

Validator's View on Green Building's Potential to Reduce Carbon Footprint

B. SENTHIL KUMAR

SGS India Pvt Ltd

19/02/2010

WHEN YOU NEED TO BE SURE



- Under the Kyoto Protocol Annex 1 Parties (developed countries and economies in transition) have absolute caps on emissions of greenhouse gases (GHG)
- The CDM allows eligible projects to generate emission reductions that can be used to offset excess emissions by Annex 1 Parties
- 1 CER = 1 tonne of CO₂
- These CERs can be traded and sold, and used by industrialized countries to meet a part of their emission reduction targets under the Kyoto Protocol

What are the eligibility criteria for CDM projects?

- They include, amongst other things:
 - Project activities must reduce GHG emissions below the baseline
 - The baseline is the scenario that reasonably represents the emissions of GHG that would have occurred in the absence of the proposed project activity
 - Projects must define the baseline using an approved methodology

- Projects must be **VALIDATED** against these criteria by a Designated Operational Entity (DOE), after which they may be registered as a CDM project

Following registration....

- Project developers can implement the project and the approved monitoring plan in order to determine:
 - Baseline emissions
 - Project emissions
 - And by subtraction, the emission reductions
- The Monitoring report must then be VERIFIED by a different DOE*, after which the DOE may request the issuance of the CERs
- Only after issuance can the CERs be transferred to buyers and surrendered against a cap or compliance obligation
- * except in the case of small scale projects where the same DOE can perform both activities

What kind of projects are possible?

- Projects that reduce emissions of energy related CO₂
- CO₂ emissions from raw material use
- Non-CO₂ GHG emissions from industrial activities, land fill, agriculture etc
- Non-CO₂ GHGs are methane, nitrous oxide, PFCs, HFCs and sulphur hexafluoride
- Typical examples include:
 - Construction of renewable energy facilities in a market dominated by thermal power
 - Fuel switch from coal to gas
 - Land fill gas capture and flare / utilisation
 - HFC23 or N₂O abatement

How do I go about making a project...?

- Review your own commercial activities – the more GHG you emit or the more energy or raw materials you consume, the greater the potential to improve
- Identify any activities that would reduce your GHG emissions that you are not legally obliged to do, and that are not current common practice within your industry
- Evaluate the magnitude of the potential emission reductions
- Identify the reasons why you have not already done this – these are the barriers that stop the project activity from being the baseline
- Consider whether the potential revenues from the sale of CERs might be enough to help you overcome these barriers

- Methodology :
 - In order to get CDM benefits, a project must comply with and register under an approved methodology
 - New methodologies can be developed if existing one are not appropriate to apply
- Additionality is important for any project to qualify for CDM benefits
- A common practice analysis for the project sector would play a major role in demonstration of Baseline and Additionality

How do I go about making a project.... (cont)

- If you have some possible ideas then you have two options:
 - Consider developing the project yourself
 - Talk to a consultant about it
- You should also:
 - Contact your Designated National Authority



Climate Change Programme

- Recognized as a global leader in the verification of greenhouse gas emissions.
- Providing range of services addressing mandatory and voluntary reporting of greenhouse gas emissions since 1997.
- Accredited and active in all schemes worldwide.
 - E.g. EU ETS, UK ETS, CDM, JI, VCS, CCAR, CCX,
- Programme brings together expertise from different business lines within SGS
 - Environment (air, soil, water, waste analysis)
 - System and Service Certification (ISO, CSR, FSC, Sustainable development)
 - Industry (Technical risk analysis, project management)
 - Agri/Oil and Gas (Biofuels)
- Professionals choose SGS because we
 - deliver with the speed and accuracy needed
 - underpin the environmental integrity of emissions reporting / trading.

Why Build Green?

