



Confederation of Indian Industry



GREENPRO CERTIFICATION STANDARD FOR

“READY MIX CONCRETE”

Draft for Public comments

Supported by:



Creating Markets, Creating Opportunities



GreenPro Certification Standard for

“Ready Mix Concrete”

Draft for Public Comments

Supported By



Copyright

All Rights Reserved

CII-Sohrabji Godrej Green Business Centre authorizes you to view the standard for GreenPro Certification for individual use. You agree not to sell or modify the GreenPro Certification standard in any way for any public or commercial purpose, including display in a website or in a networked environment.

Unauthorized use of the GreenPro Certification standard violates copyright, trademark and other laws, and is prohibited. All the contents in the GreenPro Certification standard are owned by the CII Sohrabji Godrej Green Business Centre and are protected by copyright.

Disclaimer

None of the parties involved in the creation of the GreenPro Certification, including Green Products & Services Council, its members, or the Indian government make any warranty (express or implied) or assume any liability or responsibility, to you or any third parties for the accuracy, completeness or use of, or reliance on, any information contained in the GreenPro Certification Standard, or for any injuries, losses or damages (including, without limitation, equitable relief) arising out of such use or reliance.

As a condition of use, you covenant not to sue and agree to waive and release the Green Products & Services Council, its members and the Indian government from any and all claims, demands and causes of action for any injuries, losses or damages (including, without limitation, equitable relief) that you may now or hereafter have a right to assert against such parties as a result of your use of, or reliance on, the GreenPro Certification.

Published by:

Confederation of Indian Industry
CII- Sohrabji Godrej Green Business Centre
Survey No 64, Kothaguda Post
Near HITEC City, Hyderabad - 500 084
Tel: +91 40 44185111
Fax: +91 40 44185189
www.greenbusinesscentre.com

Acknowledgement

The GreenPro certification for Ready Mix Concrete has been made possible through the efforts of Green products & Services Council and the Ready Mix Concrete – Product committee.

We express our gratitude to all the members who had contributed for the development of the certification. Our special thanks to Mr. Vijay Kulkarni, Head – Technical Committee for GreenPro Certification Standard for Ready Mix Concrete:

- Mr. KN Rao, Director, Energy and Environment, ACC Limited
- Mr Mandar Sudrik, CEO – Concrete Business, ACC Limited
- Ms. Madhulika, Director, Freespanz Design Build Pvt. Ltd.
- Mr. Abhijit Pisal, Head – Godrej Green Building Consultancy Services
- Ms. Tejashree Joshi, Head - Environment & Sustainability, Godrej & Boyce Mfg. Co. Ltd
- Mr. M.N. Pooniwala, Head Construction Materials, Godrej & Boyce Mfg. Co. Ltd
- Mr. Prashant Gawde, Chief Manager & Head – Q.C, Godrej & Boyce Mfg. Co. Ltd
- Mr. Hiten Sethi, Hiten Sethi Architects
- Mr. Sivaram Krishnamoorthy, Operations Officer, Energy and Water advisory, IFC
- Mr. Jay Shiv, Consultant, Energy and Water advisory, IFC
- Ms. Lopamudra Sengupta, VP Technical services , JSW Cement
- Dr J Kole, VP R&D, JSW Cement
- Mr. T Shenvi, West Zone head –GGBFS, JSW Cement
- Mr. Mayank Srivastav, Quality head - Dolvi Cement Works, JSW Cement
- Ms. Mala Singh, Chairperson MD, PEC Solutions Green Designs Pvt. Ltd
- Mr. Anil Jauhri, CEO, QCI – NABCB
- Mr. Raina, Managing Director, Raina Industries Private Limited
- Mr. Anil Banchhor, RMCMA - Vice President, MD & CEO, RDC Concrete India Pvt. Ltd
- Mr. Atul Desai, RMCMA – Secretary Executive Director and CEO, RMC ReadyMix (India)
- Mr. Srirang Sondur, President – Commercial Concrete, RMC Readymix (India)
- Mr. Prateek Mathur, Vice President – Marketing, RMC Readymix (India)
- Ms. Anuja, Principal Architect, SSA Architects
- Mr. Rajeeb Kumar, Zonal Head - Technical Services, UltraTech Concrete

1. Introduction

The construction industry is one of the fastest growing sectors in India contributing significantly to the economic growth. At the same time, the rapid growth of the sector poses a host of challenges for preserving the environment and health of occupants. The Green Building Movement spearheaded by the Indian Green Building Council (IGBC) has enabled the construction industry to incorporate Green Building concepts for the enhanced economic, health and environment performance of buildings.

