

Greening Telecom – Intelligently

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Practitioners Perspective and Experiences with Powering Telecom

Opportunity

- Potential to offset diesel in more than 200,000 towers
- Combine power supply with neighboring villages to improve returns and increase social impact

Challenges

- Unreliable energy information with the TELCOs
  - *Up to 20L/Day of diesel savings just with reliable identification of theft*
- Supply guarantee is expensive to serve
  - *Changing EB schedules, Large storage requirements*
- Jeopardizing the diesel black market poses additional risk for the project
  - *Unreasonable financial demands by diesel mafias*
- Telecom wants a fast, perfect solution with minimal stake or risk of it's own
  - *> 60% cost reduction desired at the pilot stage itself*

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Appropriate Approach To Electrifying Telecom Towers

Collect **reliable, tamper proof, information** on power situation of telecom towers

Analyze in **partnership with RESCO** where renewable integration will be useful

Transparently discuss current expenses on telecom tower sites

Choose high expense sites as targets for pilots and take **guarantees on minimum savings/year**

In the **scale up**, once business models are refined, sign power supply guarantee agreements

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Information Access – Gram Power Telecom Power Management System (TELPOM)

- ***TelPoM*** is Gram Power's ***proprietary, tamper-proof*** technology to ***remotely sense*** and ***control in real time*** the power supply system of any telecom tower

- ***Benefits***
  - Monitor and ***reduce diesel*** consumption
  - ***Control*** tower's operational expenses
  - ***Monitor*** operator's performance
  - Automatic analysis of ***viability of solar power*** for the tower

- ***OPEX model with instantaneous payback due to avoidance of unnecessary solarization / identification of diesel theft***



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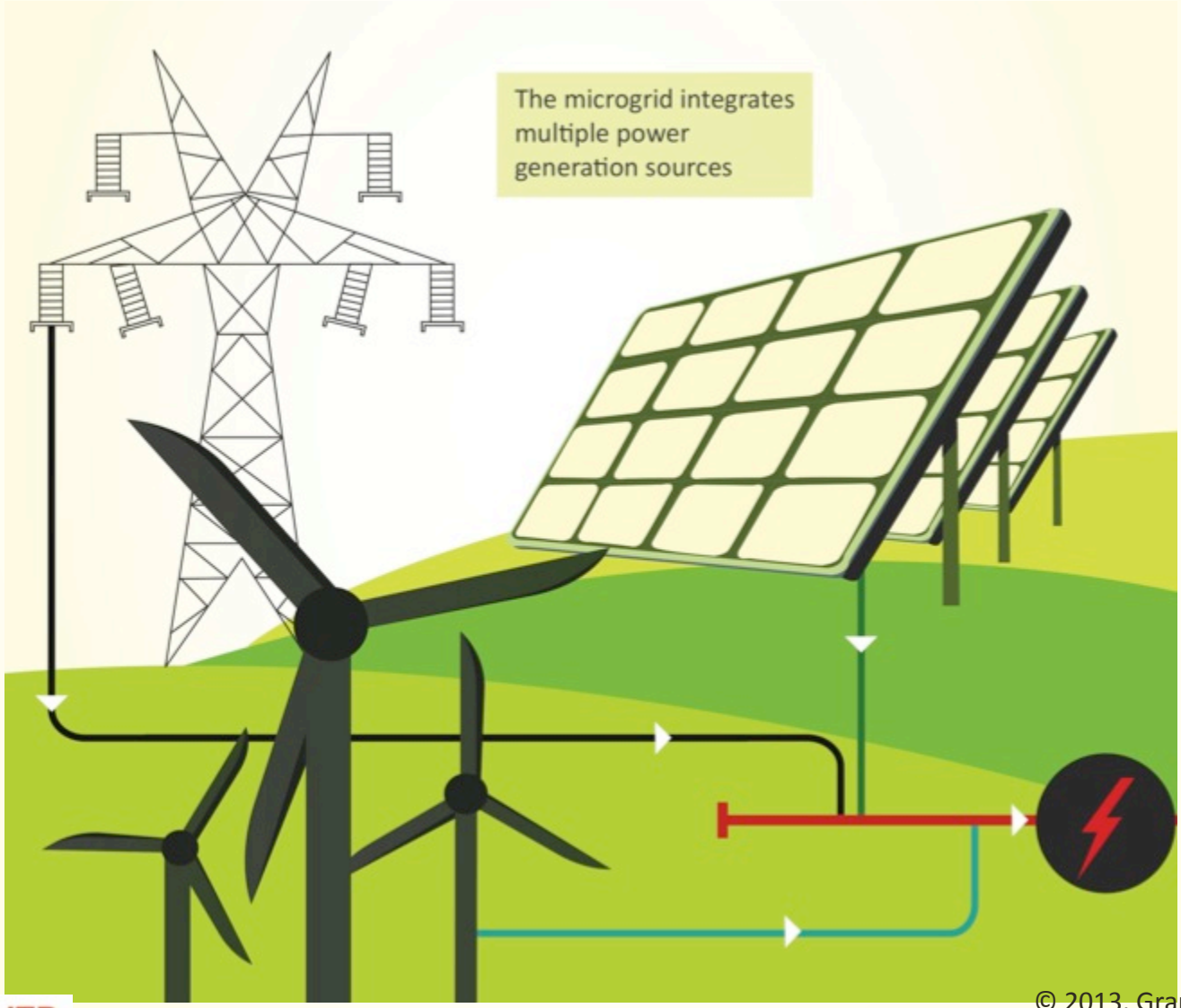
Smart Microgrid System – Village Identification



