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Increasing Rural Mobile Connectivity

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- Launched in 2006 to extend reach of mobile for those living under $2 per day
- 25 projects in 13 countries with 20 operators

mServices

Energy

Connectivity

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The Problem

1.6 billion people living in rural regions in developing countries are not connected to mobile services and the socio-economic benefits mobile provides

The Opportunity

To **increase rural mobile penetration**, from the current ratio of 1:2.25 (urban:rural) to 1:1.5

The Solution

To **develop an online Mobiles for Development Exchange** that will collate, host and communicate MNO and other organisation expertise to facilitate the delivery of mobile services to people living on less than US $2 per day

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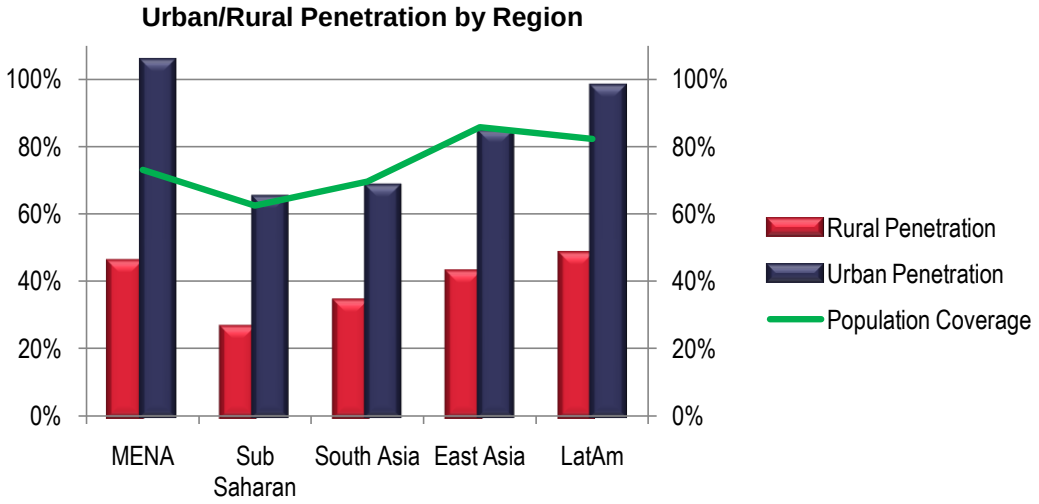
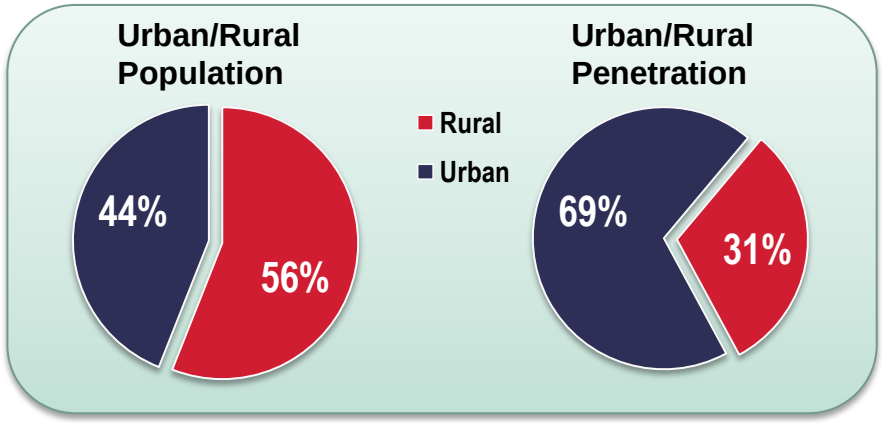
The Rural Gap

- An increasing **divide** between urban and rural subscribers
- **56%** of total population living in low and middle income countries live in rural areas
- Urban penetration is **83%** and rural penetration is **37%**
- **1.13 billion** people living in rural regions are covered by GSM but not connected to mobile services
- **500 million** people have no GSM coverage





[1] Untapped Rural Population Age 14-74

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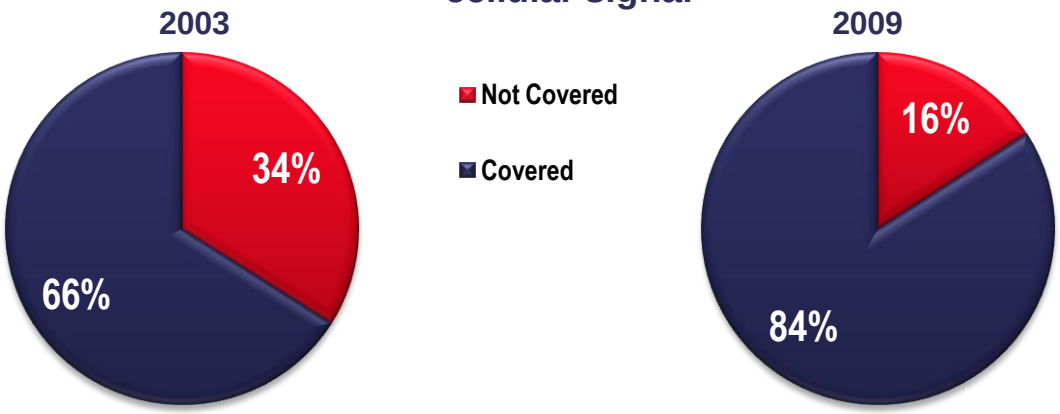
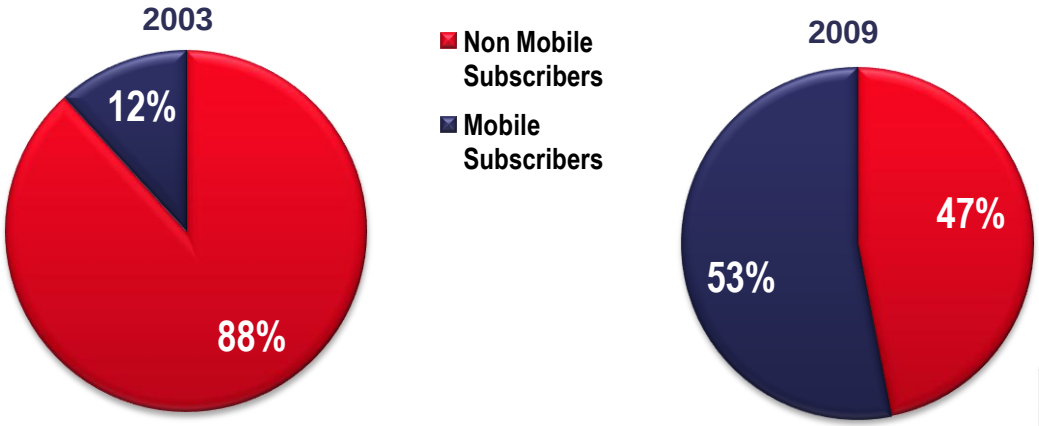
The Barrier – Is it a Coverage or Penetration Issue?

Percentage of the population in developing countries covered by a mobile cellular signal