Environmental benefits:

- Enhance and protect ecosystems and biodiversity
- Improve air and water quality
- Reduce solid waste
- Conserve natural resources

Economic benefits:

- Reduce operating costs
- Enhance asset value and profits
- Improve employee productivity and satisfaction
- Optimize life-cycle economic performance

Health and community benefits:

- Improve air, thermal and acoustic environments
- Enhance occupant comfort and health
- Minimize strain on local infrastructure
- Contribute to overall quality of life

Green Building Rating Systems

- More than 30 ratings systems followed worldwide
- Some of the green building rating systems
 - ❖ United Kingdom – BREEAM
 - ❖ United States – LEED
 - ❖ Australia – Green Star
 - ❖ Japan – CASBEE
 - ❖ Canada – LEED Canada
 - ❖ India – LEED India
- More than 67 countries have adopted LEED Rating System
 - ❖ Canada, India, UAE, Brazil etc.,
- **LEED has globally emerged as the most prominent internationally recognized rating system**

LEED Rating System –Focus areas

- **LEED, a whole-building approach to sustainability by recognizing performance in five key areas**



Sustainable sites



Water Efficiency



Energy & Atmosphere

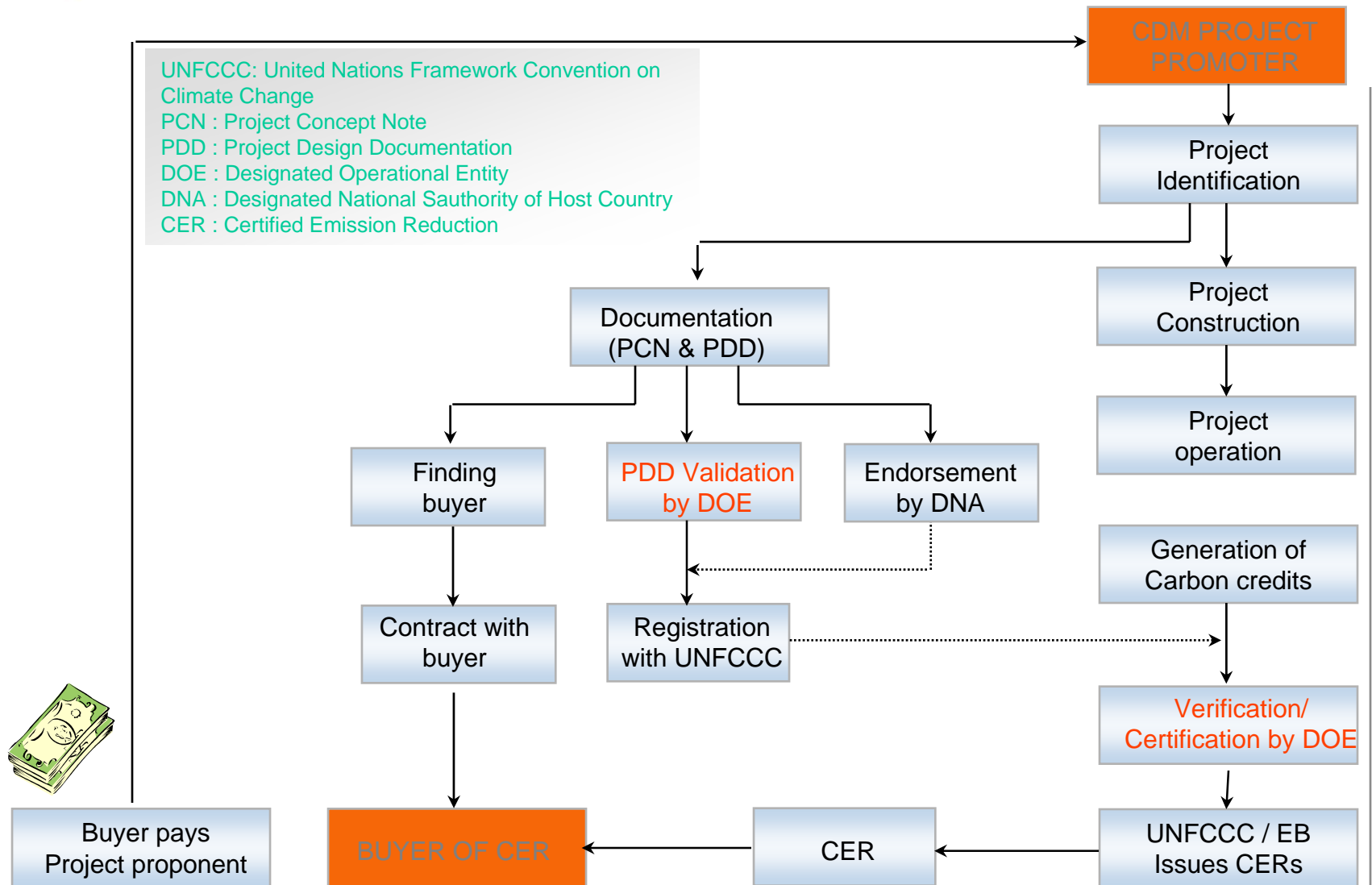


Indoor Environment Quality



Material and Resource

Typical CDM Process





CDM Benefit for Green Building ?