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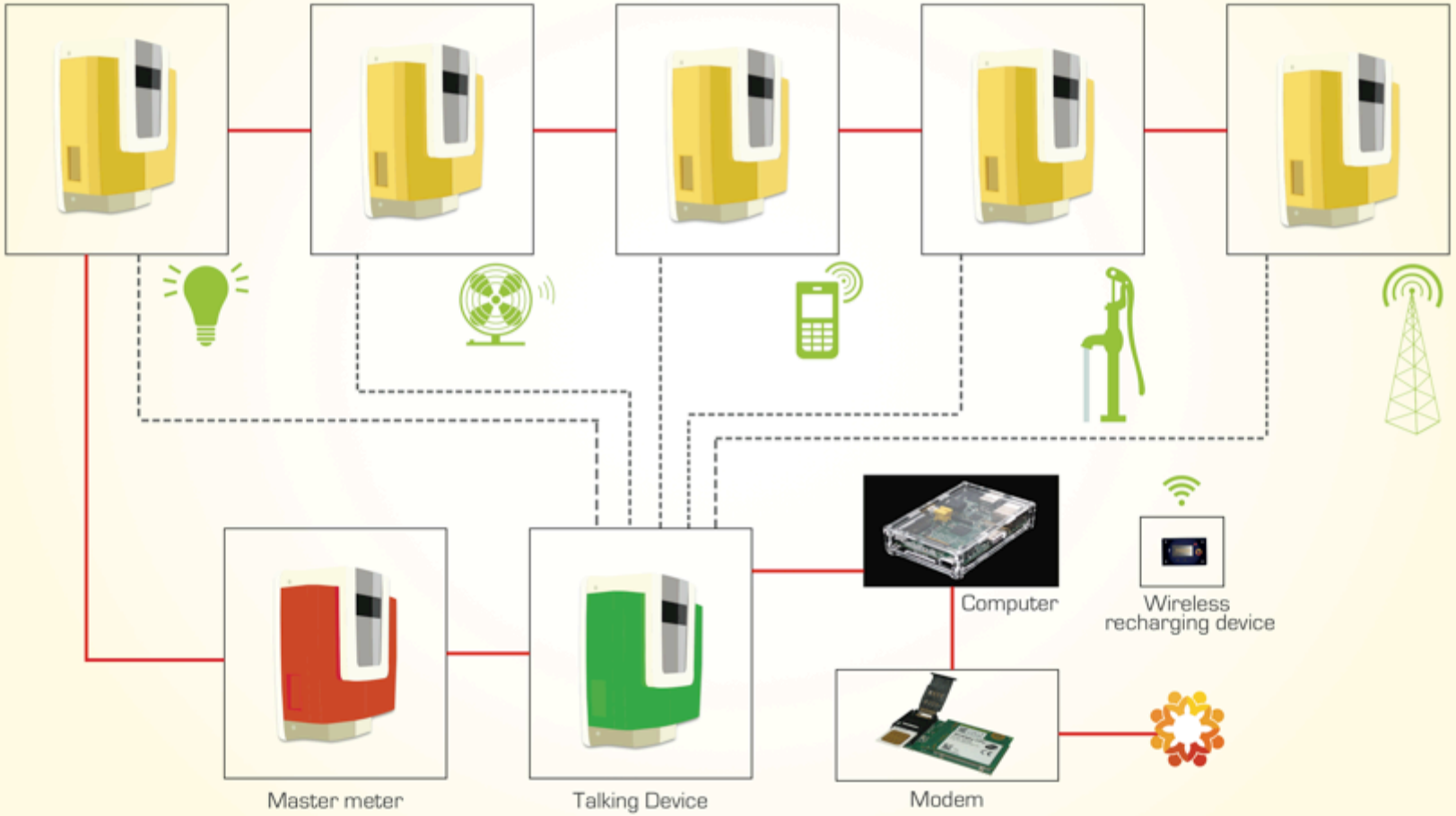
Smart Microgrid System – Local Generation



