

Community Power from Mobile

IFC International Finance Corporation World Bank Group

India Working Group

September 11, 2012

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Agenda

- Status of CPM programme, exciting developments and current opportunities
- Path-forward for Community Power
- Introduction to Enhanced Utilities & innovative business models

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Leverages mobile technology & infrastructure to provide access to rural energy services while improving the business case for network and tower operators

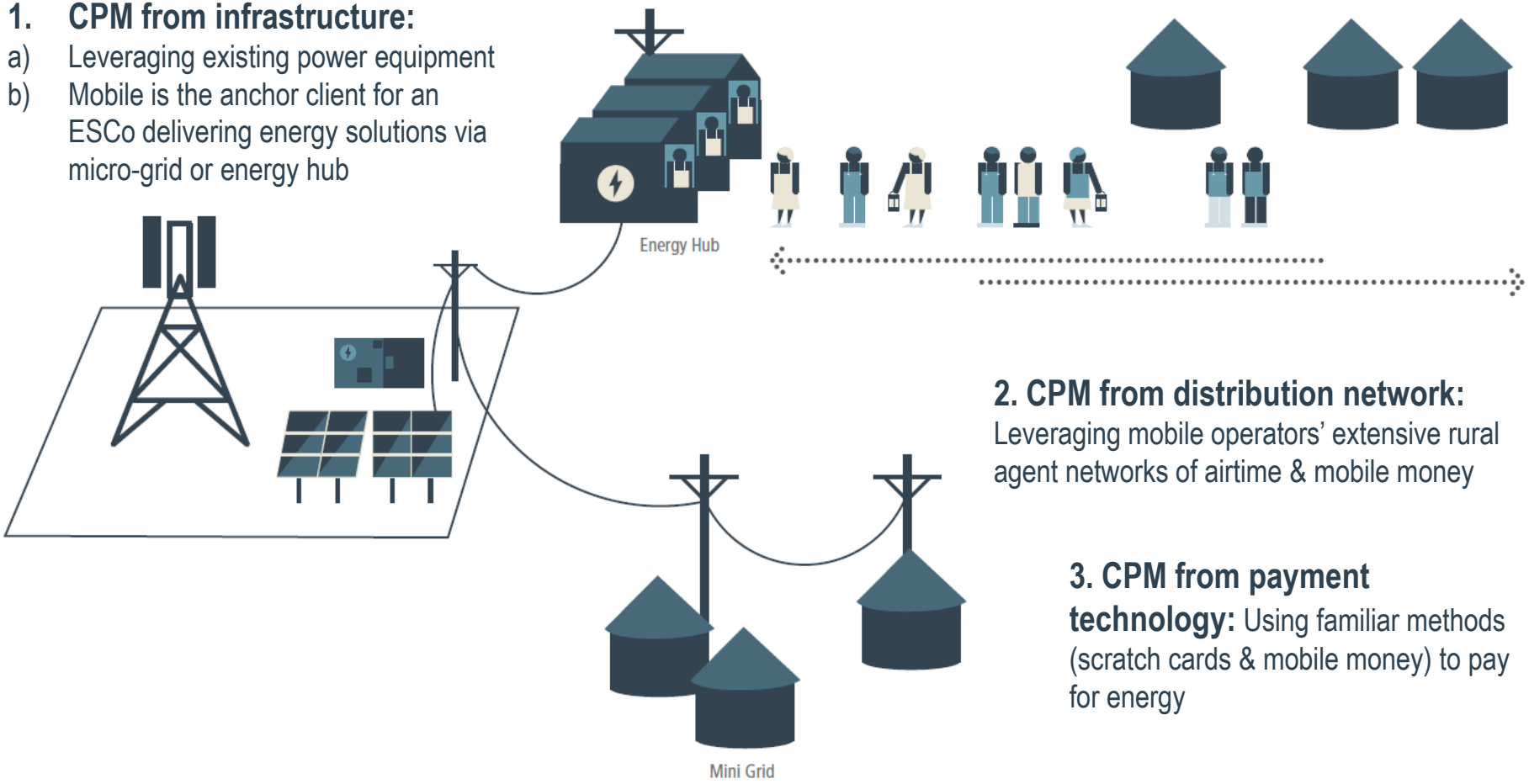
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Three aspects of Mobile providing sustainable energy access through off-grid mobile

