greenfield

Cebu 2010

Operator Case Study





creating a cleaner future

introduction

the opportunity

greenfield communications

case study: Cambodia

lessons learned

introduction

hello

chao

namaskar

welcomen

bonjour

nii how

habari bwana

selamat

buenos dias

Ian Watson

CEO

Greenfield Communications Co. Ltd.

sources: Gartner and ABI Research



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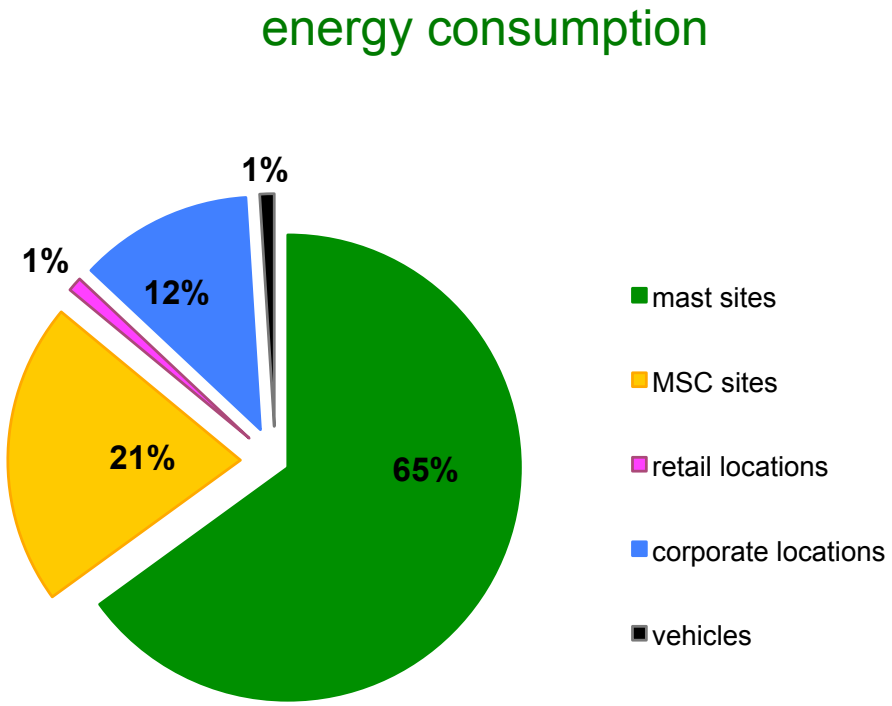
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lessons learned

network power challenges

- some operators state that power is 50% of their OPEX
- power is a top 3 OPEX item for most operators globally, and frequently the top item for many African and South East Asian operators
- frequently over 80% of mobile telecoms energy is used to run the network
- this has previously been a "forgotten" area and ineffectively managed

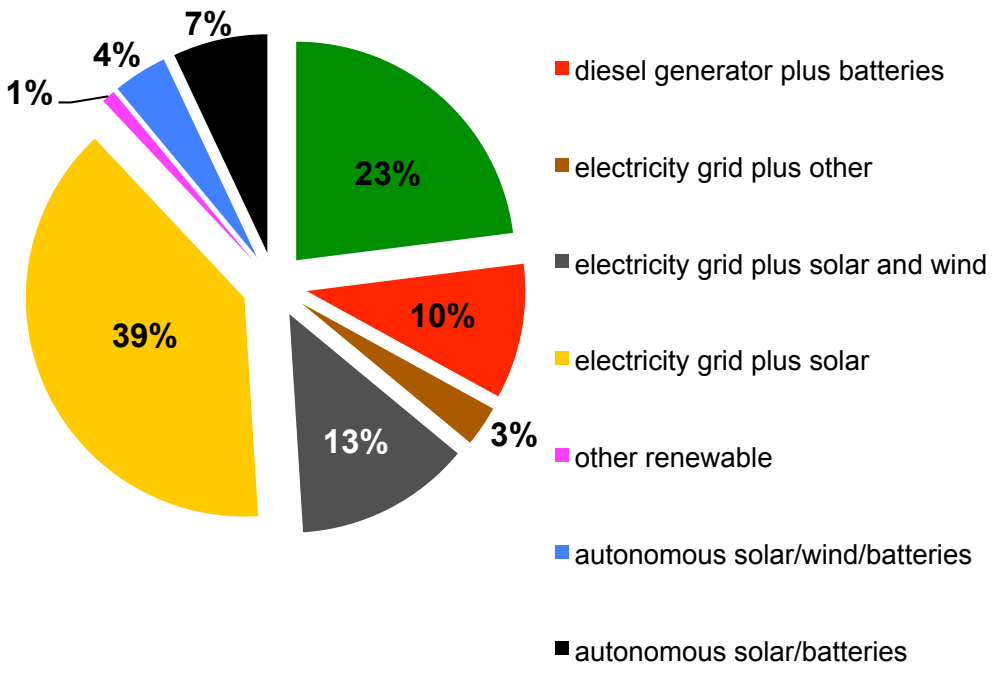


sources: Gartner and ABI Research

forecast network expansion

- by 2013 there will be nearly 2 billion new mobile subscribers, with 95% in emerging markets
- 800,000 BTS will not be connected to reliable power
- over 400,000 will be suitable to be powered by some form of renewable energy
- over 50% of the total new BTS required will be off-grid
- “green" equipment will represent over 40% of the forecast global telecom infrastructure market

forecast BTS power solutions



sources: ABI Research, Pike Research

high OPEX contributors

- volatile oil prices
  - $147 (July 08), $50 (Feb 09), $70 (Jun 09), $75 (Sept 10)

