Green Power for Mobile
Carbon Credits Opportunity
November, 2008

GSMA Development Fund

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Executive Summary

- Carbon credits are earned by green projects in developing countries, paid by polluters and governments in developed countries
- Green power (solar and wind) for base stations is likely to qualify
- The process of registering projects for carbon credits is costly and complex and likely not worth it for one operator
- However the GSMA is interested to do this with a partner operator or two and potentially scale
- At commercial scale (~100 base stations) the carbon credit value to operators is €0.3-1mln (value dependant on base station load (kW))
- Carbon credit consultancies/brokers have been identified who would assist project implementation and credit sale

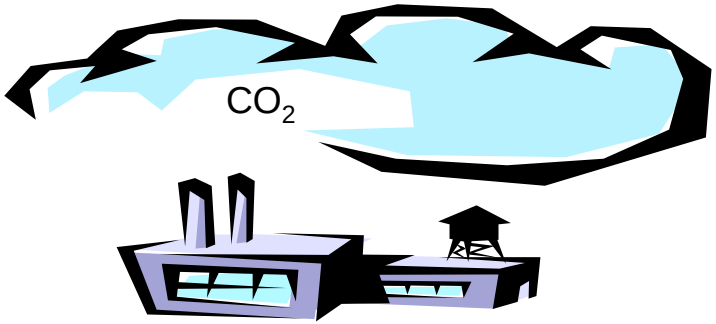
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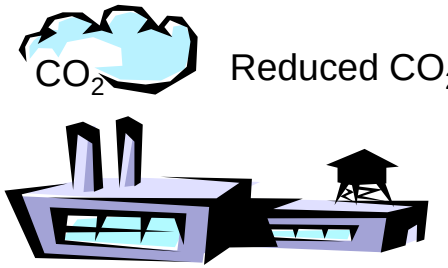
Carbon credits - how they work

SUPPLY

Before Abatement

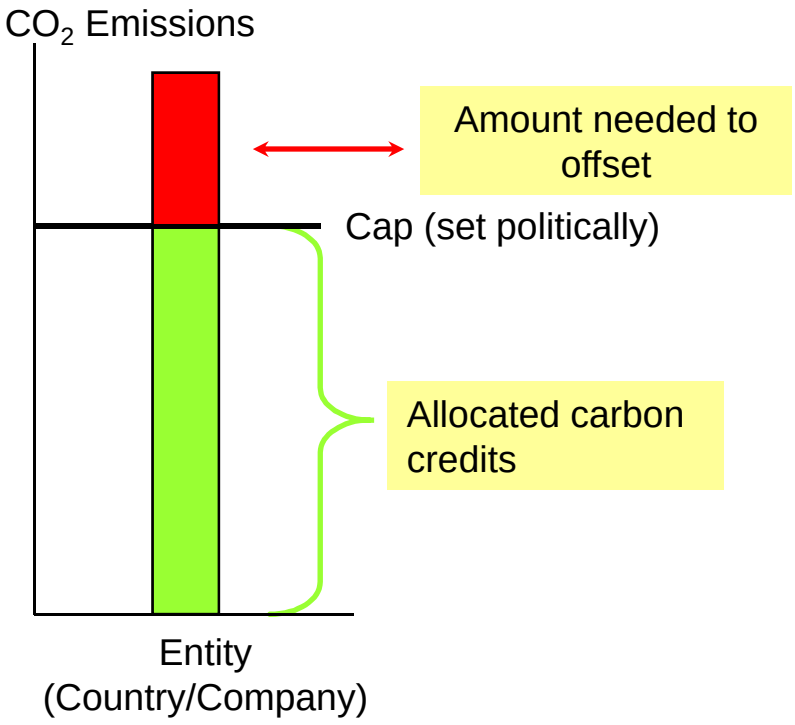


After Abatement



DEMAND

'Cap & Trade'



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Carbon credits could be worth between ~ €3,000 and €10,000 per base station over a 10 year project

TYPICAL CARBON VALUE OF EMISSIONS FROM DIESEL-POWERED BASE STATION

1.2 kW BASE STATION LOAD

Base Station Load	1,200	W
Base Station Load Profile	0.9	
Daily Energy Use	26	kWh/day
Diesel Gen Fuel Cons	0.95	L/hr
Daily Fuel Consumption	22.8	L/Day
Annual Fuel Consumption	8,322	L/Year
Diesel Carbon Emissions	2.7	kg CO2/L
Emissions per year	22	kg TCO2/yr
Primary Credit Price	14	€/TCO
Revenue per year	315	€/year

5 kW BASE STATION LOAD

Base Station Load	5,000	W
Base Station Load Profile	0.83	
Daily Energy Use	100	kWh/day
Diesel Gen Fuel Cons	3.10	L/hr
Daily Fuel Consumption	74.4	L/Day
Annual Fuel Consumption	27,156	L/Year
Diesel Carbon Emissions	2.7	kg CO2/L
Emissions per year	73	kg TCO2/yr
Primary Credit Price	14	€/TCO
Revenue per year	1,026	€/year

- **At commercial scale (~1000 base stations) the carbon credit value to operators is €3-10mln**

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Carbon credit project will break even at around 60 green-powered base stations but upfront costs can be absorbed by the carbon broker