1. CPM from infrastructure:

a) Leveraging existing power equipment

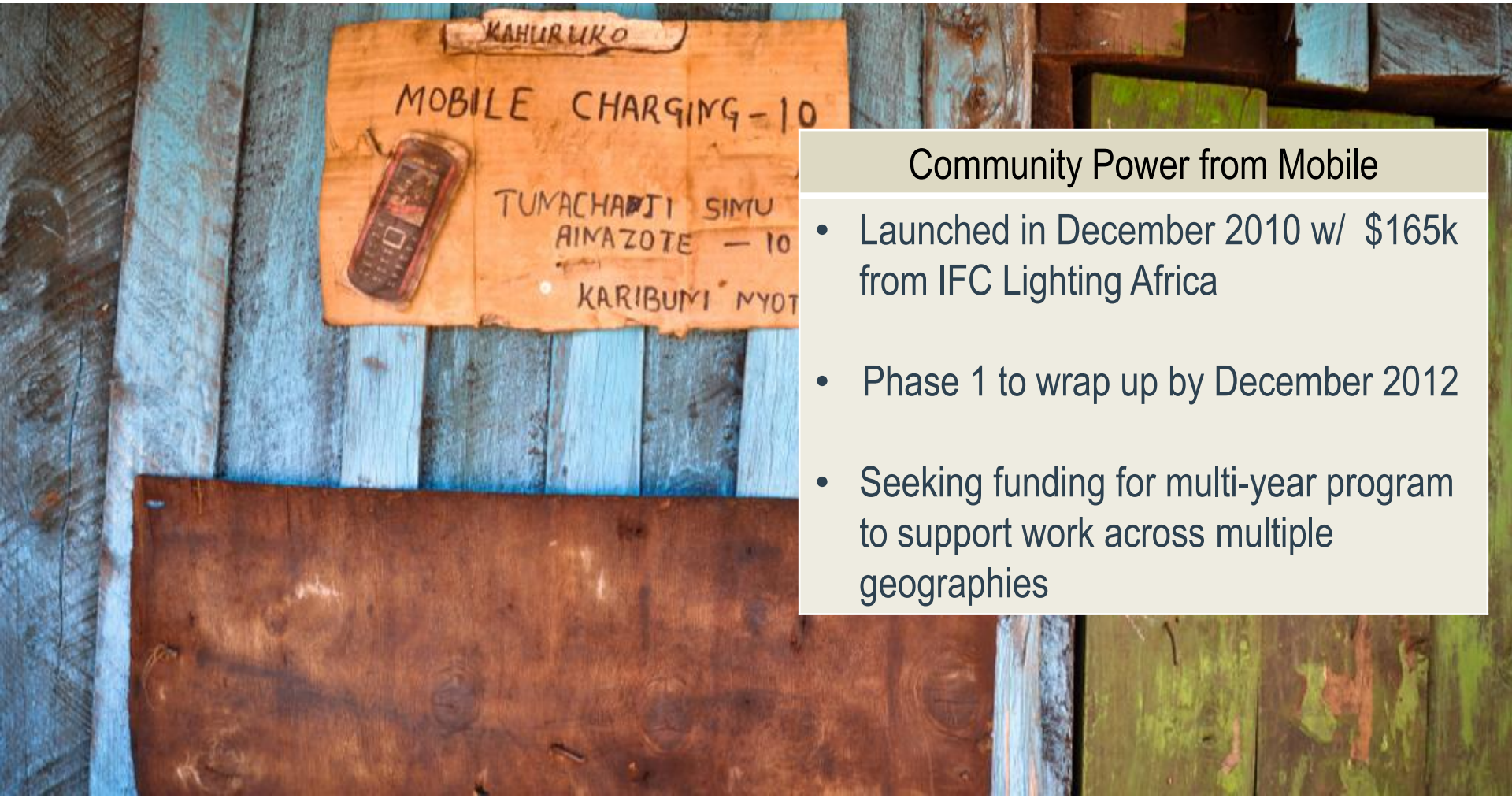
b) Mobile is the anchor client for an ESCo delivering energy solutions via micro-grid or energy hub