Thus far, the Council has been instrumental in enabling 4,792 Million Sq. of green buildings in the country. The Green Building market growth has created demand for Green products & services. The demand is expected to grow exponentially in the future.

Against this background, CII-Sohrabji Godrej Green Business Centre (CII-Godrej GBC) has launched the **Green Products and Services Council** with the support of all the stakeholders including product manufacturers, standard developers, architects, Green building developers, conformity agencies etc.

The key objective of the council is to facilitate Green product market transformation in India through 'Green Product Certification'.

The initial focus of the council will be on Green building products and related technologies. Over a period of time, the council will expand its focus to other areas such as Industrial products, consumer items, services etc.

This certification is applicable for all Ready Mix Concrete manufacturing units including commercial and captive plants.

Why GreenPro Certification?

The GreenPro Certification is a tool for facilitating Green Product market transformation in the country. The GreenPro Certification is expected to:

1. Enable green building projects in selecting the right product and equipment
2. Increase the market demand for the Green products
3. Put a system in place for a product to be called 'green'

GreenPro Certification for Ready Mix Concrete

Ready mix concrete (RMC), one of the major products used increasingly in construction industry, has cement as a major constituent. RMC is now being used in around 50 cities in India, and this is expected to go up significantly. Currently, the RMC industry consumes about 7 - 9% of the total quantity of the total cement produced in the country. This is expected to rise to 20 to 25% over the next few years. A number of organizations from the government, semi-government and private sectors have made the use of RMC compulsory, and other cities may follow suit.

When compared to other materials of construction such as steel, aluminum, glass, etc., ready-mixed concrete is considered to be a sustainable material of construction. Yet, one of the major ingredients of concrete, i.e. cement is responsible for GHG emissions. Further, the energy consumption during concrete manufacturing, transportation, placing and compaction is also substantial. Thus, there is considerable scope to reduce the GHG emission of concrete as a whole.

Significant efforts have been made by the leading ready mix concrete manufacturers to reduce GHG emissions by increasing the proportion of additives in RMC such as flyash / slag to reduce the OPC consumption and improving the energy efficiency of manufacturing process. In India, the percentage of additives varies from 5% to 50% due to various reasons, as understood from our extensive interactions with industry. The GHG emissions per m³ of concrete production also varies from 0.08 – 0.12 ton/m³ of concrete. Considering an estimate of 7-9 % of total OPC cement produced in the country is used for RMC, a total of approximately 12 – 15.5 Million Tons of GHG/ annum could be attributed to the present RMC production in the organized sector.

This clearly indicates that the ready mix concrete sector offers enormous and cost effective intervention opportunities for improving the Green performance of the product, thereby reducing GHG emissions significantly, so that total emissions attributable are pushed to the lower end of the above range.

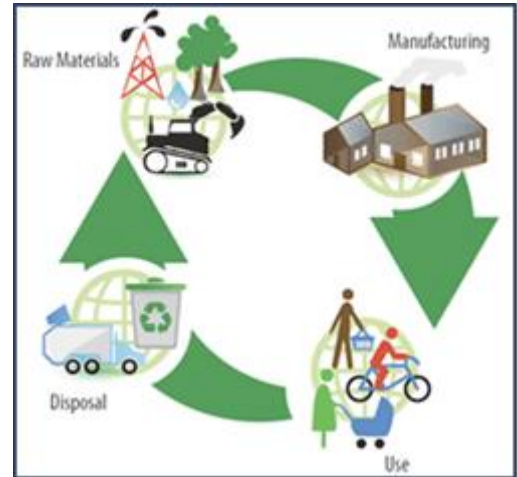
Hence, CII-Godrej GBC proposes to develop Green Product Certification for Ready Mix Concrete, facilitate market transformation and thereby reduce the overall GHG emission in the RMC sector.