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Smart Microgrid System – Smart Distribution



Our proprietary Prepaid Smart Meters and Grid Monitoring systems ensure:

(1) Theft Elimination (2) 100% Payment Collection (3) Reliable Power Supply (4) Remote Monitoring

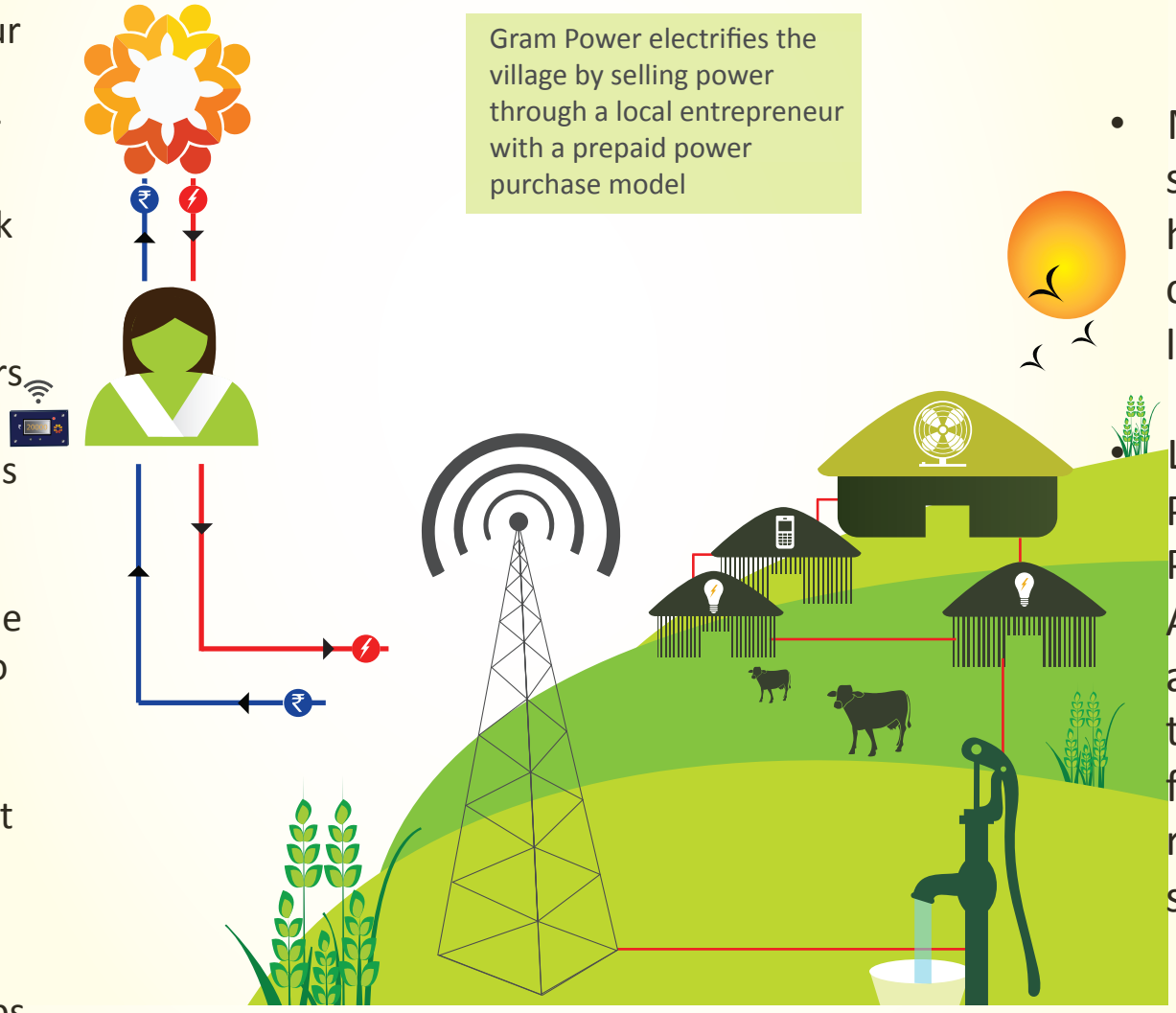
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Smart Microgrid System – Prepaid Payments and Livelihood Creation