Percentage of the population in developing countries with a mobile subscription



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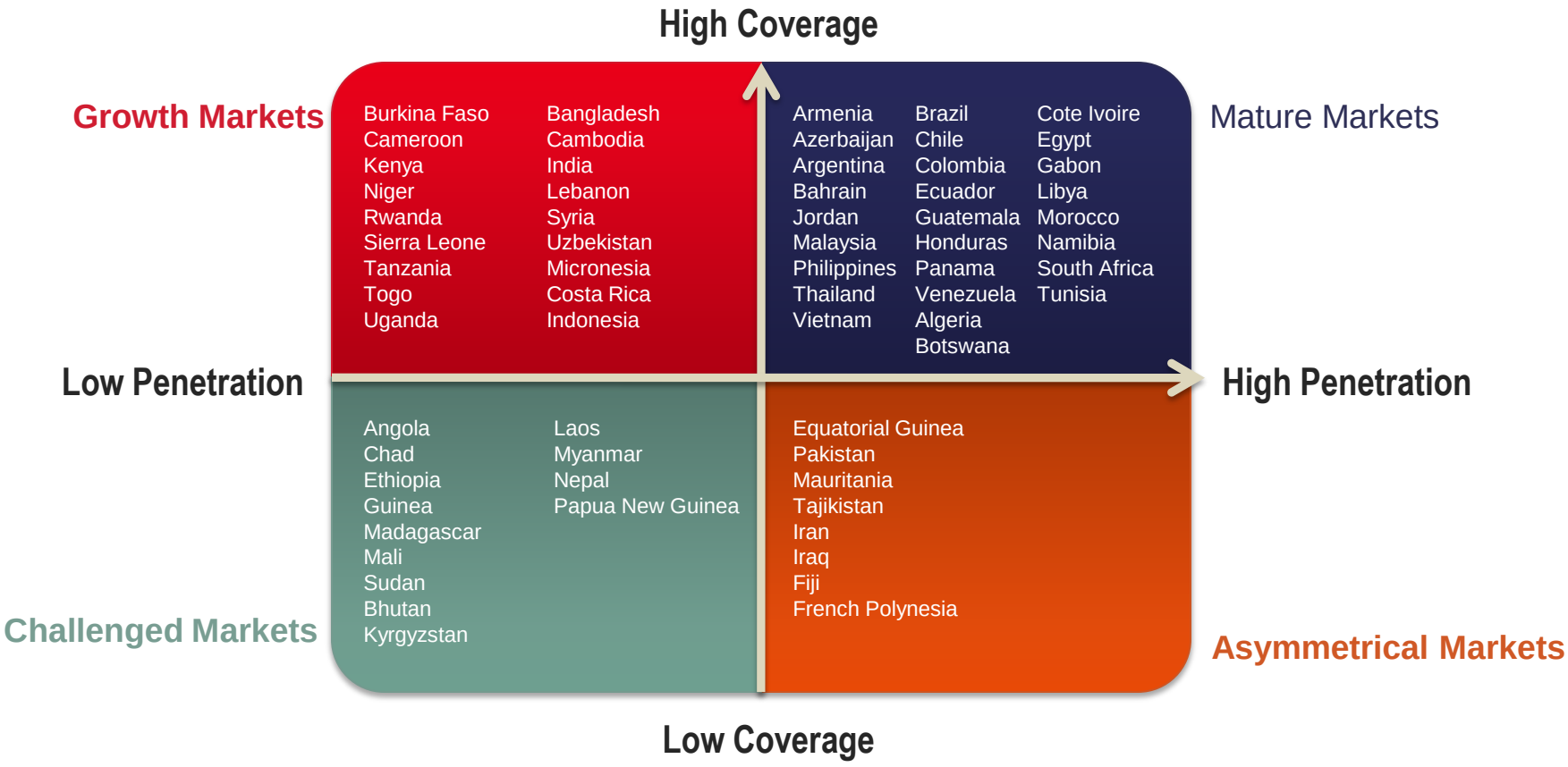
Four Groups Based on Population Coverage & Mobile Penetration



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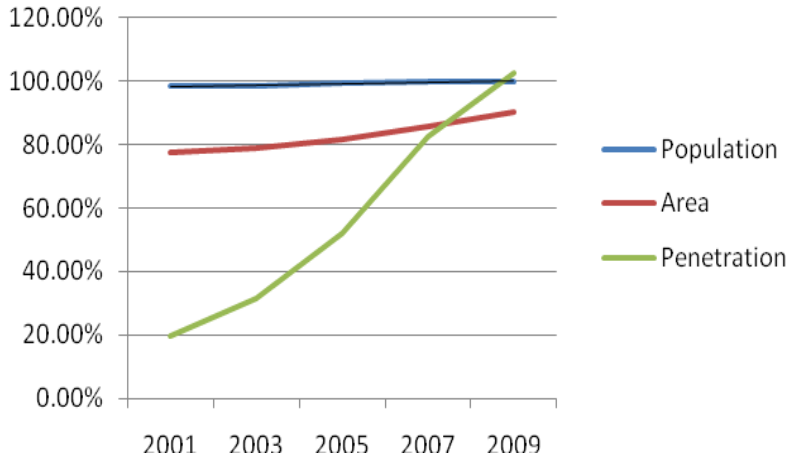
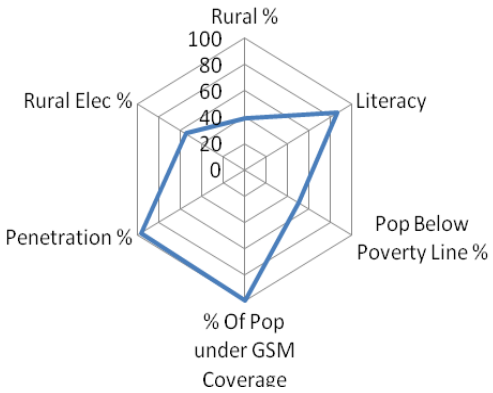
Why South Africa is a Mature Market

Population coverage, Area coverage & penetration evolution



Key country indicators



- Largest and most developed mobile market in Africa
- First African nation to have a competitive GSM market
- First to introduce pre-paid packages
- Aggressive government policies required mobile operators to meet roll-out targets and provide public access telephones at concessionary prices
- Reasonably well developed financial, legal, energy, transport and communications sectors.

- Population 50 million
- 12 million with no access to grid electricity
- 3 MNO's
- ARPU - $15.80
- 99.5% coverage
- 96 % penetration
- 39% live in rural regions
- 50% below the poverty line

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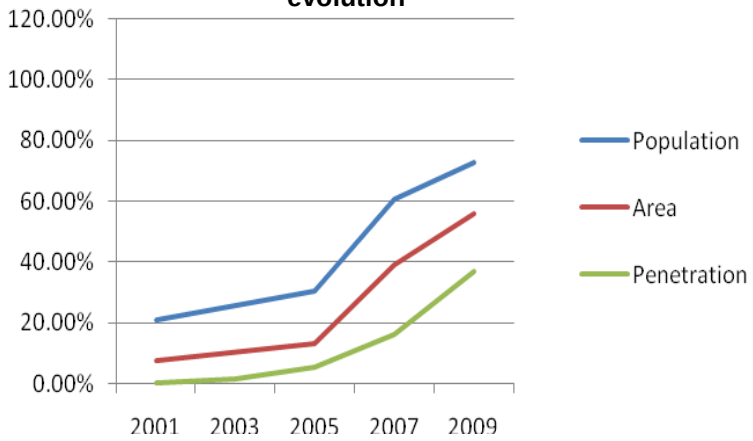
Why India is a Growth Market

Population coverage, Area coverage & penetration evolution



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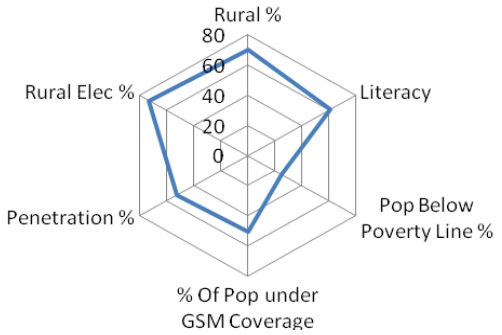

- Liberalisation of network in 2005
- 14 MNOs – intense competition, price-war on tariffs, differentiating through VAS
- Operators have invested massively in developing their networks in recent years and outsourced across the telecom value chain
- Significant untapped market of people living in a covered area but lacking mobile phone ownership
- Urban market close to saturation but recognition by MNOs of immense potential for growth through new rural subscriptions

- Population 1.2 Billion
- 404.5 million with no access to grid electricity
- 14 licensed MNOs and MVNOs
- ARPU - $3.19
- 73% coverage
- 50 % penetration
- **70%** live in rural regions
- 25% below poverty line

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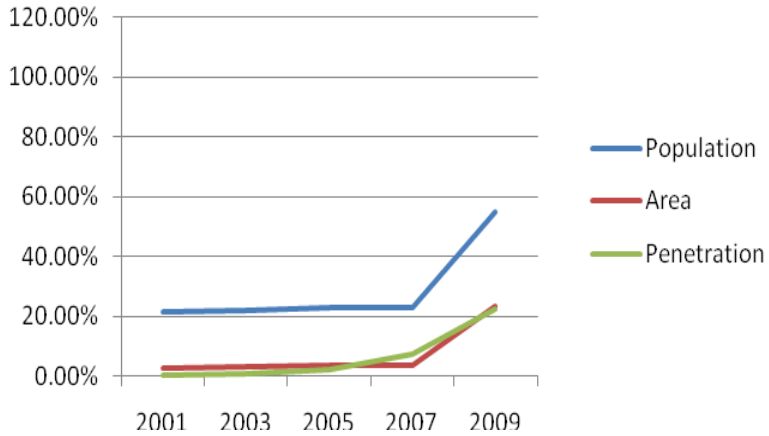
Why Madagascar is a Challenged Market

Population coverage, Area coverage & penetration evolution



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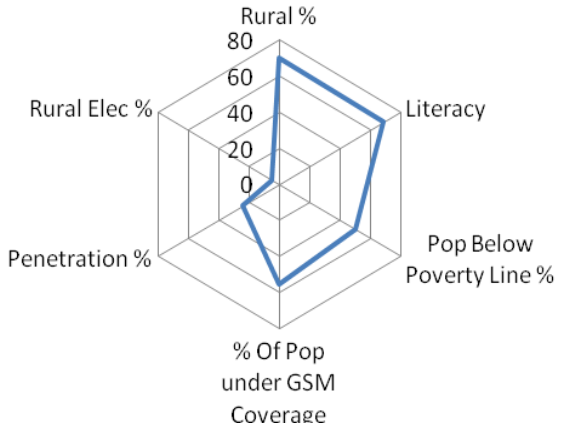

- Mobile market established in 1994
- Liberalisation in 2000
- Mobile penetration has been plagued by high price and a lack of GSM coverage (22% of the population was covered by 2007).
- Country geography is not very conducive to communication networks, however investments and deployment of mobile infrastructure since 2007 has increased population coverage to 55% in 2009
- An intensified price competition between the three mobile network operators, Orange, Zain and Telma, also led to more affordability of mobile services in a country with a very high part of the population living below the poverty line (50%).