This certification would be applicable for all Ready Mix Concrete manufacturing units including commercial and captive plants.

2. **GreenPro Certification – Life Cycle Approach**

The Green Products Rating adopts a holistic approach based on the 'Life Cycle' of the product. The rating system encourages the product manufacturers to implement measures that would result in environmental, health and wellbeing benefits at the following stages of the life cycle of the products.

1. Product Design
2. Raw materials
3. Manufacturing Process
4. Product Performance during use
5. Disposal / Recycling



3. **Benefits**

GreenPro certification benefits both the product manufacturers and the users. The benefits are both tangible and intangible.

For Product Manufacturers

Some of the benefits of GreenPro Certification for the product manufacturers are highlighted below:

1. GreenPro Certification differentiates the Green product from the competition
2. Increases the market reach out with credible and precise information on the Green features of the products
3. Enables Green product Innovation
4. Increases resources conservation through enhanced energy efficiency, water efficiency, use of renewable energy, minimization waste etc., during the manufacturing process and hence increase in profitability
5. Acts as a driver for achieving environment excellence
6. Complements National & International Green Building Certification systems

For Users

Use of rated Green concrete leads to significant tangible and intangible benefits for the end users (Developers and Contractors).

Some of the benefits for the users are highlighted as below:

1. Recognition and credits for achieving national and international Certification for the Green Buildings
2. Improved product performance during use to reduce resource consumption and environmental impacts
3. Time and effort in carrying out due diligence in selecting a green product is saved
4. Ensures Toxic and hazardous substances free products which in turn decrease “health and wellbeing” risks of the users

4. National Priorities addressed in Certification

GreenPro Certification addresses the following which are priorities of the Government at the National level:

Water:

Water is a major concern in most part of the country. Implementation of water efficiency measures and “zero Liquid Discharge” are being encouraged to address the water related issues.

Land:

Availability of land and increase in land pollution are major areas of concern. The Certification system demands for increased recycling of material after use which would result in reduction in landfills and hence reduction in land pollution.

Energy Efficiency:

The Certification system encourages the product manufacturers to adopt energy efficiency improvement measures and reduce their energy consumption which is in line with the National Mission on Enhanced Energy Efficiency. This provides an opportunity to users of RMC to choose more energy-efficient and sustainable products from the product basket of the producer.

Renewable Energy:

The Certification advocates compliance with Renewable Purchase Obligation (RPO) and encourages product manufacturers to invest in renewable power generation. This is in line with Government of India’s objective of increasing the contribution of renewable power sources.

A combination of improving energy efficiency and the use of renewable energy leads to support the government’s efforts on Climate Change issues.

5. *Development of GreenPro Certification Standards*

GreenPro Certification applies product specific '**Certification Standards**' for evaluating the products. The Certification standards are developed with the support of respective product committees formed under the aegis of Green products and services council.

The product committee involves all major stake holders related to the respective product category including product manufacturers, standard setters, conformity agencies, architects, users *et al.* The product committee is led by an expert who is also an unbiased specifier.

5.1 Features of GreenPro Certification

The Certification system follows prescriptive as well as performance based approach for evaluating a product. The Certification calls for demonstration of product performance through testing as per specified standards and implementation of measures at every stage of the Life Cycle of the product, leading to clearly measurable environmental benefits.

The Certification system evaluates green features for products based on various performance parameters grouped under the following Credit Modules.

1. **Product Design:** The Certification necessitates the manufacturer to demonstrate its top management commitment towards environmental performance improvement of the product.
2. **Product Performance:** The required performance parameters of the product need to be demonstrated through product testing as per the specified standards.
3. **Raw Materials:** The Certification demands for efforts to bring down the use of virgin materials through recycling and elimination of toxic and hazardous content in the input materials for product manufacturing.
4. **Manufacturing Process:** The green product Certification recognizes the efforts taken by the product manufacturer to reduce the resource consumption during the manufacturing process
5. **Waste Management:** The Certification calls for efforts to minimize the wastes or safer disposal of the wastes generated during manufacturing process
6. **Life Cycle Approach:** The Certification encourages the product manufacturer to carry out Life cycle analysis for the products and implement measures based on the impact analysis.
7. **Product Stewardship:** The Certification recognizes the measures implemented by the product manufacturers to reduce environmental and health impacts in product transportation, use and recycling / product disposal
8. **Innovation:** The Certification recognizes the innovative measures implemented by the product manufacturers which had resulted in substantial reduction in environment impact exceeding the threshold level specified in the Certification standard.