INDICATIVE SCALE AND ECONOMICS

	Kyoto Carbon Credits	Voluntary
Average BTS load	1.2 KW	1.2 KW
Carbon Credit Price	€ 14	€ 10
Annual value of carbon credits	€ 315	€ 225
10 yr NPV of carbon credit revenue per BTS	€ 2,130 - €3,150	€ 1,520
Typical project costs	€ 200,000	€ 100,000
# BTS required to breakeven	60 - 90	65

- **Upfront costs can be absorbed by the carbon broker**
- As well as strong business case additional benefits include corporate social responsibility commitments

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Carbon credit consultancies/brokers have been identified

- Green Power for Mobile has received responses to a Request for Information from 3 carbon credit consultancies/brokers. Key findings as follows:
  - The carbon credit consultancies/brokers can absorb all upfront costs for a % of credit
  - The selected partner would work with the operator and GSMA to minimise resource/time requirements
  - Carbon credits can be forward sold in year 1
- Following identification of a suitable operator to engage with GSMA will issue a specific Request for Proposal. Possible partners are:
  - Cantor CO2
  - Ecosecurities
  - Cairneagle Associates

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Value added to operator from GSMA involvement

- Aggregating operator carbon credits through GSMA increases the price of the carbon credit
- GSMA can aid the identification of suitable carbon consultancies/brokers
- GSMA can assist with the implementation of the carbon credit project
- GSMA can provide global publicity for the project and opportunity for GSMA conference presentations

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All three required elements for carbon credits are satisfactory at this stage of investigation – see appendix

GEOGRAPHY

- Has the country, where emission reduction takes place, signed ***and*** ratified the Kyoto protocol?
- Is the host country a developing nation?
- Are the relevant regulatory bodies to process projects in place?
- What is the host country's experience in processing carbon credit applications?



ADDITIONALITY

- Would the project lead to reductions in emissions that are in addition to any that would occur in the absence of the project activity?



METHODOLOGY

- Does the project employ a methodology already approved by the CDM Executive Board?
- If not, is it possible to develop a new methodology and what is the likelihood of the methodology receiving permission within an acceptable time frame?



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- GSMA to discuss opportunity with specific operators to assess demand

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The suitability of a project for generating carbon credits will depend on three main factors; Geography, Additionality and Methodology

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Geography - Countries which have Designated National Authorities are able to host carbon credits projects

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Geography - Many developing world countries have hosted at least 1 carbon credits project

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Additionality – this should not pose a major problem for green-powered base station projects

ADDITIONALITY CRITERIA

Step 1: Do existing Regulations and Laws require project to happen?

Step 2: Is project financially viable without carbon credits?

The large upfront CAPEX required for green power BTS is a significant barrier which carbon credits can partially alleviate

Step 3: Alternatively, are there other, non-financial barriers, that are hindering project development?

Other operator barriers such as theft, lack of knowledge, future proofing, weather variability etc, can also be used to prove additionality

Step 4: Credibility test – are similar projects already common practice

Green power BTS are not common practice today

Energy efficiency projects are unlikely as already commonplace

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Methodology - There are existing UN methodologies which would fit Green Power for Mobile projects

Approved methodology	Methodology name	Notable requirements for use	Existing Project Examples
AMS-I.A.	Electricity generation by the user	Simplified for small scale use. No grid connection. If the unit added has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15MW for a small-scale CDM project activity applies only to the renewable component.	Bundle of 100 village biomass power plants totalling 5.15 MW in India Photovoltaic kits to light up rural households in Morocco
ACM0002	Consolidated methodology for grid-connected electricity generation from renewable sources	Grid-connected renewable power generation project activities that involve electricity capacity additions of the following types: hydro power, wind power, geothermal power, solar power, wave power plant/unit or tidal power.	37.6 MW bundled wind power project in Nagercoil, Tamilnadu, India
AM0019	Renewable energy project activities replacing part of the electricity production of one single fossil-fuel-fired power plant that stands alone or supplies electricity to a grid, excluding biomass projects	The identified baseline plant must have sufficient capacity to meet the increase of demand expected during the crediting period.	Methodology recently superseded

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The registration process for carbon credits is complex. A typical project will take 12 months and costs ~ €200k

TYPICAL PROJECT PROCESS



- Identify project and determine feasibility
- Create Project Design Document - information on activity, methodology and monitoring
- Obtain written approval from Designated National Authority (DNA)
- Independent evaluation of project by a Designated Operational Entity (DOE)
- Formal acceptance of project by the UN's CDM Executive Board (EB)
- Collect all relevant data to calculate emissions reduction as per PDD
- Independent review of monitored emission reductions by a DOE
- Written assurance by a DOE regarding emission reductions
- EB will issue CERs equal to the verified amount of emission reductions

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Voluntary carbon credit projects are a viable alternative to the more rigorous Kyoto carbon credits if registration is unfeasible

	KYOTO	VOLUNTARY
Demand	Kyoto countries and EU ETS	World Bank, Corporate CSR (Brand), individuals
Standards	CDM, JI	Various and unregulated ("Gold Standard")
Stringency	Tough	Various, not necessarily verified
Primary Credit Price	€8-15	€5-10
Registration Costs	€150-300k	€20-50k
Market Size* (# credits/yr)	832 m	42 m
Project types	Large scale and profitable	Broader range, smaller scale, more sustainable and environmental projects
Outlook	Some uncertainty post 2012	Sentiment-based

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