- Population 19.5 million
- 16.4 million with no access to grid electricity
- 3 MNO's– Zain, Orange and Telma
- ARPU - $4.25
- 55% coverage
- 23 % penetration
- 70% live in rural regions
- 50% below poverty line

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Coverage

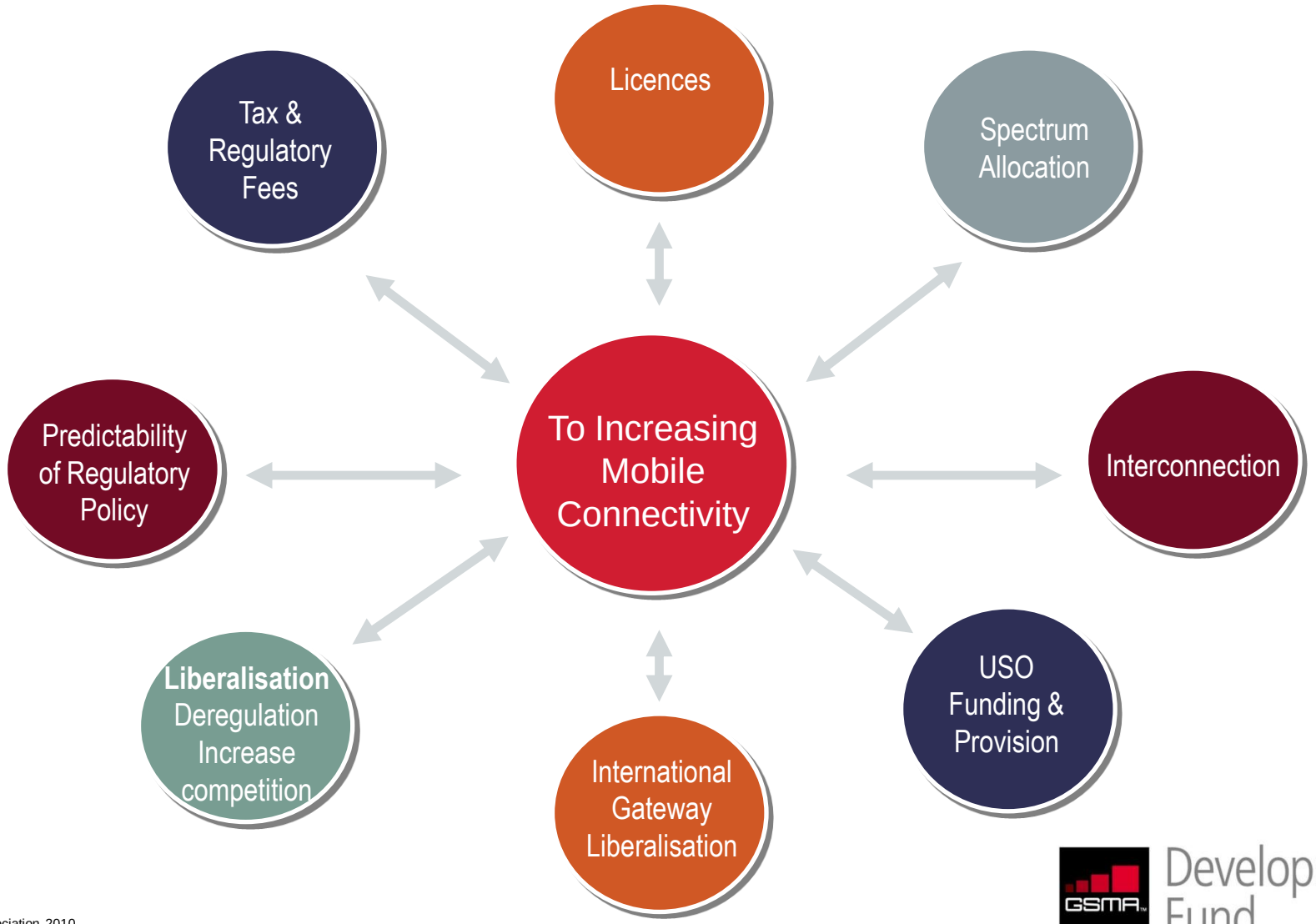
The Challenge for Operators

- Geography – remote locations and physical construction limitations
- Population – low population size and density
- Revenue - Low ARPU (less than $3)
- Power - Off-grid cell tower requires diesel generators
- Backhaul - expensive to deploy & maintain
- Commercial Considerations – transport costs, vandalism & theft

Penetration
The Challenge for Consumers

- No power to charge phone
- Initial handset cost is a barrier
- Low income
- Low literacy levels
- Bank account is pocket, therefore needs small top ups
- Current services don't meet needs

Current Approach to Increasing Mobile Connectivity



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Success, but 1.6 Billion Remain Unconnected

- **200 %** growth in mobile in developing countries between 2001 & 2005
- Enhanced competitiveness has increased penetration & coverage
- Cheapest handset costs have decreased from an average US $70 to US $15 in just five years
- Liberalisation and competition has resulted in massive tariff reductions
- The World Bank has committed $2.3 billion over 5 years and the private sector has committed $50 billion to network expansions
- **Problem - how do we make mobile services affordable for the bottom 1.6 billion?**

1.ITU
2. Nokia

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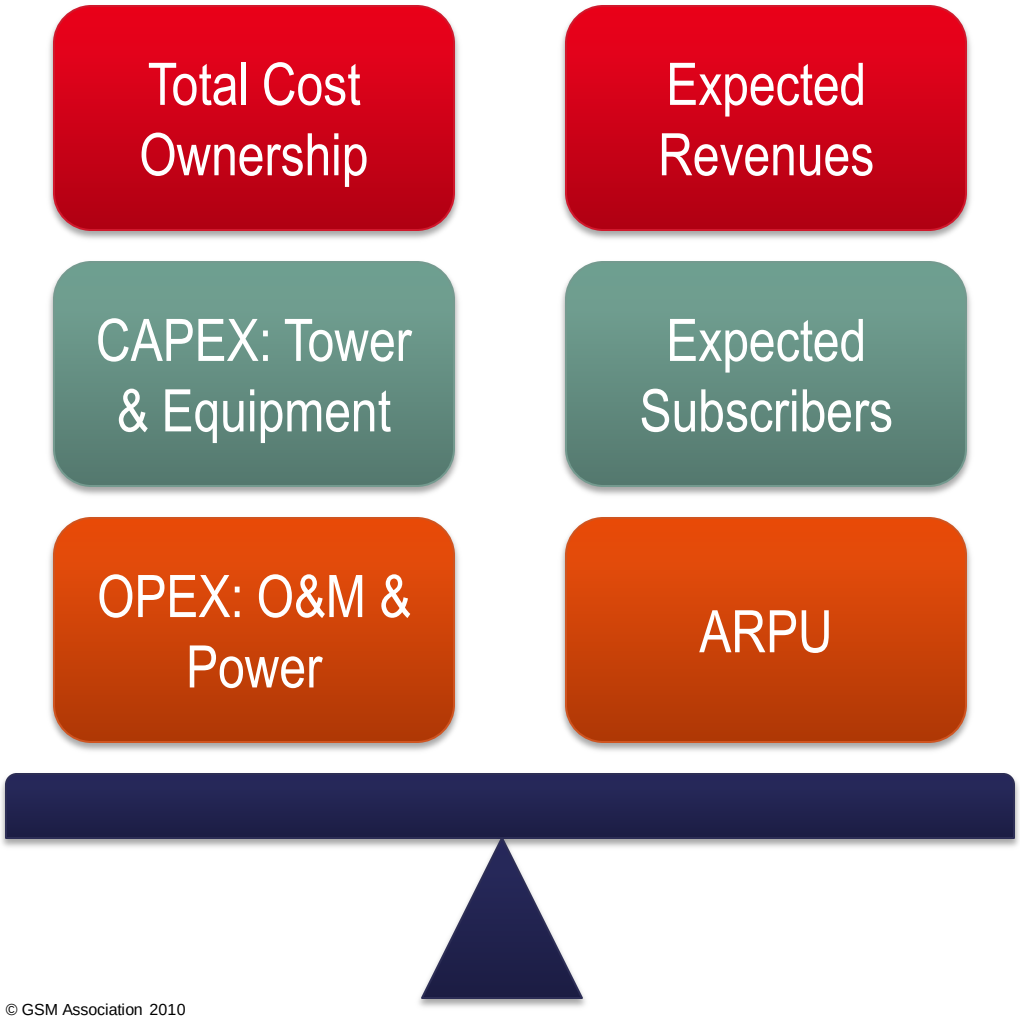
Increasing Rural Mobile Connectivity