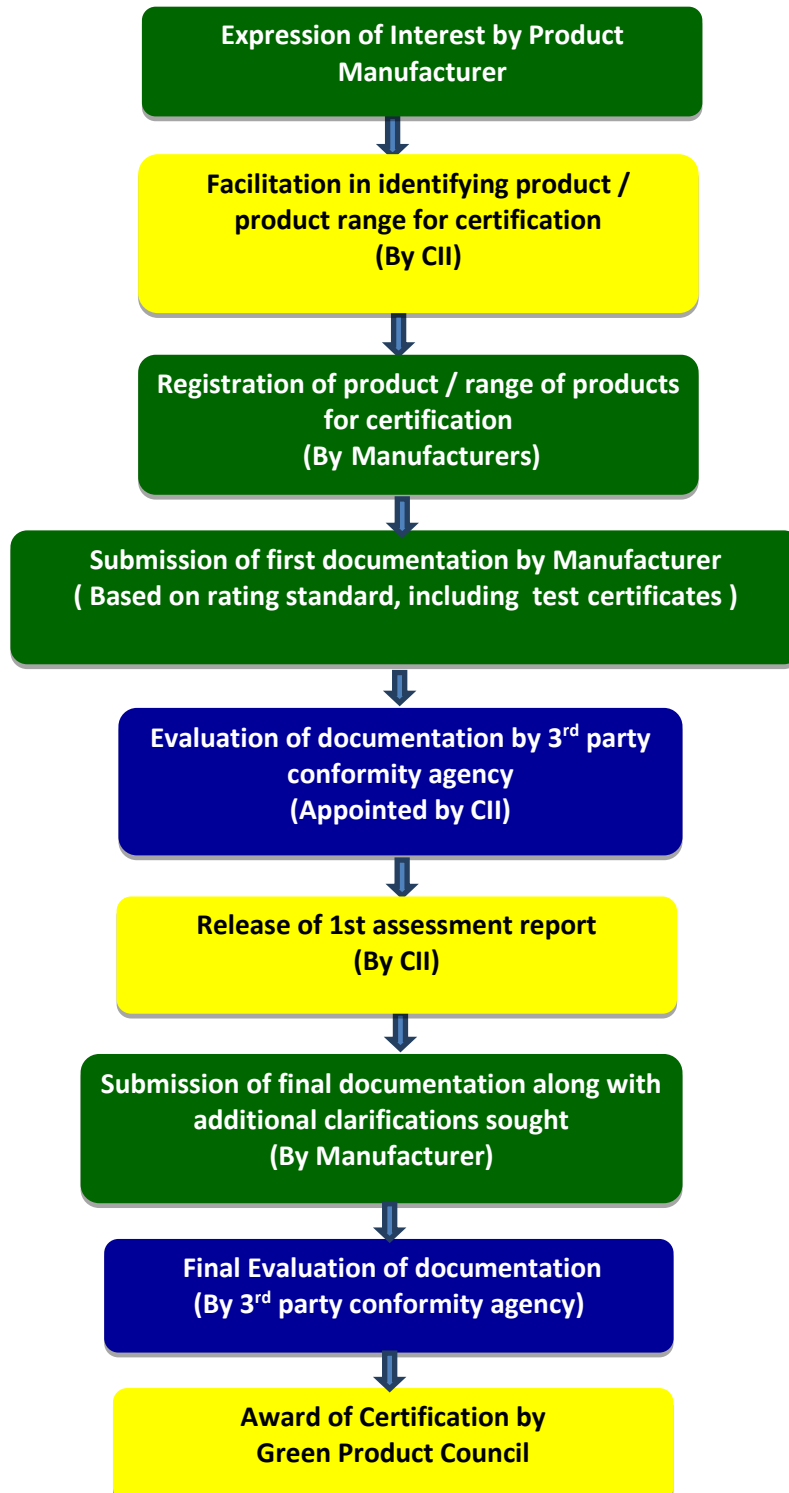
The approach and the Credit Modules for evaluation of products remain by and large the same for all the product categories. However, the credits as part of the individual Credit Modules and the weightage will vary depending upon the product categories and their significance.

