



***Global Green Telecom Summit***

***Investigating the Reliability, Cost and Environmental Benefits of Alternative Energy Sources***



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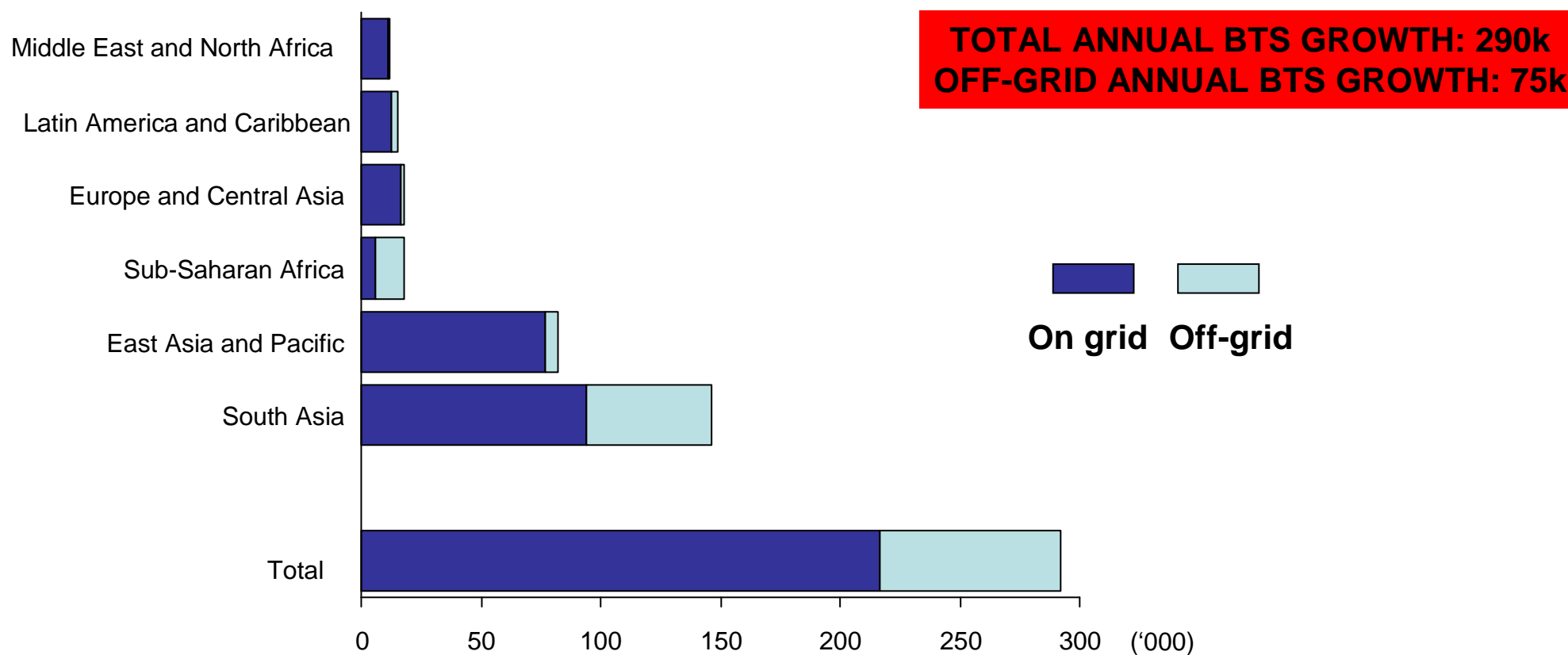
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## *Clean technology in mobile telecoms networks*

- Many new base stations, particularly in developing nations, will not be able to connect to a reliable electricity grid
  
- Currently diesel generators are the predominant off-grid power source, however
  - Costly to run
  - Require regular fuel distribution and maintenance
  - Environmentally unfriendly