A New Approach

Network coverage: An MNO Decision



- MNO will evaluate new cell towers according to TCO and expected revenues
- All viable investments will be made
- If financial returns do not meet a threshold the cell tower will not be built and the region will not receive coverage

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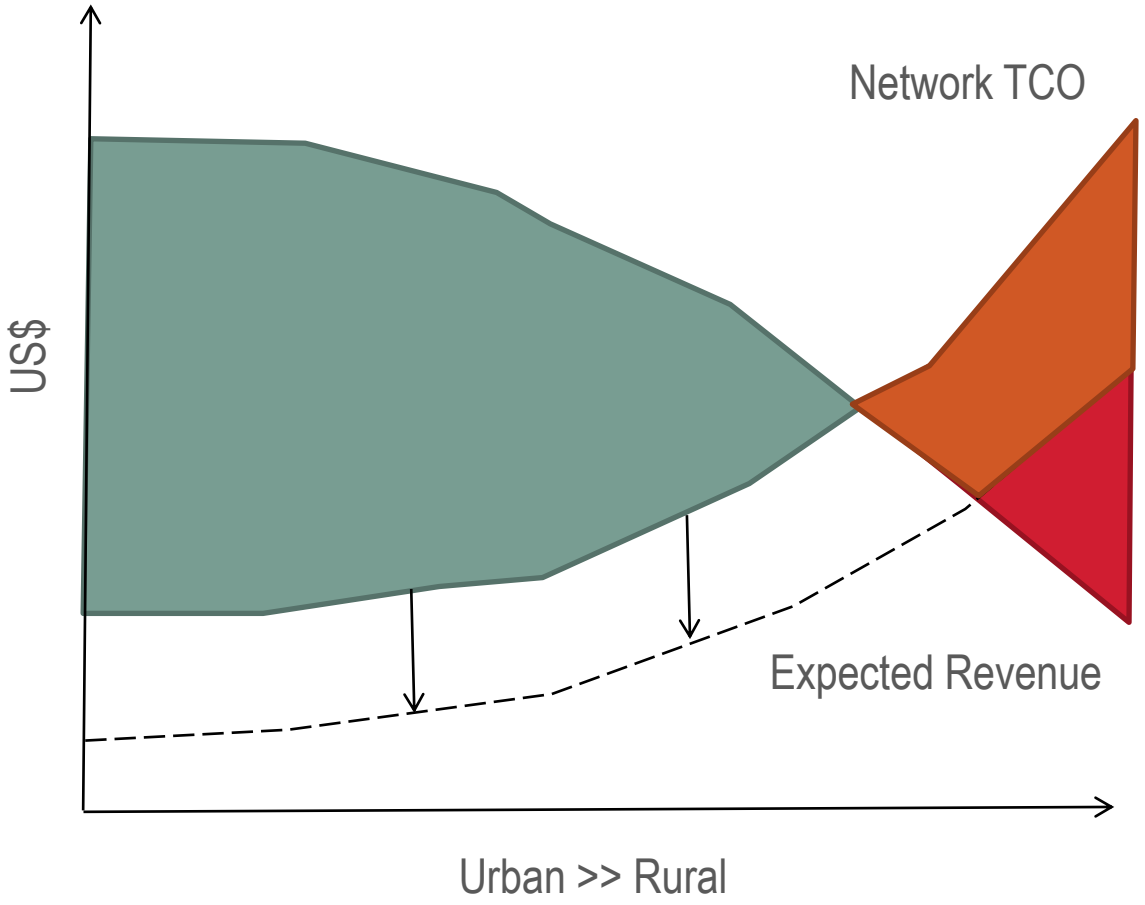
The Rural Challenge: Unsustainable Business Model



- Rural regions have high network TCO and low population density
- Some regions do not provide financial returns to justify building cell towers
- MNOs can reduce TCO to improve financial returns

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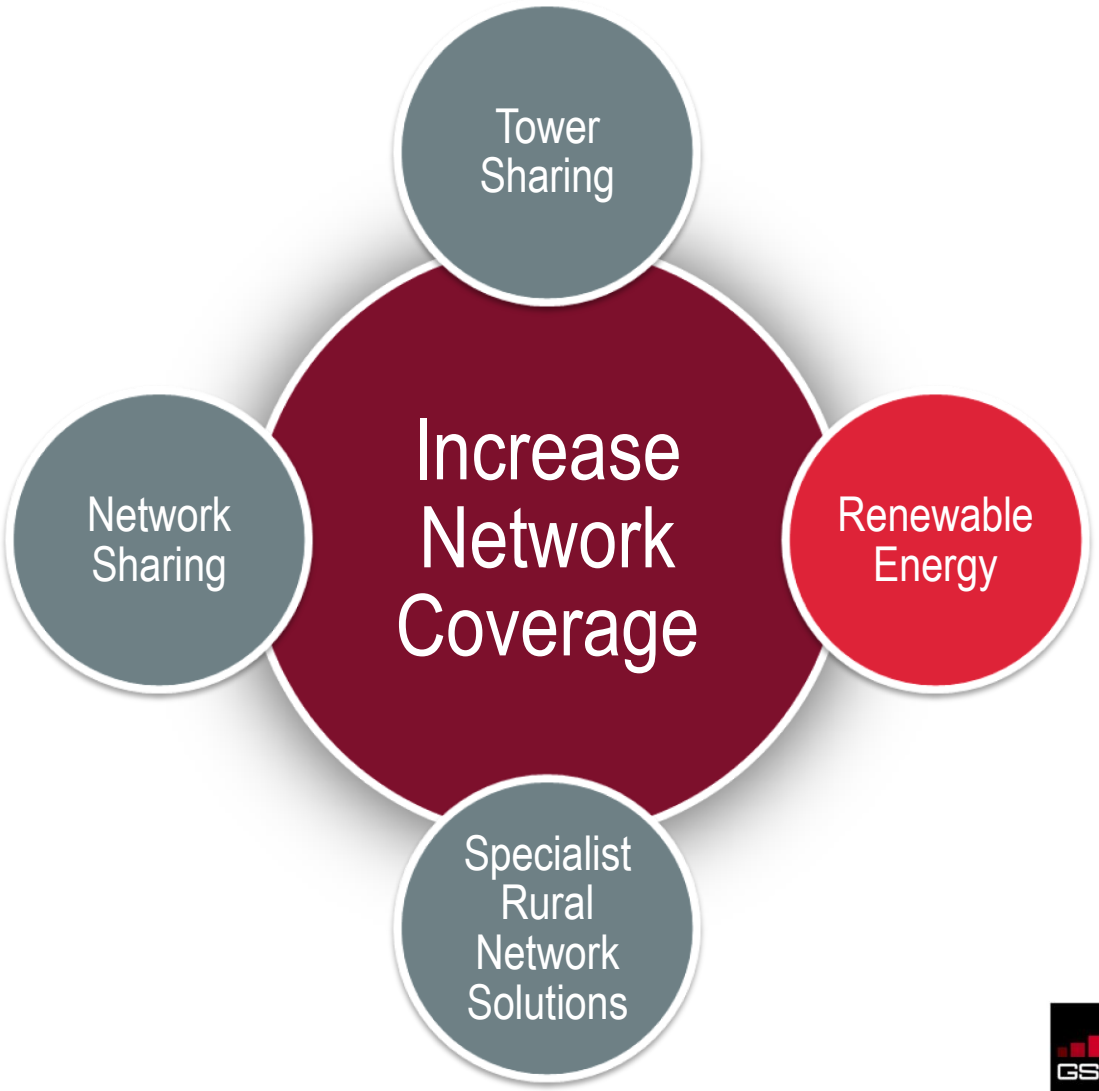
Options to Increase Network Coverage