A Product needs to comply with certain specified mandatory requirements. The mandatory requirements will vary depending upon the product category.

The threshold limit of all the credits is 100. The product manufacturers can apply for the Credits depending upon the applicability and gain credit points for the Certification.

6. *Methodology of Certification*

The step by step methodology for the Certification is mentioned below.



6.1 Product testing

The Green Product Certification calls for testing of select product parameters for the award of Certification. The product parameters will vary depending upon product categories. Wherever testing of the products is specified, the Certification system also specifies the testing standards and the requirements.

The product manufacturers can carry out the product testing in any of the Laboratories accredited by the **National Accreditation Board for Testing and Calibration Laboratories (NABL)** according to the specified standards and produce the test certificates with the test results for further evaluation.

If the product testing has been already carried out in an NABL accredited laboratory owned by the product manufacturer, the product manufacturer has to submit the details of the test procedures & methodology for verification.

If the product testing needs to be carried out outside the country, the laboratory should have been accredited by the accrediting agency recognized by the Government of the respective country or an accrediting agency which is a member of international bodies such as International Laboratory Accreditation Co-operation (ILAC), Asia Pacific Laboratory Accreditation Co-operation (APLAC) etc.

6.2 Evaluation by 3rd party Conformity Agency

The document submitted by the product manufacturer will be evaluated by a 3rd party conformity agency appointed by CII-Godrej GBC.

Conformity agency is a competent 3rd party agency for carrying out product conformity assessment for various products which would involve Product testing, inspection, factory audits and documentary review.

7. Green product Certification

A product will be certified depending upon the number of credit points achieved based on the evaluation of 3rd party conformity agency.

The maximum achievable credit points are 100. A product will be certified as 'Green Product' if it achieves 50 or more credit points in the evaluation.

8. Validity of the Certification

GreenPro Certification is valid for 2 years from the date of award of the Certification with a yearly review for the product / product range.

At the end of the validity period, the product manufacturer needs to apply for the renewal of the Green product Certification.

Before the end of the validity period, the product manufacturer can attempt for higher level of Certification after implementing sufficient measures for gaining credit points. However, the attempt can be made only after a year from the date of award of the product Certification.

9. Fee for Green product Certification

The fee details are available on website www.greenbusinesscentre.com. The fee details can also be obtained through the contact details mentioned in the manual.

10. Updation of the Standard

GreenPro Certification Standard for Ready Mix Concrete is the result of Green Product and Services council's efforts towards facilitating market transformation in Green Building Products. The council's endeavor is to periodically update the standard and raise the bar.

The updating of the standard will be taken up with the support of the product committee on consensus basis. Updates or addenda will be incorporated and formally communicated to the applicants.