CDM Benefits for Green Buildings?

- ❖ Buildings is an important energy consumer (30-50% of total generation)
- ❖ **Green Buildings**
 - Consumes at least 40-50 % less energy
 - 20-30 % less water vis-à-vis a conventional building (With an incremental cost)
- ❖ So Green buildings has huge potential to earn CDM benefits by implementing energy efficiency projects that contribute to sustainable development
- ❖ Major energy efficiency areas observed in the buildings are
 - Roof Insulation
 - Air handling unit
 - Chillers
 - Pumping system
 - Cooling Towers



Green Building Challenges

- Awareness
- Investment



Potential area : Demand side energy efficiency

- Initiatives which reduce power demand through either electric or thermal efficiency
- For example, energy efficient light bulbs, pumps, motors and air conditioners, insulation on windows, ceilings and walls



Potential area : Supply side energy efficiency

- Initiatives which increase the efficiency of power produced
- For example, improved fuel combustion, waste heat or gas recovery and utilization

Potential area : Clean energy production

- Production of energy from cleaner sources than baseline energy consumption
- Renewable energy production (wind, solar, biomass, hydro) or fuel switch from dirty to cleaner fuels (e.g. coal or diesel to natural gas)

Green Building Projects CDM registered

Projects registered in India under methodology AMS II.E are

- ITC Sonar, Kolkata is the first Indian hotel to successfully be part of carbon credit trading in India (**Project 0686 : Improvement in Energy Consumption of a Hotel**)
- Technopolis office building, Kolkata is other good examples of green buildings getting CDM benefits (**Project 1794 : Energy efficiency measures in "Technopolis"**)
- Olympia Technology Park, Chennai (**Validation under process**)

Energy Efficiency and fuel switch measures

■ Measures Implemented:

- Installation of variable frequency drives
- Retrofit of existing HVAC system to reduce unwarranted moisture laded air load in the pre-cooled air unit (PAU) by installing U shaped heat pipes that improves efficient heat transfer in the PAU pipes and thus reduce chiller load
- Retrofitting various pumps
- Enhancement of the treatment efficiency of the sewage treatment unit
- Replacement of electric water heater with solar water heater

Supply Side Energy Efficiency improvements

■ Measures Implemented:

- Installations of magnetizer for better fuel atomization
- Reuse of low energy waste heat of the flue gases exhausted from the boiler stack to pre-heat the boiler feed water and improve the generation efficiency of the boiler
- Utilization of the waste heat of the return steam condensate to reduce HSD consumption

■ Result:

- ~3000 t CO₂eq reduced per annum
- Assists in relieving electricity supply constraint in the region
- Reduction in pollution associated with extraction, transportation and utilization of fossil fuels
- Encourages green technology adoption in other Indian hotels

Demand side energy efficiency management

- Exposure of glass wall area- High performance double glazed panels with reflective low “e” glass panes and having low U value and solar heat gain co-efficient.
- Roof insulation – U value of the roof kept low with R-15 extruded polystyrene insulation and roof gardening.
- Each AHU is provided with VFD driven supply air blower and each AHU room has a heat recovery wheel (HRW) with supply/ recovery air fan.
- Chillers- two 650 TR water cooled centrifugal chillers with COP of 6.1 are installed & a 300 TR water screw with COP of 5.5, kept as a standby
- Cooling towers – There are two 1700 TR cooling towers in the HVAC system for cooling the water used as cooling medium in the HVAC system of the building.
- Average annual GHG reduction : 9000 tCO₂

Case study : Olympia Technology Park, Chennai

Demand side energy efficiency management

- Energy efficient design of wall construction (material with better insulation properties)
- Energy efficient design of the roof construction- Over deck insulation and roof garden.
- Energy efficient glass area – high performance glazing (double glazed with low U- value, optimum light transmission and optimum shading coefficient)
- Energy efficient design of the HVAC system
 - High performance chillers
 - VFD (Variable frequency drives) for AHU and chilled water pumps
 - Heat recovery wheels
- Annual average GHG reduction= 15000 t CO₂



Why SGS?