(http://www.digitallook.com)

- generator wear and tear
  - Substantially reduced life hour (poor maintenance, poor quality fuel)

(African operator)

- High maintenance costs of generators

- hidden cost of diesel
  - up to 20% theft en route

(African operator)

the true cost of diesel

- pump price alone is not a true indicator of diesel cost
- cost of diesel delivered to site includes:
  - transportation to remote or inaccessible sites
  - contamination leading to generator damage
  - theft en route and at site
  - generator rebuilds from contamination often lead to lower service life.
- environmentally unfriendly
- defeats other investment into C.S.R. programmes



benefits of solar hybrid

- energy independence
- main energy source is already delivered free to site
- minimal maintenance
- maximum reliability
- generate the energy you need where you need it
- minimise power loss risks
- substantially reduce operator dependency on diesel fuels
- rural sites are no longer dependent upon unreliable and expensive power infrastructure
- **reduced carbon emissions**
  - the GPM programme has set the goal of helping the mobile industry use renewable energy sources to power 118,000 new and existing off-grid base stations in developing countries by 2012
  - they are targeting savings up to 2.5 billion litres of diesel per annum and carbon emission reductions by up to 6.8m tonnes

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lessons learned

greenfield communications

- established in 2007
- Leading provider of bespoke solar solutions into the network operator environment for off- grid , remote sites in cambodia
  - offers environmentally responsible, practical and cost effective solutions
  - tailored to meet operators' specific requirements
  - Proven legacy of the design, supply and installation of hybrid sites into tough working environment
  - **2 years KPI on all elements of the Apollo solution into client /operator environment**
- constantly researching new and developing technologies to provide even more efficient solutions as part of ongoing evolution of green technologies

Greenfield communications

- Greenfield are recognised as one of the leading providers of hybrid systems in Cambodia offering a full range of services incorporating the design, build, installation and operation of solar hybrid technology.
- Greenfield provide a full turnkey managed service program for operators including packages for vendor finance.
- Our unique finance program allows operators to obtain immediate savings from capital and operational budgets from the Apollo build, operate and transfer concept .
- Greenfield has partner programs with financial institutions to assist clients with carbon credit trading

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lessons learned

country information



- 15.5M people
  - Phnom Penh 1.4M
  - Siem Reap 650K
  - Battambang 250K
  - Sihanoukville 25K
- large rural and transient population
- outside of the major urban developments Cambodia has no reliable power infrastructure
- where commercial power supply is available it is normally unreliable and intermittent
- Power is also expensive , 22 us cents per KWH in cities , in remote towns 50 us cents per KWH

operator case study

- leading operator in country
- nationwide coverage both urban and rural
- our client has over 1,800 BTS locations nationwide
- over 850 of client sites are depend ant upon solar hybrid power
  - Greenfield were the sole supplier for the build and development of solar hybrid sites for the last 3 years
  - greenfield have supplied over 30% of total sites and are currently the preferred supplier for client solar hybrid sites



off grid base stations





location is no longer a problem









savings

- before - dual diesel generator:
  - capital investment around USD 15,000-20,000
  - increasing annual fuel costs
  - high annual maintenance costs

- after - complete solar hybrid system:
  - capital investment: $40,000 for complete solution, $33,000 for solar components
  - Competitive volume discounts structure for operators.
  - annual fuel costs reduced by up to 80%
  - annual maintenance costs reduced by up to 70%
  - operator ROI in 2 years (compared against a dual diesel generator site)