Summary of Credits & Points Distribution

GreenPro Certification - Ready Mix Concrete		
Credits	Criteria	Proposed Credit Points
1	Product Design	
Credit 1.1	<i>Eco - Vision</i>	1
	<i>Strategies adopted, environment improvement measures/ green measures implemented</i>	
	<i>- At design stage of the product</i>	2
	<i>- At manufacturing stage of the product</i>	1
	<i>- ISO 14001 certified manufacturing plant</i>	1
	<i>Sub Total</i>	5
2	Concrete Performance	
Credit 2.1	Low Density Concrete	
	<i>Concrete Density $\leq 1200 \text{ kg/m}^3$</i>	5
	<i>Concrete Density $\leq 1000 \text{ kg/m}^3$</i>	10
	<i>Concrete Density $\leq 800 \text{ kg/m}^3$</i>	15
	<i>Concrete Density $\leq 600 \text{ kg/m}^3$</i>	20
Credit 2.2	Self-Compacting Concrete	20
Credit 2.3	Concrete with high SCM (Supplementary Cementitious Material)	
	<i>Substitution of OPC with flyash, GGBS or other industrial waste</i>	
	<i>High Volume Flyash $\geq 45\%$</i>	5
	<i>High Volume Flyash $\geq 50\%$</i>	10
	<i>High Volume Flyash $\geq 55\%$</i>	15
	<i>High Volume Flyash $\geq 60\%$</i>	20
	<i>(or)</i>	
	<i>High Volume GGBS $\geq 65\%$</i>	5
	<i>High Volume GGBS $\geq 70\%$</i>	10
	<i>High Volume GGBS $\geq 75\%$</i>	15
	<i>High Volume GGBS $\geq 80\%$</i>	20
	<i>(or)</i>	
	<i>Any combination of SCM substituting OPC greater than 65%</i>	
	<i>Substituting OPC $\geq 65\%$</i>	5
	<i>Substituting OPC $\geq 70\%$</i>	10
	<i>Substituting OPC $\geq 75\%$</i>	15
	<i>Substituting OPC $\geq 80\%$</i>	20
Credit 2.4	Pervious Concrete	
	<i>Concrete with high percolation rates</i>	
	<i>Percolation rates $\geq 200 \text{ lit/minute/m}^2$</i>	5
	<i>Percolation rates $\geq 300 \text{ lit/minute/m}^2$</i>	10
	<i>Percolation rates $\geq 400 \text{ lit/minute/m}^2$</i>	15
	<i>Percolation rates $\geq 500 \text{ lit/minute/m}^2$</i>	20

Credit 2.5	High Strength Concrete Concrete with high grade strength	20
	Strength \geq M60	4
	Strength \geq M70	8
	Strength \geq M80	12
	Strength \geq M90	16
	Strength \geq M100	20
<i>Sub Total</i>		20
3	Raw Material	
	Mandatory Requirement	
	The raw materials should conform to IS requirements (or) equivalent international standards : <ul style="list-style-type: none"> • Flyash (IS 3812 Part 1) • Slag (IS 12089) • Water (IS 10262) • Aggregate Size (IS 383) • Silica Fume (IS 15388) • Chemical admixtures (IS 9103) • Metakaolin • Rice Husk Ash 	
Credit 3.1	Use of supplementary cementitious material (Applicable for types such as Low Density Concrete, Self-Compacting Concrete, Pervious Concrete and High Strength Concrete) *Note : High SCM Concrete will gain all 5 credit points	
	Any combination of SCM substituting OPC greater than 20%	
	Substituting OPC \geq 20%	1
	Substituting OPC \geq 25%	3
	Substituting OPC \geq 30%	5
Credit 3.2	Use of recycled aggregates	
	Utilization of industrial waste in coarse aggregate Sintered Flyash Aggregate Aggregate made of copper slag or steel slag Recycled Concrete Aggregates	
	Percentage Substitution \geq 50%	2
	Percentage Substitution \geq 60%	4
	Percentage Substitution \geq 70%	6
	Percentage Substitution \geq 80%	8
	Percentage Substitution \geq 90%	10
Credit 3.2	Fine Aggregate	
	Utilization of the following as fine aggregate in lieu of river sand or sand produced from pebbles Sand produced from crushed stone, Crushed Gravel Sand	
	Percentage Substitution \geq 50%	3
	Percentage Substitution \geq 60%	6