# Rapid expansion in subscriber numbers driven by increased coverage in rural areas

## ANNUAL GROWTH IN BTS IN DEVELOPING REGIONS 2007-'12

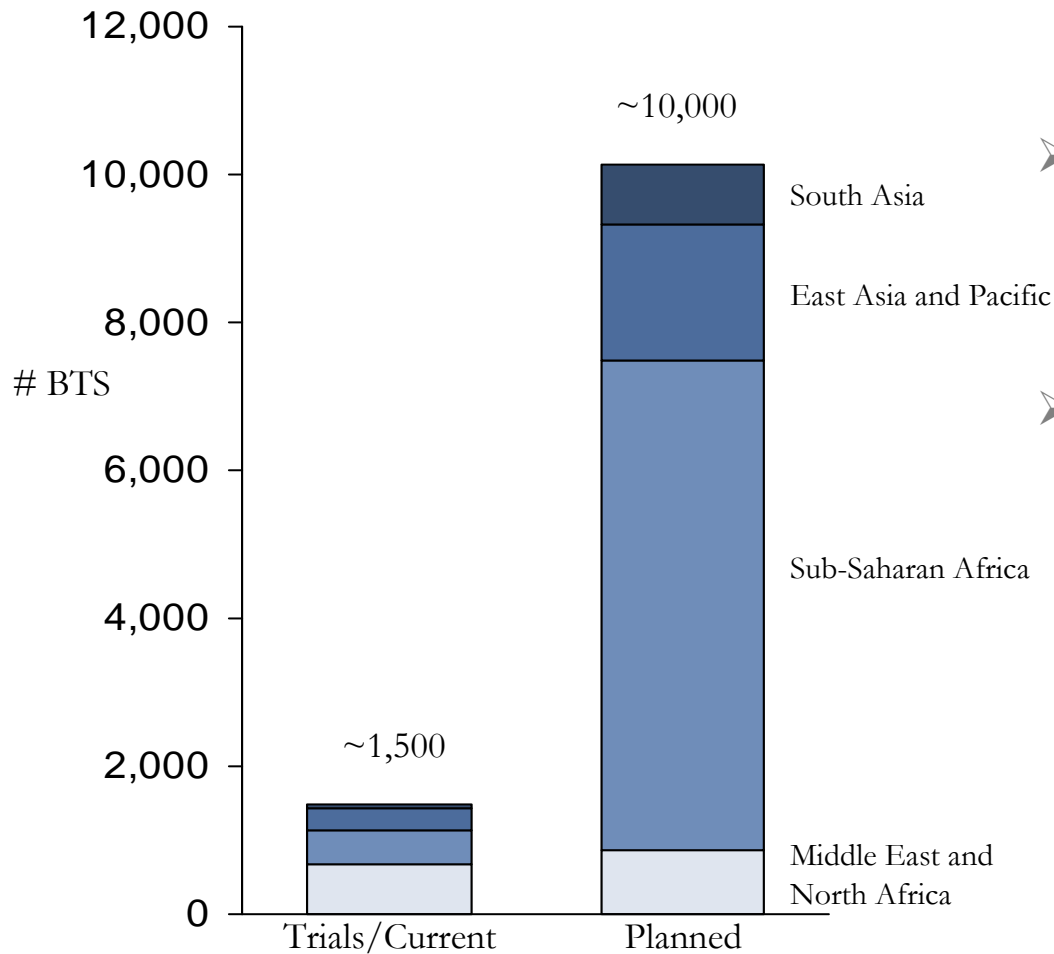


Source: Cairneagle analysis, GSMA



## Implementation – Existing Planned Growth

### CURRENT AND PLANNED GREEN POWER BTS



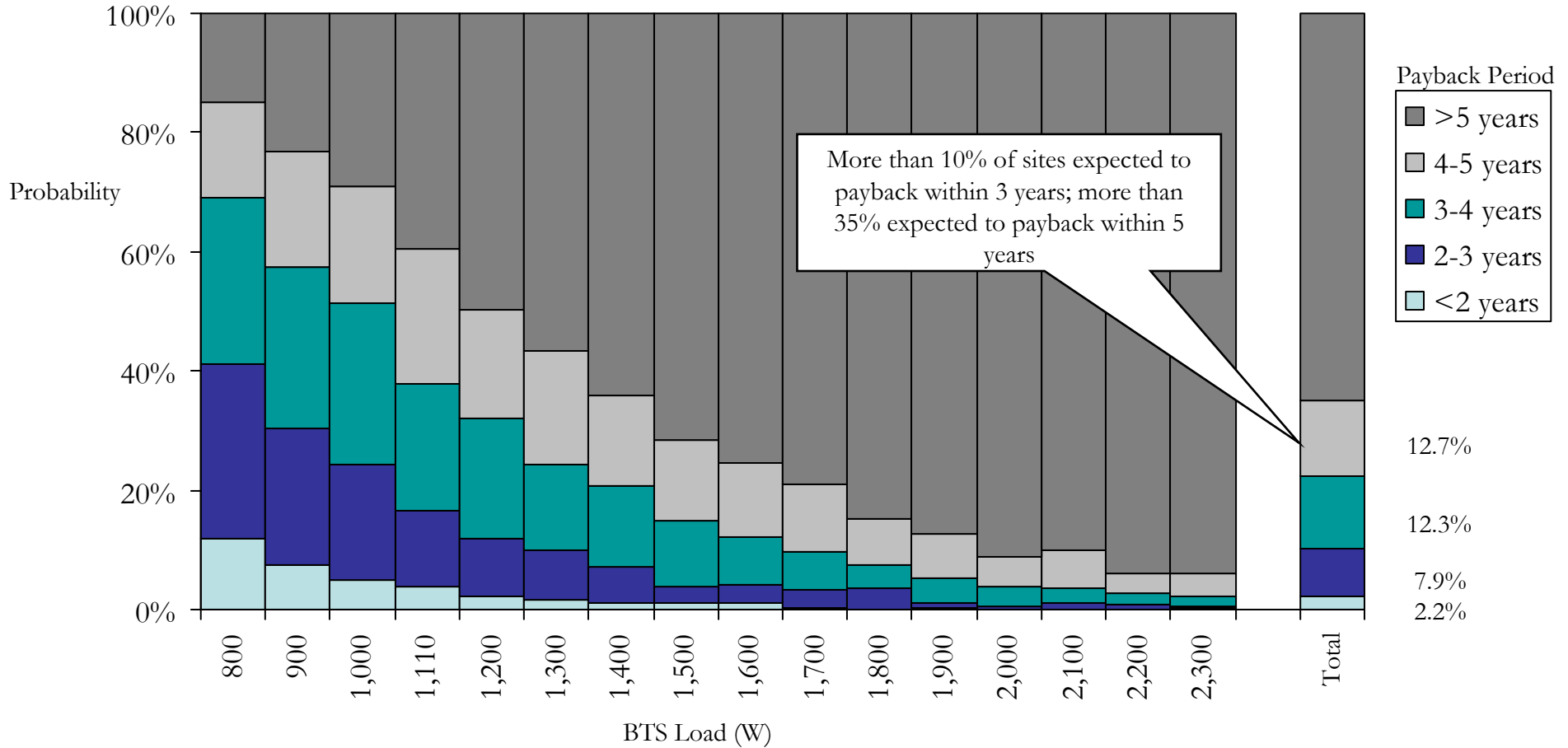
➤ Operators in developing countries are already planning to scale green power deployments

➤ Based on interviews with operators

- Not a comprehensive dataset
- Anticipated and extrapolated future deployments up to 2012

**Running the economic model shows that as load increases, the chance of achieving an acceptable payback diminish rapidly**

