply to low demand rural areas.
 - Renewable Purchase Obligations to the extent the SPEED projects are able to supply surplus power to the grid.

How is SPEED different?

SPEED is building upon past pilots that focused on distributed renewable generation for rural electrification but, unlike past projects, has an explicit focus on scale and anchor loads.



Key barriers and past learnings	Designing for Scale
Micro-enterprise development has been constrained by lack of electricity; and electricity supply has been constrained by lack of demand. Consequently many Distributed Rural Electrification projects have failed as consistent demand has not materialized.	SPEED assures base demand for Distributed Rural Electrification providers by tying in anchor loads in the form of cell-tower. Consequently SPEED assures upfront electricity supply for micro-enterprise development, hastening the process of economic development.
The historical rural electrification projects have generally involved 'Public' and 'Quasi Public' or non-profit formats with focus on initial investments only. Consequently long term operation and maintenance has been ineffective.	SPEED model entails a comprehensive ESCO (energy service company) formed through engagement of private enterprise and leveraging private investment. Long term operations and maintenance are likely to be more effective and sustained.
The biggest challenge for creating distributed renewable energy systems is the requirement for upfront CAPEX.	SPEED catalyzes investment by creating investable frameworks for private third parties: both at a program level; as well as at a project level.
Rural electrification typically caters to BoP communities and their lighting / household needs. Community empowerment and income enhancement has not been a key tenet.	Through electrification, SPEED works on building micro-enterprises and hence creating employment/ income generation in the areas served.
Payment collection and power theft typically have been challenges and a significant factor impacting viability.	Working closely with communities, SPEED will mitigate theft by offering a variety of payment mechanisms and tariff rates based on service provided. SPEED will work with existing community organizations to ensure payment collection.

The case for going beyond greening cell-phone towers

Projects that go beyond greening cell-towers and also power the community and its micro-enterprises provide the following benefits:

- A. Community development.
- B. Diversifying loads for sustainability.
- C. Building on the above, even if the load requirements of cell towers reduce, this model will still be viable.

Anchor Load Estimates

GSMA has estimated a market potential for 70,000 'green powered' sites in India which can also serve the community. This analysis included wind and biomass only. Approximately 70% of these sites are those that are being planned in an off-grid set-up with the balance sites providing replacement opportunities.

Clean-technology (r)evolution

A key enabler for SPEED is the rapidly maturing renewable energy industry: falling levelized costs, economic viability of smaller distributed systems, reduced maintenance and higher up-time. As this trend continues, the SPEED program (which is technology agnostic) will deploy the most appropriate mature solution.

The current challenges to the adoption of distributed clean-energy solutions are (a) higher upfront CAPEX as compared to conventional diesel generators; and (b) limited personnel with technical know-how for field deployment and maintenance.

To address these challenges, the focus of SPEED is on building the rural energy service company capacity and creating long-term bankable solutions.

Technology	Levelized economic cost (Rs/ kWh)
Small hydro	4.61
Biomass	5.73
Wind	6.08
Solar PV	20.20

Source: TERI and World Bank Estimates

Concept Validation: Testing program with DESI Power in Gaiyari and Bhebhra Village, Araria District, Bihar.

In a first step to demonstrate how SPEED implementation can look like, a test program was initiated towards the end of 2010 by DESI Power, a Rural Energy and Enterprise Company. The test program entailed connection of 6 cell-towers to the existing DESI Power biomass based plants. Location: Gaiyari and Bhebhra Villages, Araria District, Bihar (Population: Bhebhra – about 950 and Gaiyari - about 2000)

Technology used	: Biomass gasifier
Plant generation capacity	: 56 KW
Type of fuel	: Dhanicha, Ipomea, corn cob and hardwood
Average distance of fuel source:	Within 20 km radius
Load consumed by towers	: 5-6 KW each
Electricity supplied per day	: 8-10 hrs
Average distance of telecom towers from the power plants	: 1–1.5kms

What began as a test now provides energy for 10 hours a day to 3 telecom towers. When all 6 telecom towers are connected the Plant Load Factor will increase by about 20-25% at Bhebhra & 30-35% at Gaiyari which will result in the reduction of generation cost by about 10%. The data and experience of the testing program will be used in optimizing the design of the validation pilots being planned in the next phase of SPEED.

Other impacts:

- Growth of micro-enterprises like huller, chakki, rice mill, repair shops, irrigation pumps, domestic households, etc.
- Establishment of Management Training Centre to train staff (with a focus on local women), thereby generating rural employment.
- Cultivation of energy plants, inter-cropped with other crops, for power plant fuel (Ipomea, Dhaincha) which generate cash income for the farmers.