THE WORLD'S **LEADING** INSPECTION, VERIFICATION, TESTING AND CERTIFICATION COMPANY.

- More than 52'000 employees
 - Europe, Middle East & Africa: 24'000 employees
 - Americas: 12'000 employees
 - Asia/Pacific: 16'000 employees
- A network of over 1'000 offices & laboratories in over 140 countries





DELIVERING **TRUSTED** TESTING, INSPECTION, VERIFICATION & CERTIFICATION

EXPERTISE
ACROSS INDUSTRIES



ACTING ON PROCESSES, PRODUCTS,
ASSETS



SERVING BUSINESSES,
GOVERNMENTS & END USERS



TO DELIVER SUSTAINABLE RESULTS





**Environmental
Services**



**Life Science
Services**



**Automotive
Services**



**Trade
Assurance
Services**



**Systems and
Services
Certification**



**Agricultural
Services**



**Consumer
Testing
Services**



**Minerals
Services**



**Industrial
Services**



**Oil, Gas &
Chemicals
Services**



RANGE OF SERVICES PROVIDED - Environment

- **Laboratory Analysis**
 - All matrices (soil, water, air, waste)
 - Specialised analysis (dioxins, residues)
- **Field Activities**
 - Air monitoring
 - Drilling
 - Sampling (including asbestos)
 - Mobile laboratories
 - Climate Change validation and verification
- **Data Interpretation**
 - Studies – noise, air, heat, safety, odour
 - Data Management
- **Consulting & Management**
 - Data Management
 - Studies – noise, air, heat, safety, odour
 - Risk assessment
 - Remediation Planning
 - Environment Impact Assessment, Due Diligence
 - Risk Assessment
 - HSE audits
 - Energy audits
 - Green Building Services
- **Climate Change Programme**
 - Validation and Verification
 - CDM, JI
 - VCS
 - ISO 14064, WBCSD

BEST VALIDATOR &
VERIFIER CDM-2008





LEED Consultancy Service

- **SGS**
 - Member of Indian Green Building Council, Hyderabad and
 - Member of Indoor Air Quality Association, USA;
- **SGS provides consultancy services for new construction and core shell and Homes. It includes**
 - Feasibility Study
 - Building Energy Simulation, facilitation service
 - Third Party Commissioning
 - Indoor Air Quality Audit
 - LEED Documentation
 - FSC, Material Testing
 - Environmental Impact Assessment
 - Energy & Water Audit



SGS LEED Commissioning Project

Some of the prestigious LEED Commissioning projects of SGS India are

- Indira Gandhi International Airport, New Terminal T-3, New Delhi with GMR & DIAL
- AIRCEL Office Building, Gurgaon
- HCL Building, Manesar
- Lemon Tree Hotel, New Delhi
- Dabur Building, Gurgaon

- SGS India - hired by Bureau of Energy Efficiency, Ministry of Power (India) as an Independent Agency for Monitoring and Evaluation of BEE Star Rated office Buildings
- Star Rating - based on the Energy Performance Index (kWh/sqm/year)
- Buildings will be rated from 1 star to 5 star (1 star- less energy efficient; 5 star- more energy efficient). Similar to star rating of appliances.
- Star Rating - based on actual performance of the buildings in terms of specific energy consumption.
- To participate in this programme and get energy efficient building ratings, please visit <http://www.bee-india.nic.in>



Thank you!



For details, please contact,

B. Senthil Kumar

Lead Assessor

Climate Change Programme

Phone: +91 9600001418

E-mail: senthilkumar.b@sgs.com

Sanjeev Kumar

Regional Technical Manager

Climate Change Programme

Phone: +91 9871794628

E-mail: Sanjeev.kumar@sgs.com