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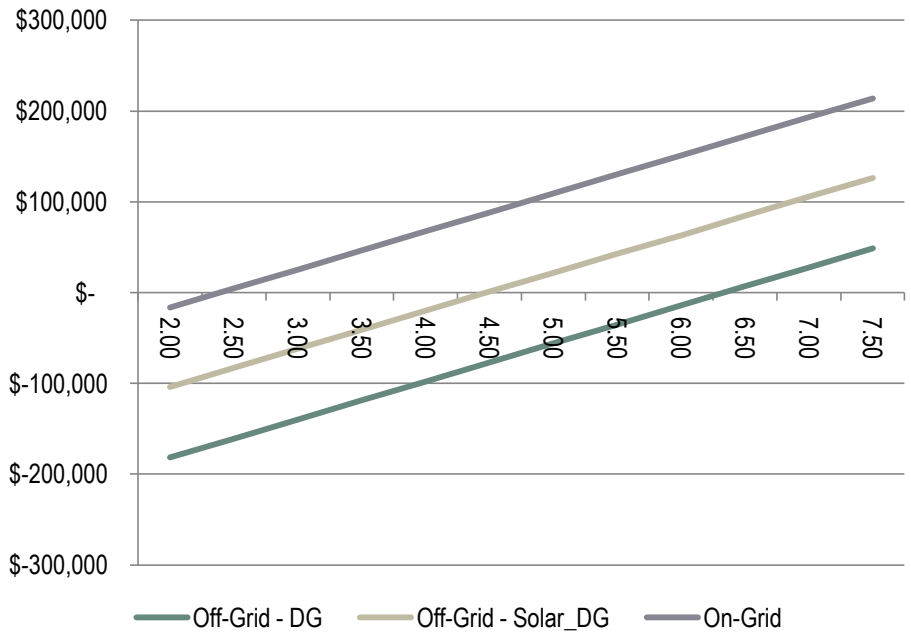
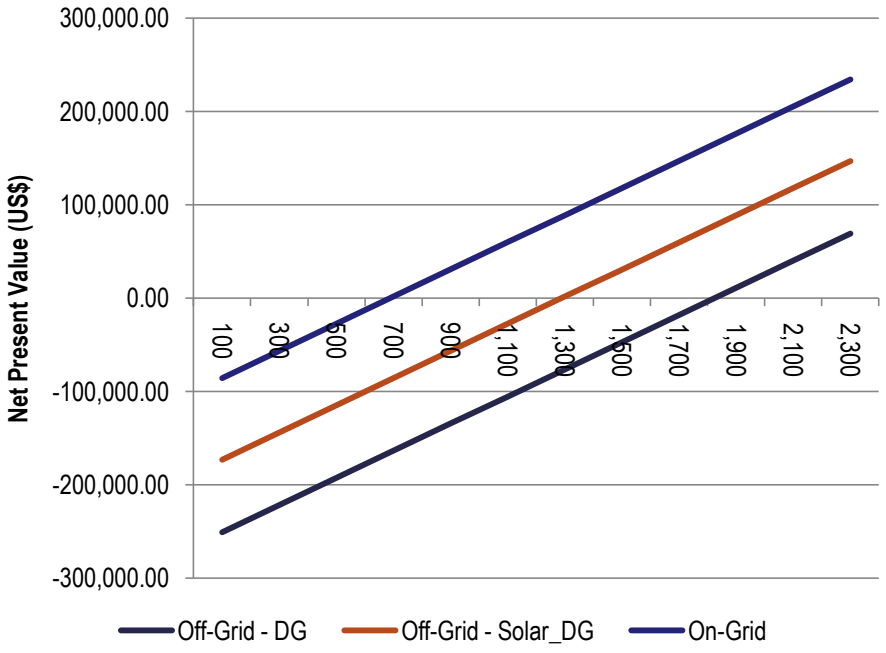
Example Business Case for Renewable Energy Network

- Optimising network operations, for example, using renewable energy reduces OPEX
- This allows financial returns at far lower expected ARPUs and subscriber levels
- This allows network expansion into rural regions





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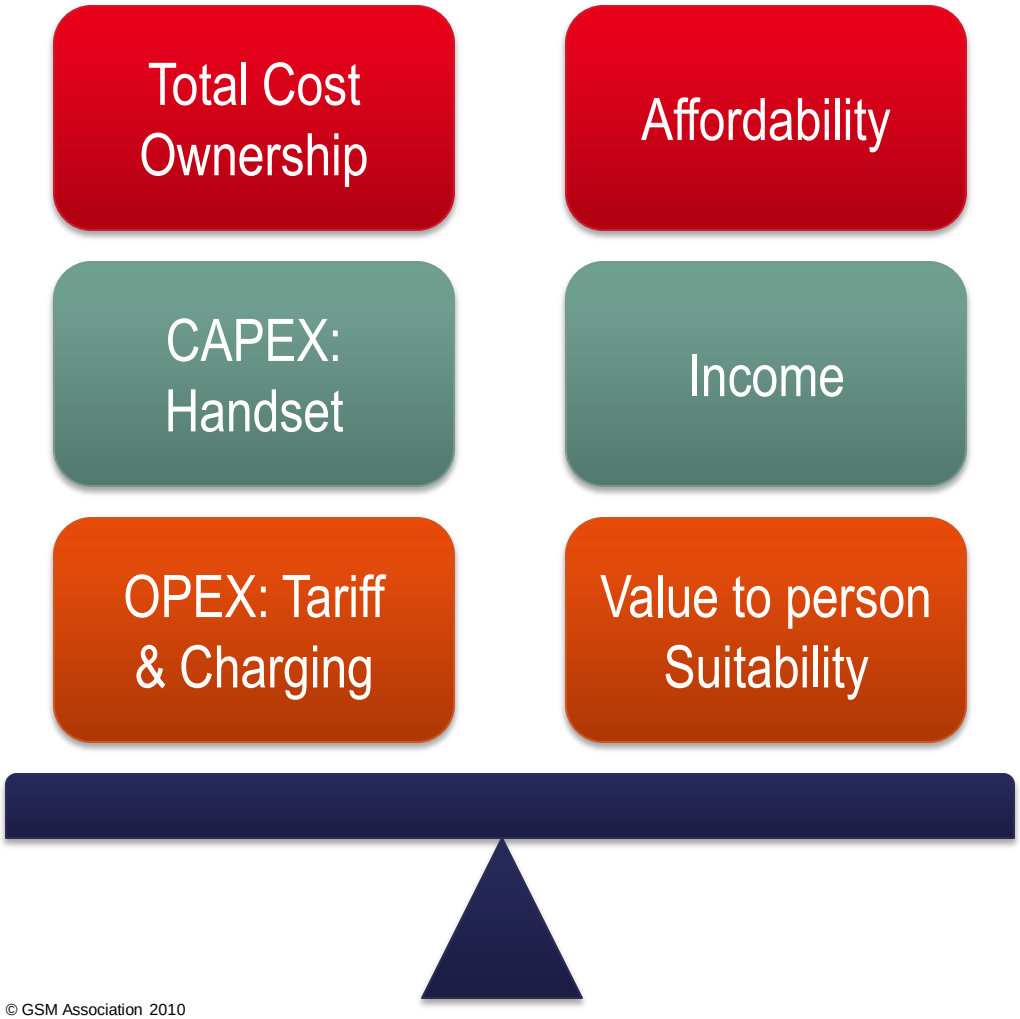
Penetration: The Consumer Decides



- Once network coverage is available a person will decide whether to purchase handset
- They will evaluate affordability against TCO
- If TCO is higher than affordability the purchase will not be made, penetration will not increase

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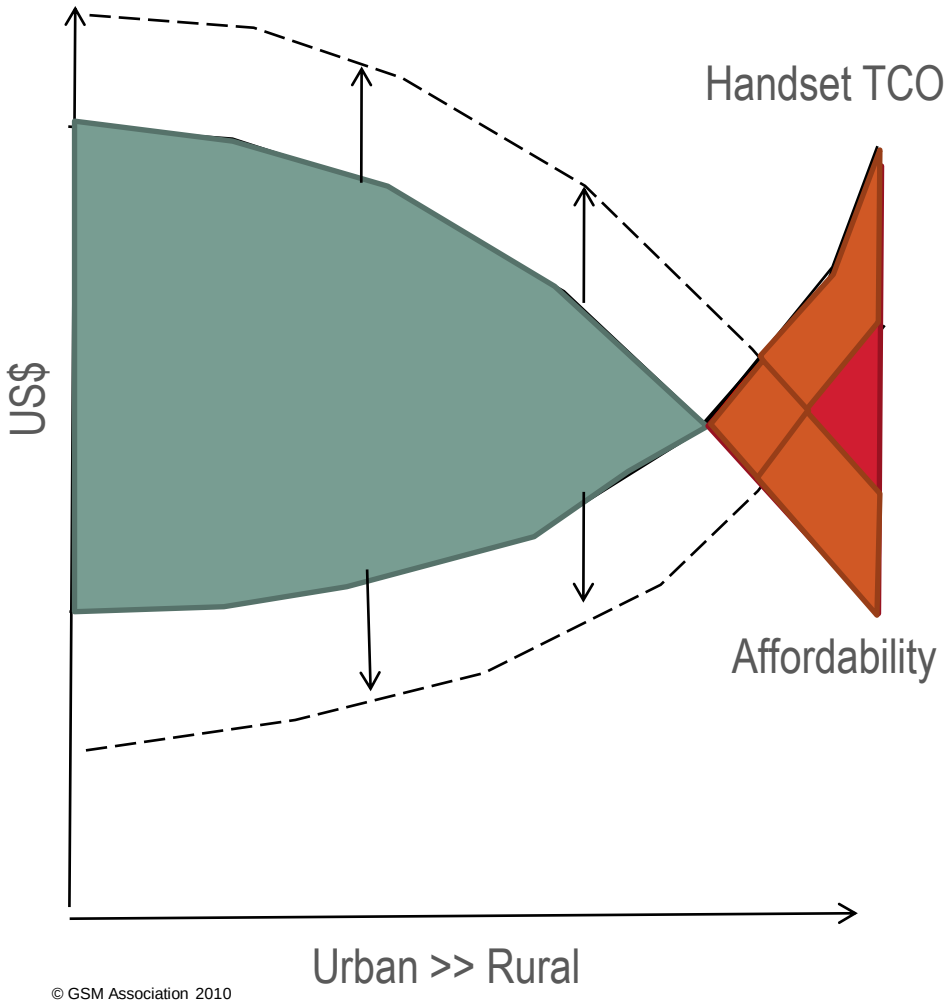
The Rural Challenge: High Handset TCO & Poor Affordability