	<i>Percentage Substitution ≥ 70%</i>	9
	<i>Percentage Substitution ≥ 80%</i>	12
	<i>Percentage Substitution ≥ 90%</i>	15
	<i>(or)</i>	
	<i>Mixed Sand – Substitution with River Sand</i>	
	<i>River sand less than < 50%</i>	3
	<i>River sand less than < 40%</i>	6
	<i>River sand less than < 30%</i>	9
	<i>River sand less than < 20%</i>	12
	<i>River sand less than < 10%</i>	15
	<i>Sub Total</i>	30
4	CO₂ Emission per tonne of concrete over base year	
	<i>Reduction in CO₂ emission ≥ 2%</i>	2
	<i>Reduction in CO₂ emission ≥ 4%</i>	4
	<i>Reduction in CO₂ emission ≥ 6%</i>	6
	<i>Reduction in CO₂ emission ≥ 8%</i>	8
	<i>Reduction in CO₂ emission ≥ 10%</i>	10
	<i>Sub Total</i>	10
5	Manufacturing Process	
Credit 5.1	Energy Efficiency	5
	<i>ISO 50001 certified manufacturing plant</i>	1
	<i>Reduction in specific energy consumption ≥ 5 %</i>	2
	<i>Reduction in specific energy consumption ≥ 10 %</i>	3
	<i>Reduction in specific energy consumption ≥ 15 %</i>	4
Credit 5.2	Water Efficiency	6
	<i>Reduction in specific portable water consumption</i>	
	<i>Reduction ≥ 5%</i>	1
	<i>Reduction ≥ 10%</i>	2
	<i>Reduction ≥ 15%</i>	3
	<i>Rain Water Harvesting</i>	
	<i>Harvest 75% rainwater run-off from Roof & Non- Roof areas</i>	1
	<i>Minimize water use for washing transit mixture trucks</i>	1
	<i>Beyond the fence initiatives</i>	1
Credit 5.3	Particulate emission reduction <i>Measure the particulate emission within the plant premises and the surrounding areas</i>	
	<i>Particulate emissions within the plant</i>	
	<i>PM 10: 60 – 100 ppm</i>	
	<i>PM 2.5: 40 - 60 ppm</i>	2
	<i>Particulate emissions in the surrounding areas</i>	
	<i>PM 10: 60 – 100 ppm</i>	
	<i>PM 2.5: 40 - 60 ppm</i>	2
	<i>Note : In case the particulate emissions in the surrounding are higher compared to specified threshold limits due to various</i>	

	<i>external factors, credits will be awarded if the particulate emissions in the plant and the surroundings are at the same level.</i>	
Credit 5.4	Waste or Concrete Sludge Management	
	<i>Reduction in quantity of sludge disposed over previous year</i>	
	<i>Reduction ≥ 10%</i>	1
	<i>Reduction ≥ 20%</i>	3
	<i>Reduction ≥ 30%</i>	5
Credit 5.5	Renewable Power	
	<i>Use of on-site or off-site renewable sources for meeting the power requirements</i>	
	<i>≥ 5% substitution</i>	1
	<i>≥ 10% substitution</i>	3
	<i>≥ 15% substitution</i>	5
	<i>Sub Total</i>	25
6	Product Stewardship	
Credit 6.1	Education	
	<i>≥ 10% of people involved in handling the product after dispatch and users</i>	1
	<i>≥ 20% of people involved in handling the product after dispatch and users</i>	2
Credit 6.2	Quality Management System	1
	<i>Quality management system after dispatch of the product</i>	
Credit 6.3	Extended Producer Responsibility : Institute a system for product take-back for recycling or safe disposal	1
	<i>Encourage recycling of concrete at end of life</i>	1
	<i>Sub Total</i>	5
7	Innovation	
Credit 7.1	Innovation	4
Credit 7.2	Other Credentials, Awards and Accolades	1
	<i>Sub Total</i>	5
Total Points		100

**GREENPRO CERTIFICATION STANDARD
FOR READY MIX CONCRETE**

Mandatory Requirement

For a product to be taken up for GreenPro certification, the manufacturer shall comply with the applicable acts & rules related to environment and health & safety (demonstrated, for example, by providing copies of:

- (a) Valid Certificate of consent to operate the plant by the local Municipal Corporation.
- (b) Valid consent to operate under the water (Prevention & Control of pollution) Act & Air (Prevention & Control of pollution) Act
- (c) Valid authorization under the hazardous waste (management, handling & trans-boundary movement) rules
- (d) Health & Safety compliance as per the norms of RMCMA & National Safety Council
- (e) Approval from Central Ground Water Authority from drawing water
- (e) Data to demonstrate continued compliance with the requirements of (a) to (e)

Minimum Equipment and System Requirement

The plant shall meet the following to demonstrate that minimum equipment and systems are in place for manufacturing concrete with acceptable quality.