2. CPM from distribution network: Leveraging mobile operators' extensive rural agent networks of airtime & mobile money

3. CPM from payment technology: Using familiar methods (scratch cards & mobile money) to pay for energy

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Community Power from Mobile

- Launched in December 2010 w/ $165k from IFC Lighting Africa
- Phase 1 to wrap up by December 2012
- Seeking funding for multi-year program to support work across multiple geographies

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Growth of CPM Ecosystem

- Active participation in 7 Working Groups building a strong network of supporters
- Mobile World Congress 2012 events
- Significant increase in CPM pilots and future pipeline
- In India: on-going support by MNOs and Tower Cos & integrated into ESCO outsourcing model



Channel 1: mobile towers/3rd party ESCO
Channel 2: Distribution Channel
Channel 3: Micropayments

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Lessons from CPM Phase 1: Challenges faced by concept

- **Regulatory** framework that supports mobile-enabled rural energy access
- Understanding **community level** energy needs & ability to pay
- Accounting for diversity across **geographies**
- Accessing **R&D capital** for large scale trials
- Who's **role** is it to prove the business models?
- Room to trial several **business models** before choosing a winner
- Quantifying the opportunity demands much more **data**

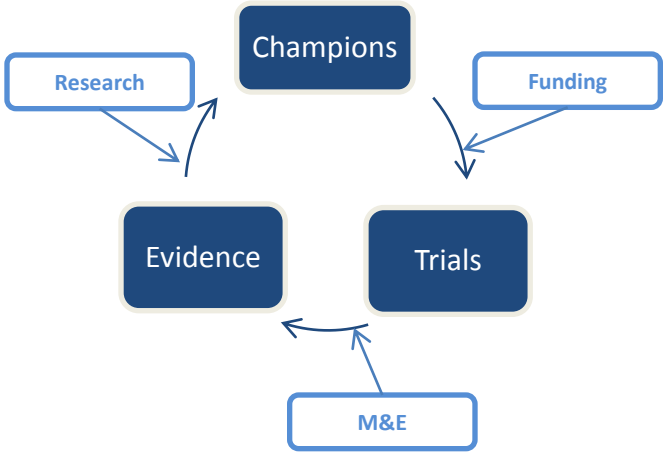
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Developing a path forward for CPM…

GSMA process of catalysing commercial solutions

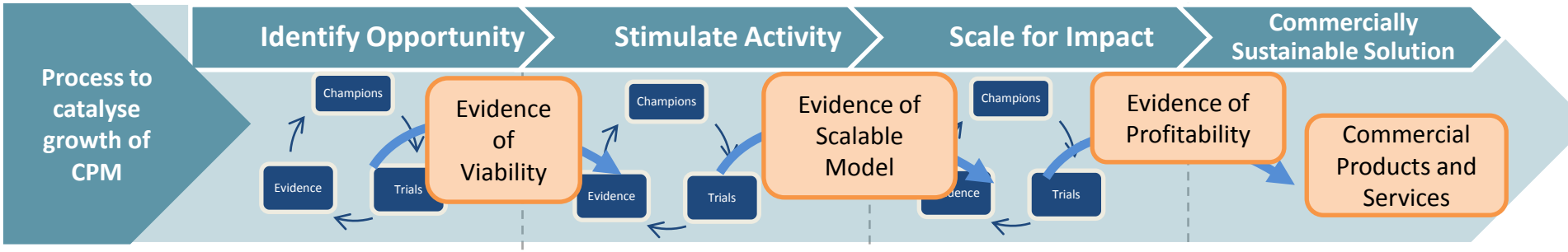


Virtuous Cycle of Market Facilitation



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What is missing to move CPM from idea to commercial solution?



Seeking Funding for:

1 Expanding technical assistance to mobile sector focusing on feasibility studies in multiple geographies

2. Catalytic investment in community power trials led by operators with matched funding

3. Facilitate growth in mobile-to-mobile (M2M) market for improved energy services through research, a seed-stage funding facility and knowledge sharing

4. Knowledge dissemination through further convening and publications, complementing more active senior-level advocacy and engagement with the investment sector

Expand program scope to include application of mobile technology to improve *water* services.