- Rural regions have high handset TCO and affordability falls in rural regions
- Mobiles are unaffordable for a subset of rural population
- MNOs can reduce handset TCO and increase the value of ownership

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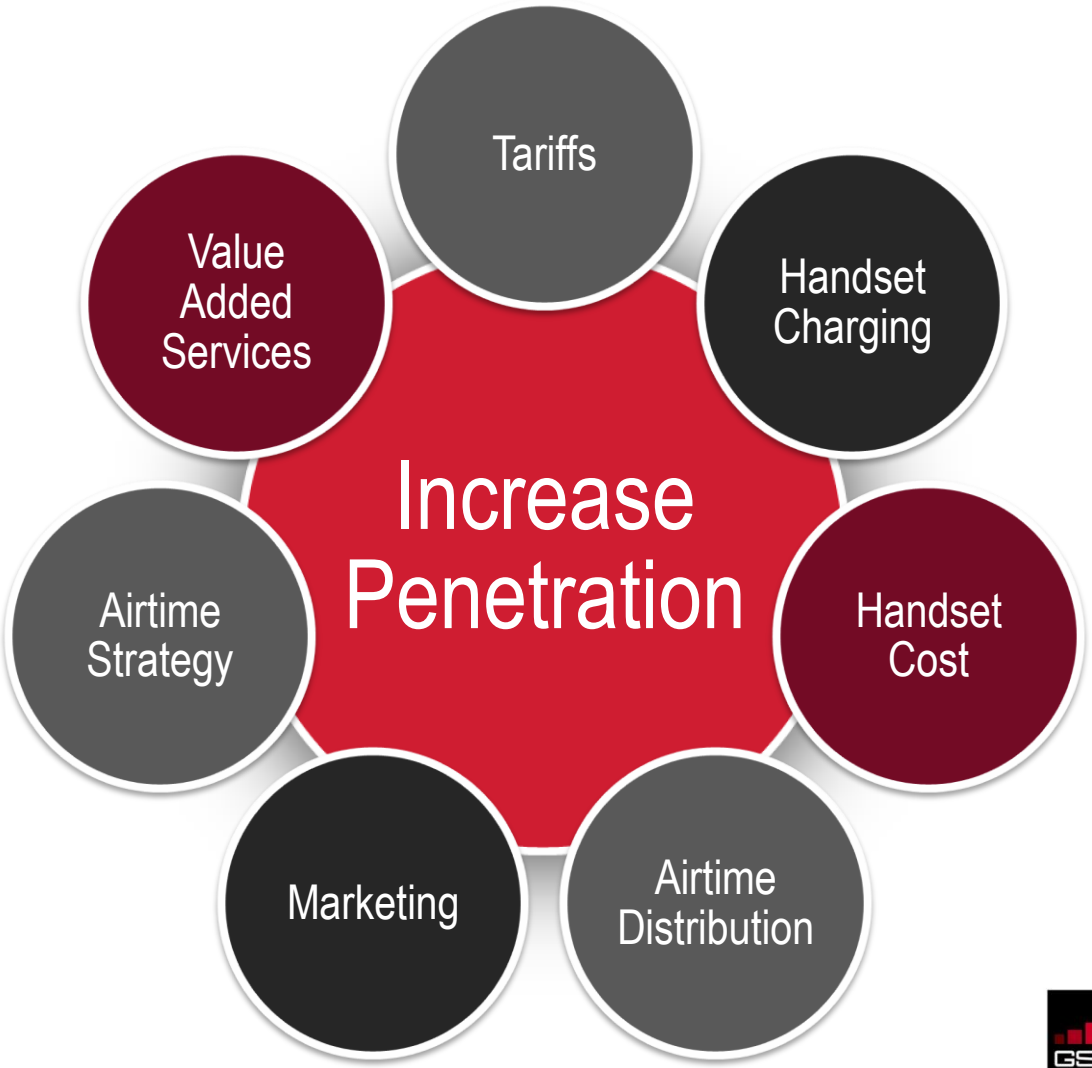
Options to Increase Mobile Penetration



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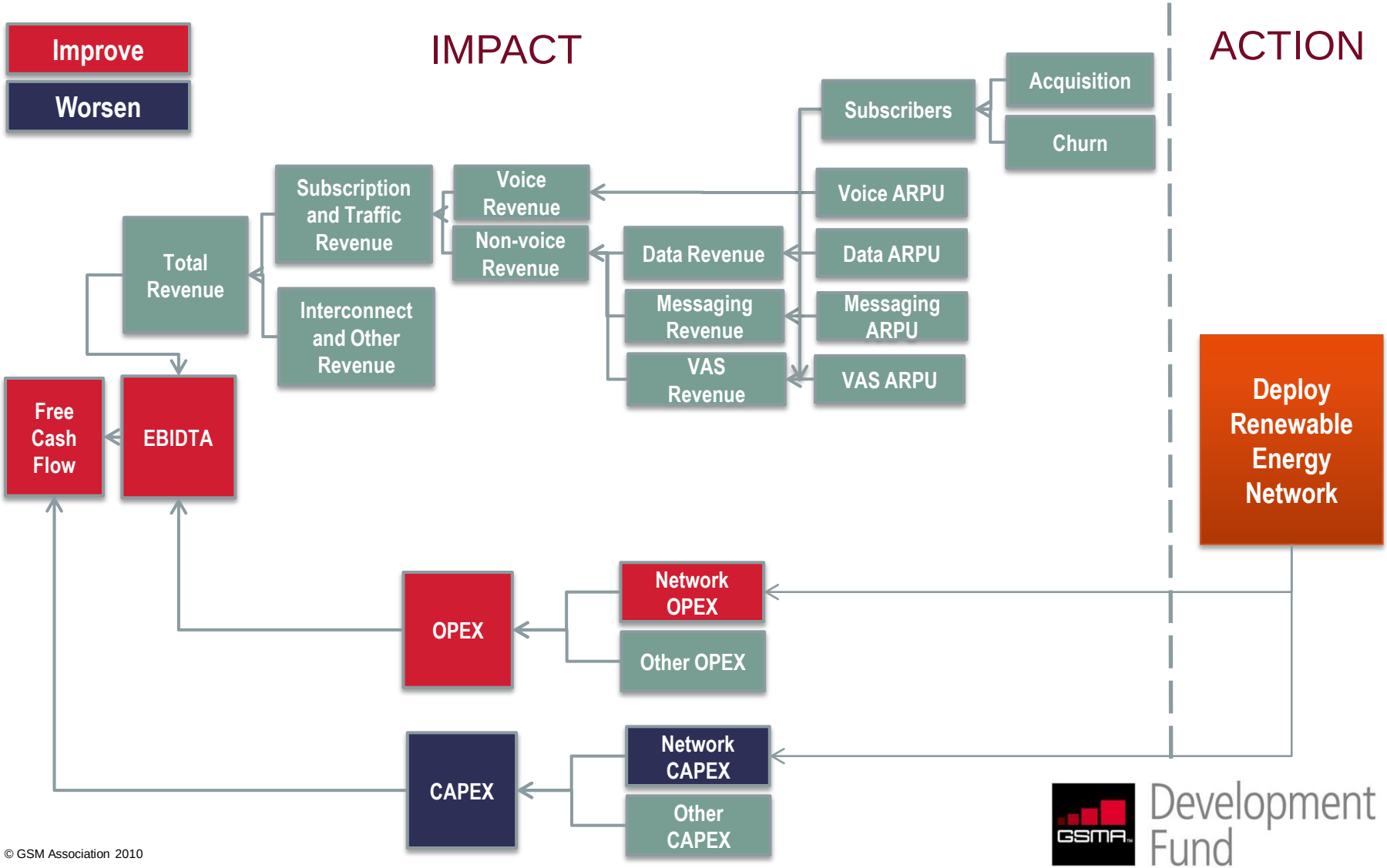
Profitability Driver Tree to Asses Operator Decisions



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Best Practice – Increasing Network Coverage

- **Network Sharing**

India has become a leader in sharing network infrastructure. As network costs typically represent between 15% and 25% of OPEX and 75% to 80% of CAPEX, the benefits of network sharing are obvious. Indus Tower, jointly-owned by Vodafone Essar, Bharti Airtel, and Idea, has approximately 90,000 sites, making it the largest tower company worldwide.

- **Renewable Energy**

Digicel Vanuatu deployed renewable energy to 30 of its network base stations, carrying up to 60% of Digicel's traffic. "By implementing alternative sources of energy, we are able to connect the unconnected, making communications accessible to many in Vanuatu for the first time," said Tanya Menzies, CEO of Digicel Vanuatu.