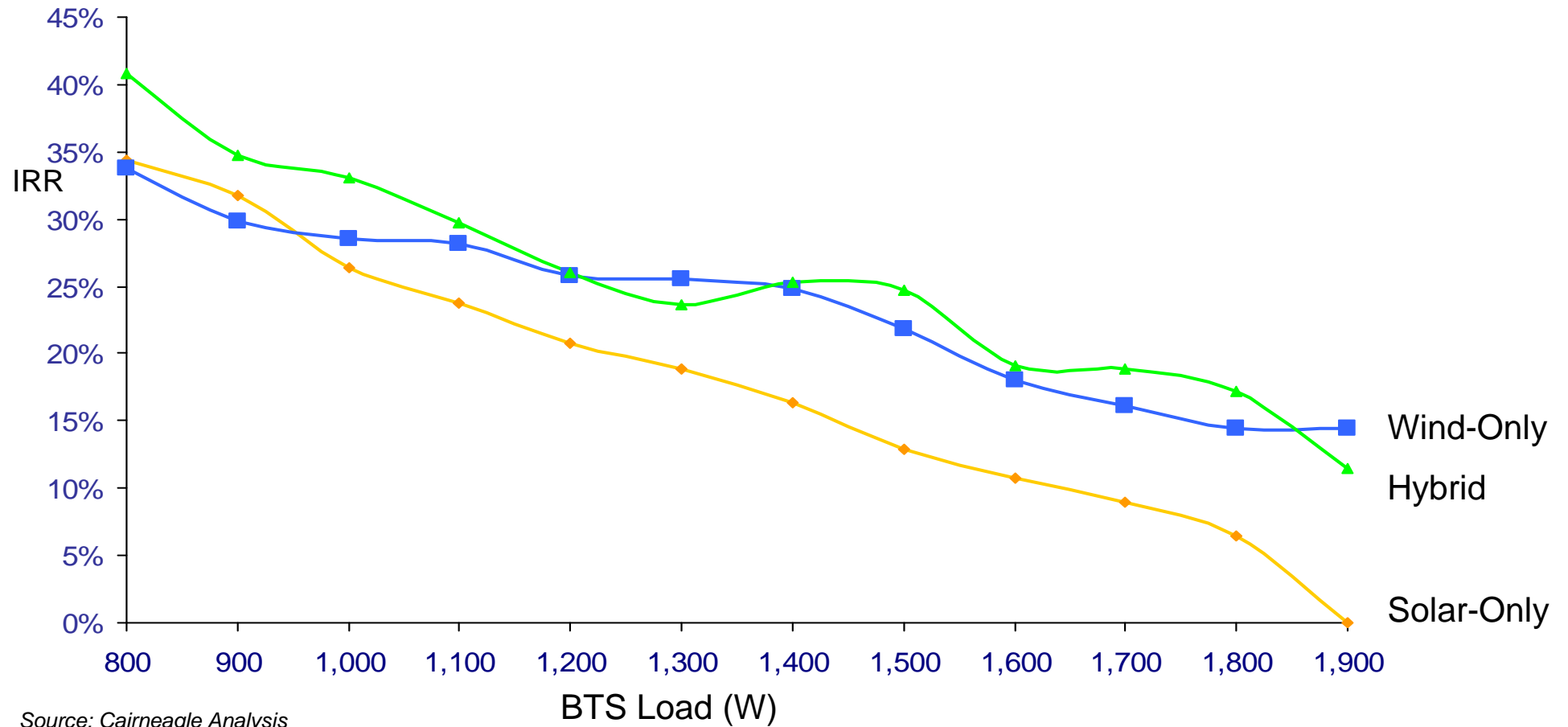
DISTRIBUTION OF BTS-LOAD



Source: Cairneagle analysis

## Economic Summary by Technology Type

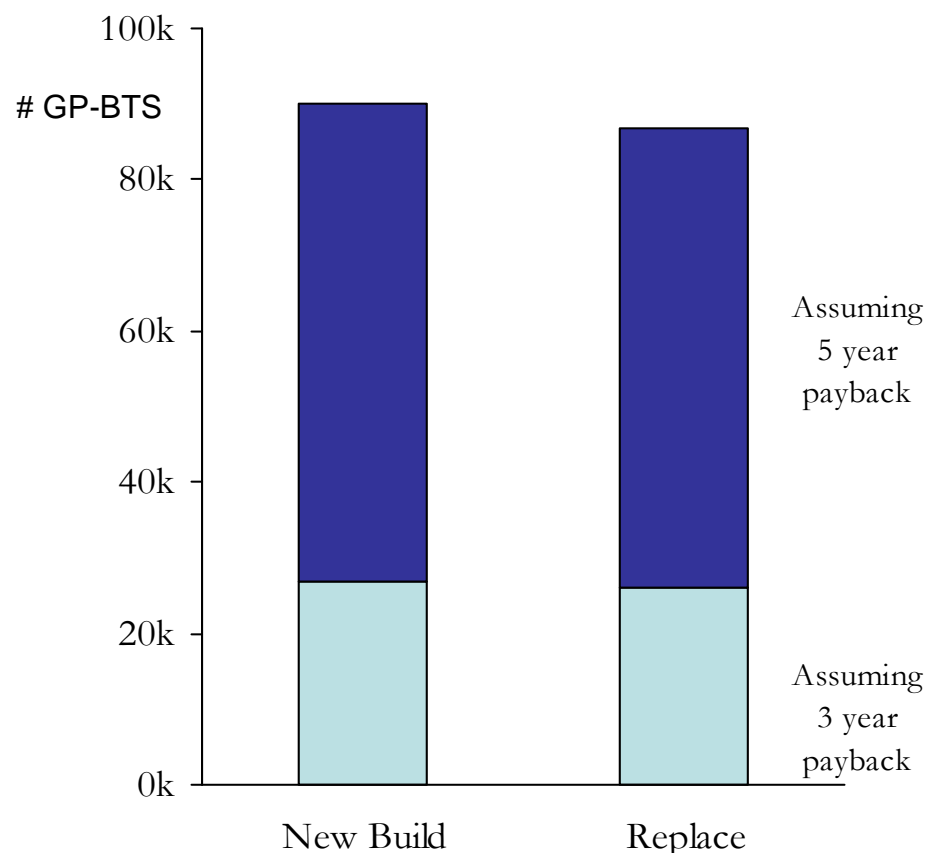
### LOAD EFFECT ON IRR BY TECHNOLOGY



Source: Cairneagle Analysis

**Depending on the financial payback that operators require, the number of green power BTS could reach almost 200k by 2012**

**POTENTIAL OFF-GRID GREEN POWER BTS IN DEVELOPING COUNTRIES BY 2012**



	3 year Payback	5 year Payback
% off-grid BTS sites viable for green energy*	9%	30%
# green BTS by 2012	53k	176k
Reduced diesel consumption / yr	1.1bn ltrs	3.5bn ltrs
Fuel savings / yr	\$1.3bn	\$4.2bn
CO <sub>2</sub> emission reductions / yr	2.8m T CO <sub>2</sub>	9.6m T CO <sub>2</sub>

\* Note: Covers new build and replacements; off-grid only

Source: Interviews and Cairneagle Analysis using economic model and Monte Carlo analysis, GSMA

## ***Technology - Overview***

- **Diesel: costs increasing; distribution expensive for remote sites**
- **Wind: successful in certain locations, but need a secondary power source as back-up**
- **Solar solutions are being successfully deployed in many locations**
- **Proper site dimensioning and use of batteries are key to optimising both capital and operating costs**
- **Other solutions, such as hydro, fuel cells and biofuels, will remain niche**

## ***Some Issues***

- **What % of new and existing sites will be powered by renewable power?**
- **Will renewable energy compliment grid electricity powered base stations?**
- **What are the best technologies?**
  - **Different power requirements**
  - **Different weather conditions**
  - **Future technologies**
- **Operational issues: dimensioning, batteries, controller, diesel as back-up?**
- **Barriers to take-up: future proofing, theft, capex, lack of expertise and knowledge...**
- **Who are the best partners and suppliers?**
- **Carbon credits?**

## ***Green Power For Mobile***

- **The research was carried out for the GSM Association which represents the interests of the worldwide mobile communications industry**
- **The GSMA have launched a Green Power for Mobile initiative to drive the adoption of green power**
  - ***Aiding the mobile industry to deploy solar, wind, or sustainable biofuels technologies to 118,000 new and existing off-grid base stations in developing countries by 2012***
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