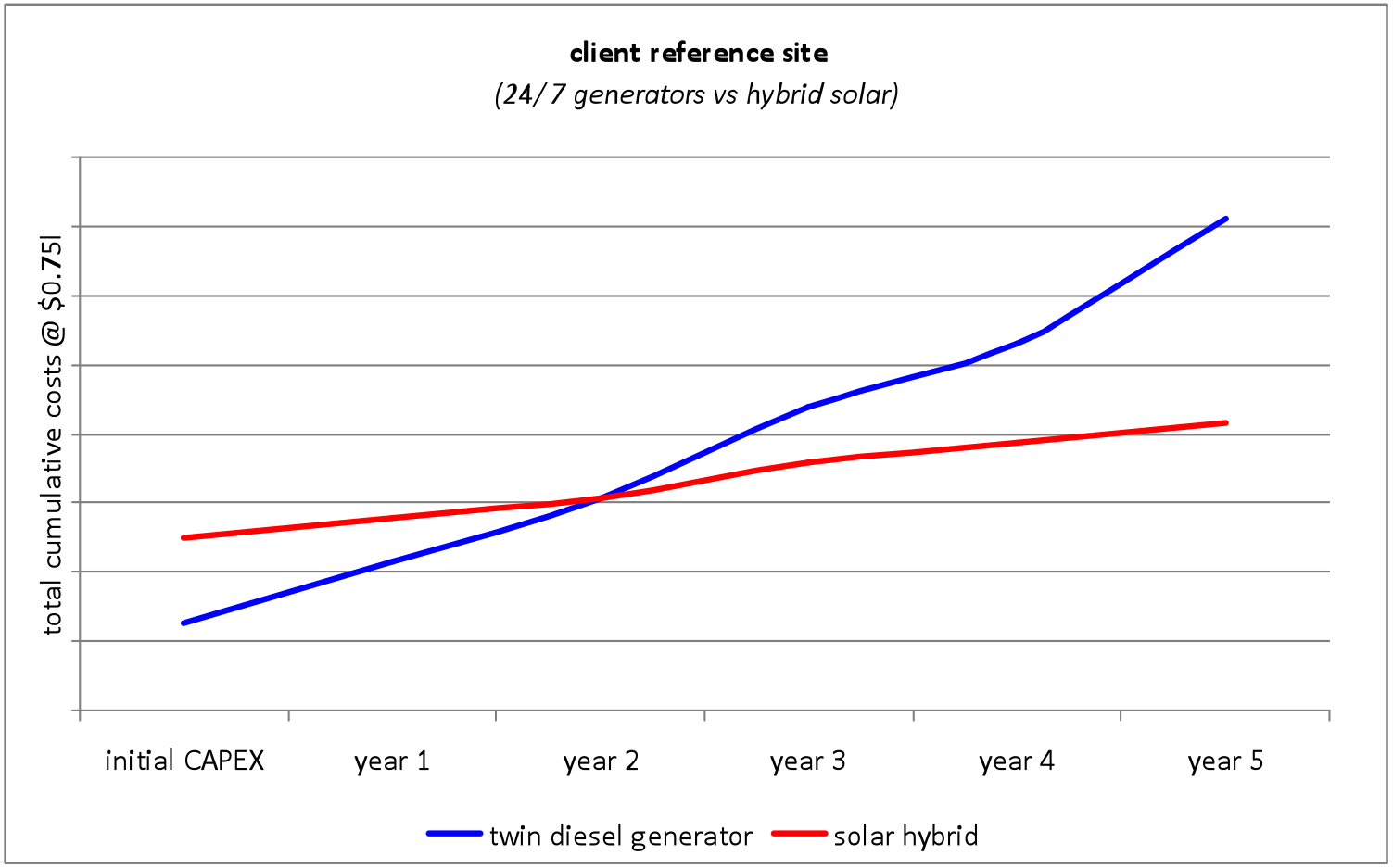
OPEX

- maintenance and fuel information
  - hybrid solar site
    - 2-3 month maintenance cycle
  - dual generator site
    - 3 week maintenance cycle
- maintenance costs reductions of up to 70%
- reduction of up to 80% in fuel costs

all calculations are benchmarked against dual generator solutions running 24/7 with fuel priced at $0.75 delivered to site



cost effectiveness



operational data



- solar information
  - average footprint 22m^2
  - Up to 24 panels a site
    - 20 year limited operational warranty on panels.
  - 2 days autonomy
  - 3.1 KW load produced energy

operational data

- generator information
  - 8KvA capacity
  - runs @ 1500rpm (+/-5%)
  - 75-80% utilisation load
  - Approx 2lhr consumption
  - average run time of less than 3 hours a day
  - 2-3 months maintenance cycle
  - bio-fuel capable
    (4% power reduction and dependent upon fuel quality)



operational data

- battery information
  - VRLA (valve regulated lead acid)
  - selected batteries conform to the specifications of:
    - IEC/EN 60896-2
    - BS6290 part IV
    - IE118 and IEE119
    - EUROBATGuide 1999 - classified as “Long Life”
  - manufactured under quality and environmental controls conform to the requirements of both ISO9001:2000 and ISO14001:1996



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lessons learned

Installation issues

- site access and road conditions
- Specialist site clearance required in some areas
- Different and unconventional methods of product delivery to site .



lessons learned



- training and ongoing support to be more focussed and relevant (cultural issue)
- improved lightning protection for sites in areas prone to higher levels of incidence
- local presence and support is critical to ensure real time communications with client and operational team

summary

- fuel OPEX savings of up to 80%
- maintenance savings of up to 70%
- payback is approx 2 years
- long life solution
  - solar panels guaranteed for up to 20 years
- operational availability in excess of 99.7%



thank you

enquires@greenfield-communications.com

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