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Best Practice – Reducing Total Cost of Ownership

- **Handset Costs - Initial handset cost is the most commonly cited barrier**

Major vendors have decreased handset prices to US$15 and US$20 respectively

Reliance in India saw its net share of subscriber additions increase by 20% after it introduced a handset microfinance scheme. The handset, worth $120 can be bought for $10 upfront and $4 per month for 36 months.

- **Handset Charging - Unreliable electricity access affects rural mobile penetration**

Digicel distributed 350,000 solar handset chargers throughout Papau New Guinea, Vanautu, Haiti and several other markets. Digicel tracked the mobile phone usage of subscribers before and after acquiring a solar charger. The introduction of alternative charging solutions resulted in an ARPU lift of between 13 and 15%.

- **Airtime Strategy - High airtime denomination increases TCO**

According to Nokia, customers are willing to spend 4 – 5% of income on mobile

In 2008 Vodacom South Africa introduced their lowest denomination airtime voucher from R12 (US $1.5) to R5 (US $0.60). The R5 vouchers had reached 34% of sales volumes and 12% of usage value by March 2009.

Best Practice – Developing Relevant Value Added Services

Provide a range of services targeted to the needs of the rural market – making mobile more of an investment than an expenditure

- **Agricultural related VAS**

Bharti Airtel in India have launched a "Green" SIM card targeted at the agricultural sector. The Green SIM delivers free daily agri-information voice messages and provides access to a helpline. The SIM is used to differentiate Bharti from competitors; increase customer loyalty and help penetrate into deep rural areas. 1Million customers use the service.

- **mFinancial VAS**

Safaricom in Kenya launched mPesa in 2007 – the majority of transactions are sent from urban to rural. Since then more targeted services for the rural market have been launched including an agri micro-insurance product.

- **Information VAS**

CellBazaar - Grameenphone, Bangladesh: A trading service with 4 Million active customers – the majority rural

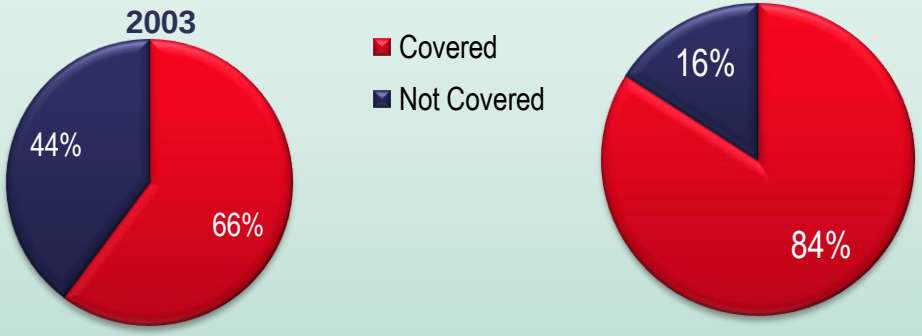
- Nokia Life Tools: 2 Million active users in India: ~40% agriculture, 40% education, 20% entertainment. Average income $100-$120 per month – payment for the service is deducted [illegible] days to suit the low mobile wallet of the BOP.

Appendix

The Barrier – Is it a coverage or penetration issue?

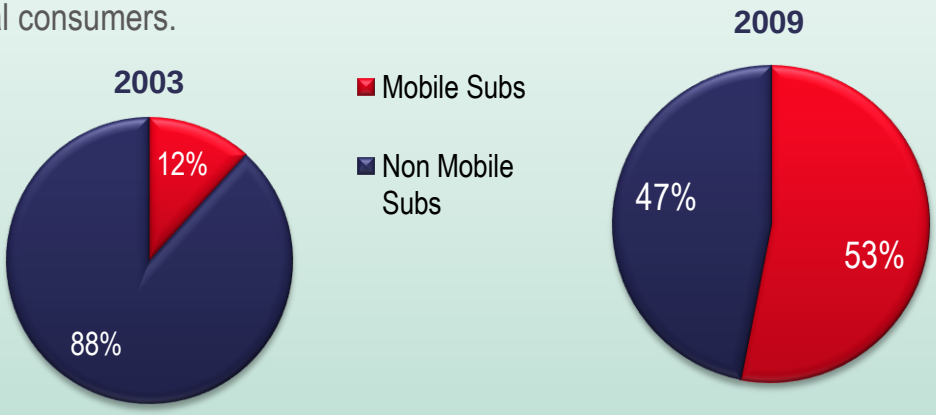
Coverage: relates primarily to the difficulties of reaching rural and geographically isolated consumers – as ARPUs fall in the face of increasing CAPEX, OPEX and distribution/marketing costs, the profitability of these consumers can become marginal or unviable, making it difficult for mobile operators to increase network coverage in rural and remote regions.

Percentage of the population in developing countries covered by a mobile cellular signal

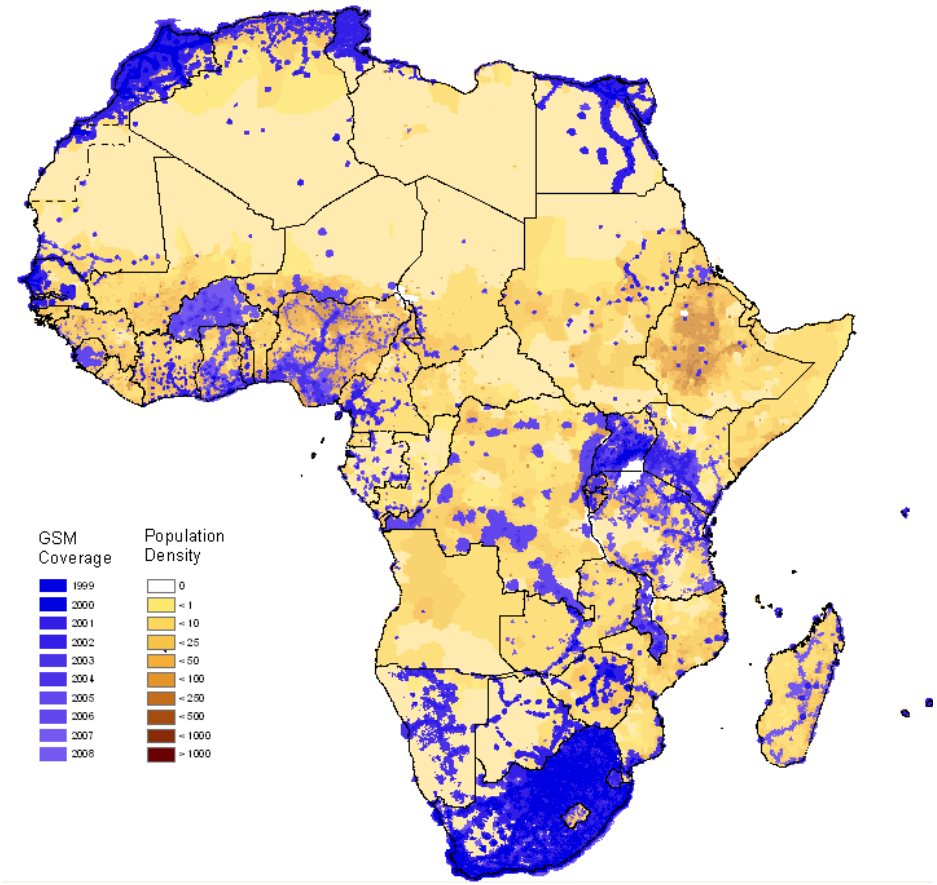


Penetration: relates primarily to the historically high-cost of total mobile ownership in relation to income, low population density and remoteness, low levels of functional literacy, low disposable income, lack of electricity, poor health and living conditions, and the challenges of providing content of value to low-income rural consumers.

Percentage of the population in developing countries having a mobile subscription



GIS Methodology



What are the key factors explaining lack of traction of mobile markets

- Is it a coverage issue?
- Is it an economical issue?

Geographic Information System (GIS) Method:

This method allows to have a visual overview and a data of the rural/urban coverage (population and area) divide

Two sets of maps are processed using the GIS methodology: coverage maps and population distribution.

The map layer for population density contains millions of pixels, with each individual pixel assigned a value representing the number of people per square kilometre.

The layer defining the GSM signal coverage is superimposed over the population density to have a correlation between population density and coverage for each pixel.