1. Local entrepreneur purchases power from Gram Power by depositing money in the bank
2. Gram Power wirelessly transfers energy credit to the entrepreneur's ***energy wallet***
3. Consumers pay the entrepreneur who then recharges their meters with the wireless wallet
4. When the meter runs out of credit, power supply stops

Gram Power electrifies the village by selling power through a local entrepreneur with a prepaid power purchase model



- Microgrid can serve all household and commercial loads
- Long term Power Purchase Agreements are signed with telecom towers for reliable revenue stream

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Microgrid Experiences

The Good

- Extremely strong word of mouth snowballing effect after initial adoption
- Fast growth in power demand
- Creates strong barrier to entry for all other solutions
- Government is very responsive to solutions

The Bad

- Productive and guaranteed loads are essential for regular revenue stream
- Site identification is time consuming and challenging
- Scalability is limited with household microgrids due to local challenges, need of local partners, etc.
- High operational costs

Opportunity with Telecom

- Regular reliable loads
- Scale up process is clearer
- Project finance is easier

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In a nutshell…

TELCOs and RESCOs have the opportunity to sustainably solve a large chunk of the energy access problem provided they work together as partners and not simply supplier/customer

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India's FIRST Smart Microgrid in Rajasthan



Clean Generation



State-of-the-art **Monitoring Technology**

Smart Prepaid Meters eliminate defaults and payment collection expenses



150 people served, **24 x 7 'On-Demand' Power** with 2kWp system for lights, fans, TVs, coolers, chaach machines, cell phones, etc.,



After our first system in March 2012, Gram Power will have 27 systems live impacting 7000 people by August 2013

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Awards and Recognition

International Awards

Corporate Awards

Business Plan Competition Awards

Partner Institutions

India Smart Grid Forum
An Initiative of Ministry of Power Govt. of India

Ministry of New & Renewable Energy
Govt. of India

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Company Profile

Management and Advisory Team

- **Yashraj Khaitan**
  Co-Founder & CEO
  UC Berkeley, B.S. Electrical Engineering and Computer Science (EECS)
- **Jacob Dickinson**
  Co-Founder & CTO
  UC Berkeley, B.S. EECS
- **Kishore Khaitan**
  Chairman
  Chairman, Basant Wire Inds. Pvt. Ltd.
  Boston University, MBA
- **Mikkel Vestergaard Frandsen**
  Partner & Strategy Advisor
  CEO, Vestergaard Frandsen
  Henley Management College, MBA
- **Prof. Eric Brewer**
  Chief Technical Advisor
  VP Infrastructure, Google
  Professor at UC-Berkeley
  MIT, M.S. & Ph.D. in EECS

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