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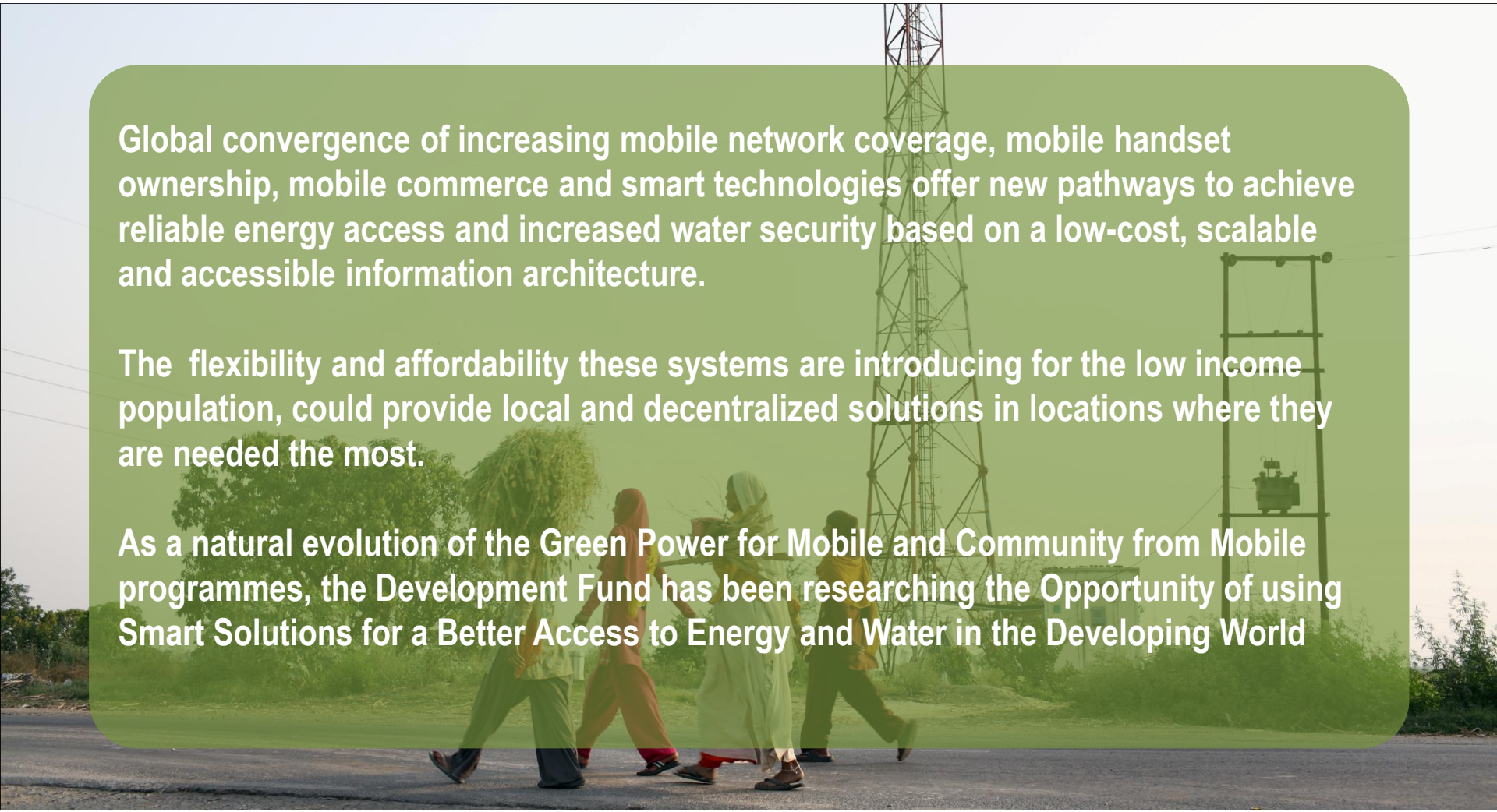
Opportunity for India: Budget allocated for Feasibility Study in early 2013.