Population coverage and area coverage data for 140 countries

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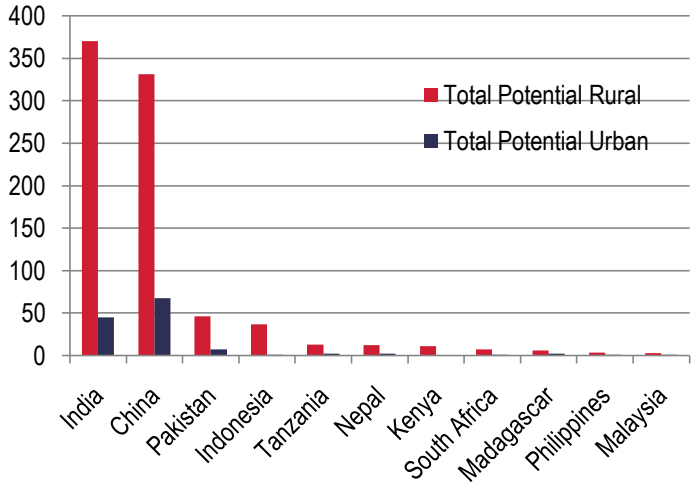
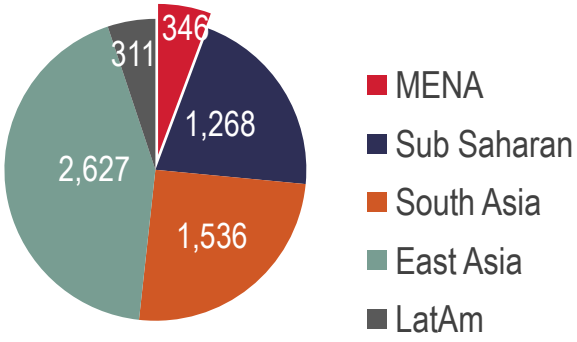
The Rural Population: An Untapped Market

Number of untapped subscribers rural/urban (in Million)



Incremental Revenues from Rural Subscribers by Region (in Million USD))



1.13 billion people between the ages of 14 and 65 living in rural regions covered by GSM are **not connected**

South Asia and Sub Saharan countries are the most significant **untapped** markets, in which people could access mobile services (they live in a GSM covered area) but don't own a phone.

Based on the average ARPU for rural regions per country, GSMA estimates incremental revenue for operators amounts to **US $73 Billion per year**

1 Rural potential subscribers aged between 14-74

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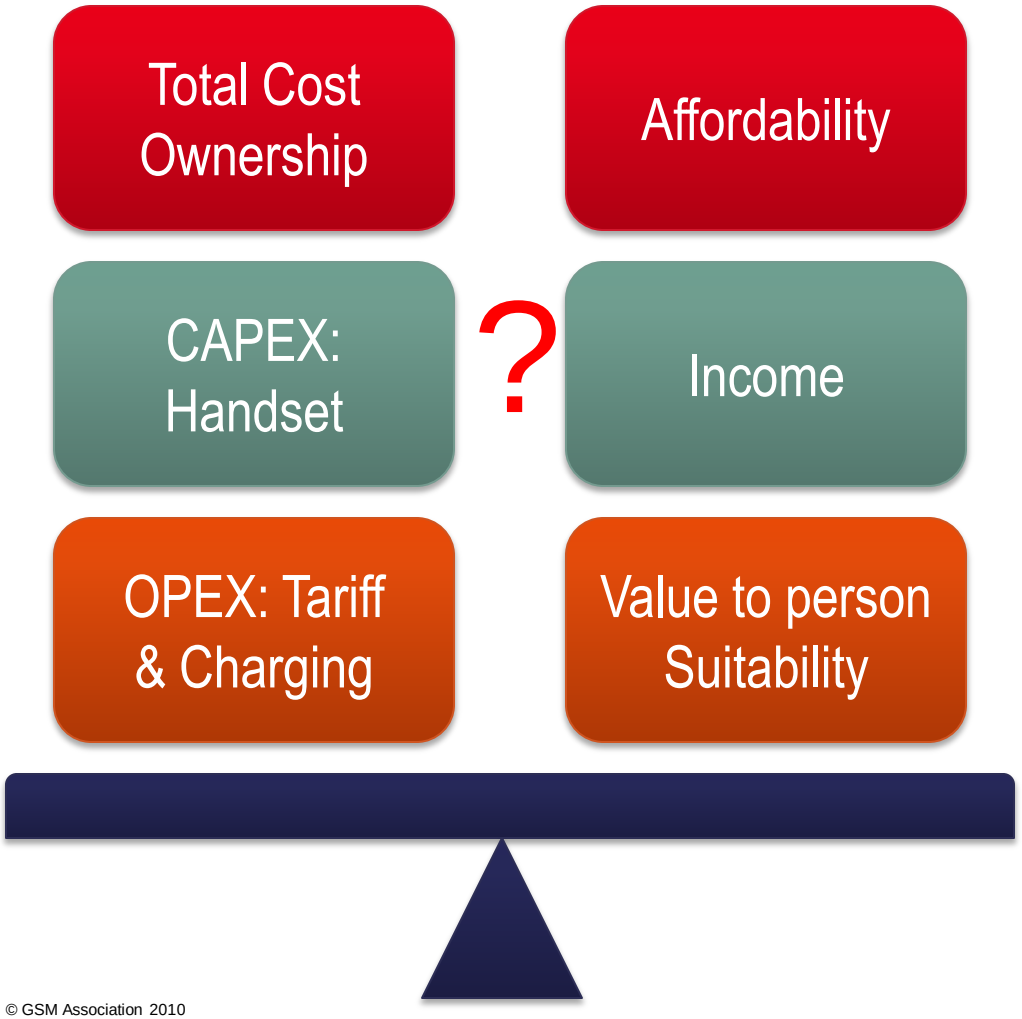
Existing data on the relationship between TCO and affordability is inconsistent



- Relationship between TCO and affordability is poorly understood
- Inconsistent data on the proportion of income spent on mobile
- Understanding the relationship between TCO and affordability is a major gap in industry knowledge to address the rural market

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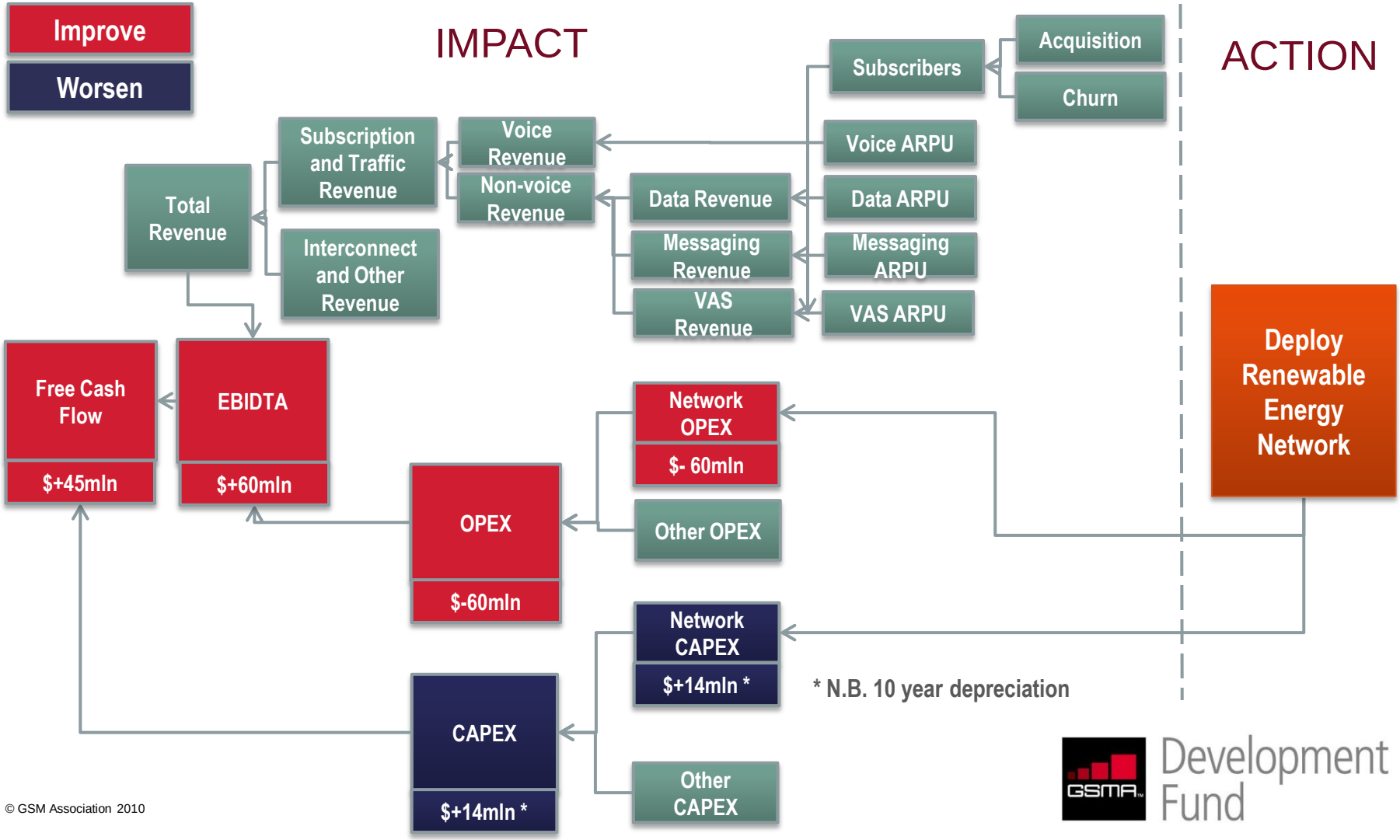
Example: Convert Off-grid diesel sites to solar for Grameenphone



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