Objectives of the feasibility studies

- **Assist Management** in defining the strategic and financial goals of CPM deployment
- **Shortlist** the sites with greatest potential for impact and business returns
- Size the **opportunity & costs** of 3 business cases:
  - Leveraging infrastructure & power systems for energy delivery to the community
  - Using rural service supply chains & agents to distribute & sell energy solutions
  - Using mobile payment technologies for users to pay for energy solutions
- Creating replication **guides** for internal use

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GSMA Metering Project:
Potential of Smart Solutions for Utility Services in the Developing World



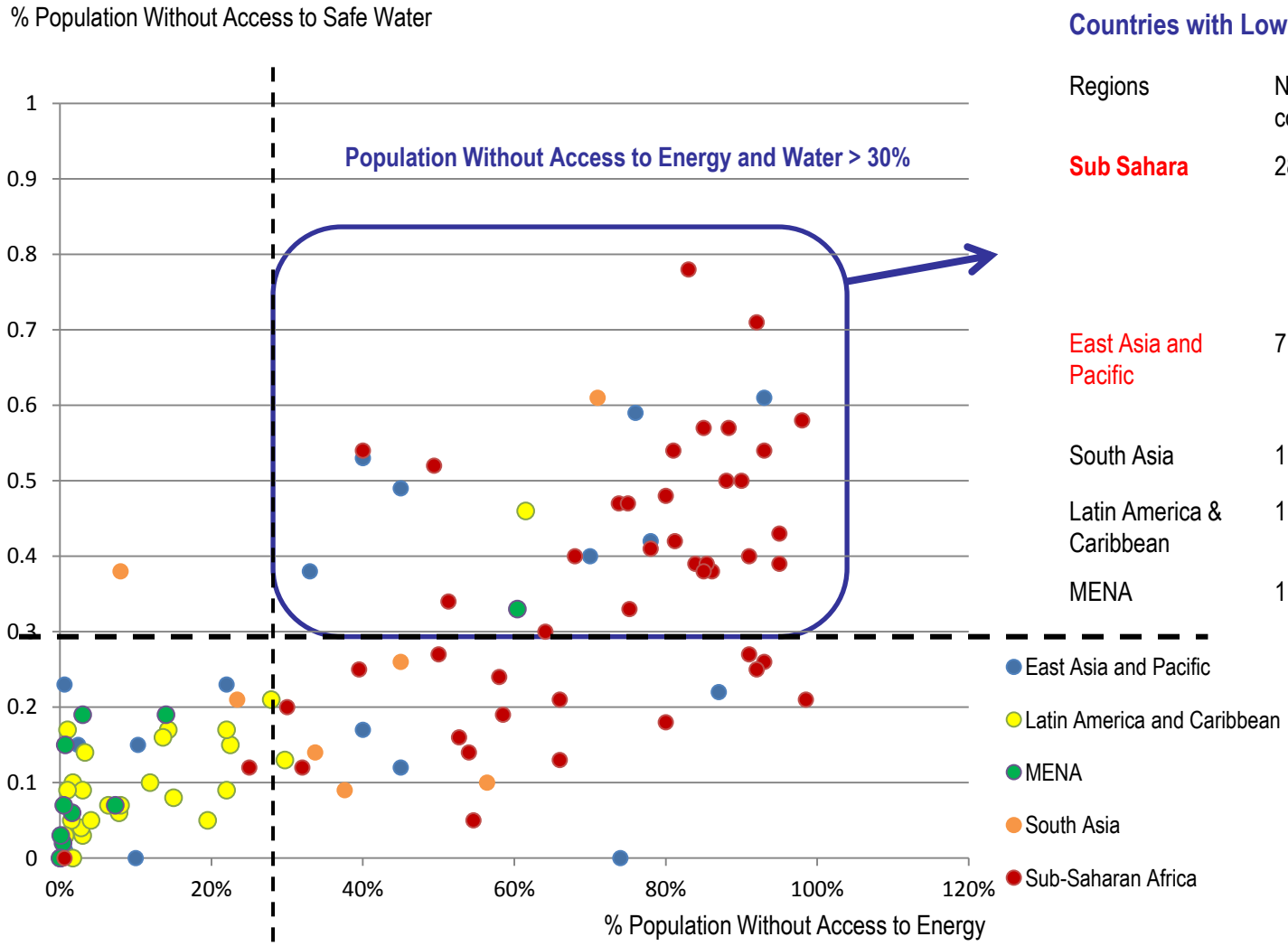
Global convergence of increasing mobile network coverage, mobile handset ownership, mobile commerce and smart technologies offer new pathways to achieve reliable energy access and increased water security based on a low-cost, scalable and accessible information architecture.

The flexibility and affordability these systems are introducing for the low income population, could provide local and decentralized solutions in locations where they are needed the most.

As a natural evolution of the Green Power for Mobile and Community from Mobile programmes, the Development Fund has been researching the Opportunity of using Smart Solutions for a Better Access to Energy and Water in the Developing World

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Percentage Population without access to Energy and Safe Water



Countries with Low Access to Water and Energy (%)

Regions	Number of countries	Countries
Sub Sahara	28	Uganda Tanzania Ethiopia Niger Mali …
East Asia and Pacific	7	Papua New Guinea Cambodia Myanmar
South Asia	1	Afghanistan
Latin America & Caribbean	1	Haiti
MENA	1	Yemen

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The addressable market for enhanced utilities…

The Total Addressable Market in each country was calculated using the following data and analysis:

- The percentage of the population with access to Electricity and Water
- The percentage of the population being covered by GSM mobile networks (calculated using GIS processing based on GSM network maps and population density maps)

The main assumption for this model was that the people covered by GSM networks, and without access to energy and water, could benefit from the mobile technologies to improve their access to these utility services.

We estimates that the total number of people who could benefit from enhanced utilities to be 411 million people for energy and 165 million for water

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The addressable market for enhanced utilities…

	% Population with access to electricity (2011)	Total Addressable Market for Energy Access (number of people impacted)	% Population with access to clean water (2011)	Total Addressable Market for Water Access (number of people impacted)	% Population with mobile coverage (2010)	% Population with mobile connection (2012)
Bangladesh	55	54,432,392	80	6,267,373	89	61
Nigeria	51	38,601,263	58	21,136,691	72	58
DRC	60	27,724,104	46	5,353,784	53	22
Kenya	16	27,308,728	59	9,733,760	95	66
Tanzania	14	26,378,720	54	7,782,166	76	55
Uganda	9	26,214,741	67	5,334,174	97	42
India	66	21,147,140	88	10,573,570	73	72
Afghanistan	29	17,054,473	48	4,521,804	65	62
Burkina Faso	15	12,275,389	76	1,179,889	97	40
Niger	7	10,980,064	48	4,476,91	86	27
Yemen	40	10,507,745	62	6,636,252	98	52
Rwanda	7	7,847,267	65	979,273	82	37
Mozambique	12	7,563,451	47	431,428	44	35
Cambodia	24	7,388,110	61	1,744,970	86	108
Madagascar	19	7,376,492	41	1,869,930	55	29
Ghana	61	5,315,114	82	1,130,561	79	82
Burundi	2	4,417,599	72	156,759	59	25
Senegal	42	4,324,421	69	650,416	86	78
Sierra Leone	5	4,213,164	49	1,060,184	78	47
Haiti	39	3,582,596	62	805,192	78	55
	Source IEA	Source GSMA	Source UN	Source GSMA	Source GSMA	Source GSMA

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Challenges of Energy and Water Access and Impact of Smart Solutions

	Challenges for Energy	Challenges for Water	Impact
Service Provider	• **Loss of revenues and reliability of services as people tap illegally the grid** • **Poor Payment Collection**, consumers sometimes delay payments increasing project risk	• **Payment efficiency is low** (sometimes <80%) • **High water wastage** due to unmetered connections • **Unreliability** of water connections and handpumps	• **Improved payment processing** **Billing Accuracy** • **Higher Collection rate**
Consumers	• **Low income people are unable to pay for electricity** and tap illegally the grid • **High expenditures on energy** (kerosene) or charging services for handsets • **Too much time spent on traveling** accessing energy for the most rural parts	• Problems of disconnection when payment is not properly taken into account • People often **need to travel** to fetch water or reports water usage • **High Cost of water** in underserved areas • **Water Security** is not proven	• **Save Time** • **Save Money** • **Flexibility of Payments**
MNOs	• **Lower ARPU** - Subscribers use their phone less because the phone battery is depleted • Less money spent on airtime because of charging expenditures		• **Drives Transaction Volumes** • **Attract/Retain subscribers by capturing increased % of wallet**

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Shared Solar Case Study – Pay as you go Electricity

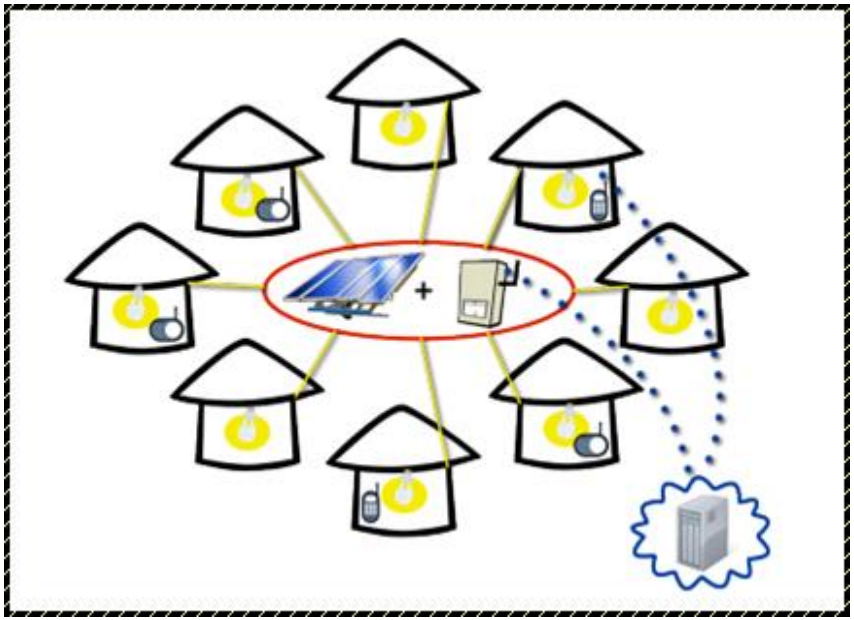
New York based Start Up developed by Vijay Modi, Director of the Modi Research Group and Professor of Mechanical Engineering at Columbia University & Director of the Modi Research Group and Professor of Mechanical Engineering at Columbia University

Product: small scale (1 kW) micro-grids based on renewable energy with prepaid, aggregated metering and semi-automated management

System: Customers have the flexibility to purchase electricity in small incremental amounts, either from local entrepreneurs who can upload credit, or using scratch cards.

SharedSolar has recently signed an agreement with Airtel to explore the use of mobile-money transactions. About a dozen pilot systems, benefiting a population of 1500 are now functioning in Mali and Uganda with some in place as long as one year.

SharedSolar is looking at expanding its project to new countries and develop a similar product for smart water access solutions.



Source: Shared Solar

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Simpa Networks: Selling solar like cell phone service

Simpa sells distributed energy solutions on a "Progressive Purchase" basis to underserved consumers

Customers make a small initial down payment for a high--quality solar PV system and then pre--pay for the energy service, topping up their systems in small user--defined increments using a mobile phone.

Each payment unlocks the system for a paid amount of energy consumption (Kwh). Once the prepaid consumption is exhausted, the solar home system is temporarily disabled until another payment is made.

The Progressive Purchase™ pricing model is enabled by the **Simpa Regulator**, a tamper-proof, system-integrated microcontroller and user interface that regulates the function of our solar home systems based on proof of payments, and the **Simpa Revenue Management System**, a centralized software solution in the "cloud", accessible via SMS gateway and over the internet, for payment processing and accounts settlement.



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Sarvajal Water

Piramal Water Private Limited is a for-profit business that was established in mid-2008 to find viable mass-market solutions to India's drinking water crisis. Water is sold under the brand "Sarvajal", meaning "Water for All."

Solution: Sarvajal uses a Rural Franchising model where they recruit local entrepreneurs to sell water to communities from Piramal Water-owned filtration equipment.

- Franchisees pay an upfront fee that represents a fraction of the capital cost of the filtration unit.
- Revenues are shared 60:40 between the Franchisee and Sarvajal.
- They have developed a Controller to help track all of the water produced by their Franchisees. Every filtration unit sends Sarvajal SMSs to keep track of use and status: On/off, low/high pressure, possible leaks
- Customers get 24-7 access to clean water using their pre-pay cards (or coins), and can recharge their cards using their mobile phones – just like buying minutes.



Source Sarvajal Water
http://www.sarvajal.com/solutions/



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