The plant should have the RMC Capability Certification under Ready Mix Concrete (RMC) Plant Certification Scheme (QCI) and provide

- a. The details of compliance every 6 months

(OR)

The plant team shall provide information on the following along with details of capacity and test labs. CII team shall carry out internal audit of the plant to ensure compliance to the following requirements:

- b. Details of plant equipment and utilities
- c. Material storage and handling
- d. Batching and mixing control
- e. Delivery fleet inspection
- f. Laboratory
- g. Key personnel
- h. Control on quality of incoming materials
- i. Concrete Mix design
- j. Production and Delivery
- k. Complaints
- l. Feedback

Credit 1: Product Design

Eco-Vision

Points: 5

Intent:

To design the product holistically considering all the environmental attributes, so as to minimize associated impacts

Award of points:

Provide the details of the Eco Vision to action as per the following for achieving excellence in design of the products that would result in environmental, health & well-being benefits.

- ❖ Eco-Vision statement
- ❖ Strategies adopted, environment improvement measures/green measures at design and manufacturing stage of the following products :
 - Low Density Concrete
 - Self-Compacting Concrete
 - Concrete with high SCM (Supplementary Cementitious Material)
 - Pervious Concrete
 - High Strength Concrete
 - Any other concrete with green features

Credits	Criteria	Proposed Credit Points
1	Product Design	
Credit 1.1	<i>Eco - Vision</i>	1
	<i>Strategies adopted, environment improvement measures/ green measures implemented</i>	
	<i>- At design stage of the product</i>	2
	<i>- At manufacturing stage of the product</i>	1
	<i>- ISO 14001 Certified manufacturing plant</i>	1
	<i>Sub Total</i>	5

Exemplary Performance:

This credit is not eligible for exemplary performance under Innovation Credit.

Documentation Required:

1. Eco Vision statement
2. Type of green concrete manufactured
3. Strategies adopted and the details of measures implemented during product design and manufacturing of green concrete.

Credit 2. Concrete Performance

Points: 20

Intent:

Enhance the performance of the concrete to reduce the environmental impact during its use.

Award of points:

Points under this criterion would be awarded on the basis of concrete properties which reduce the environmental impact during its use.

Low Density Concrete:

Encourage use of low density insulating material (Ex: EPS, Foam Concrete), leading to increased thermal insulation for the building envelope.

Self- Compacting Concrete

Encourage use of high workability and flowable mix concrete, eliminating the use of vibrators. Contributes to savings in material, energy and reduction in noise.

High SCM (Supplementary Cementitious Material) Concrete

Substitution of OPC with flyash, GGBS or other cementitious material encouraging use of industrial waste

High Strength Concrete

High Grade strength to reduce the overall use of concrete material during construction

Pervious Concrete

Concrete with high percolation rates contributing to rain water harvesting during its application in pavers etc.

High Strength Concrete

Encourage use of high Grade strength concrete to reduce the overall use of concrete material and enhance the life of construction.

2	Concrete Performance	Credits
Credit 2.1	Low Density Concrete	
	<i>Concrete Density $\leq 1200 \text{ kg/m}^3$</i>	5
	<i>Concrete Density $\leq 1000 \text{ kg/m}^3$</i>	10
	<i>Concrete Density $\leq 800 \text{ kg/m}^3$</i>	15
	<i>Concrete Density $\leq 600 \text{ kg/m}^3$</i>	20
Credit 2.2	Self-Compacting Concrete	20
Credit 2.3	Concrete with high SCM (Supplementary Cementitious Material) Concrete	
	<i>Substitution of OPC with flyash, GGBS or other industrial waste</i>	
	<i>High Volume Flyash $\geq 45\%$</i>	5
	<i>High Volume Flyash $\geq 50\%$</i>	10
	<i>High Volume Flyash $\geq 55\%$</i>	15

	<i>High Volume Flyash ≥ 60%</i>	<i>20</i>
	<i>(or)</i>	
	<i>High Volume GGBS ≥ 65%</i>	<i>5</i>
	<i>High Volume GGBS ≥ 70%</i>	<i>10</i>
	<i>High Volume GGBS ≥ 75%</i>	<i>15</i>
	<i>High Volume GGBS ≥ 80%</i>	<i>20</i>
	<i>(or)</i>	
	<i>Any combination of SCM substituting OPC greater than 70%</i>	
	<i>Substituting OPC ≥ 65%</i>	<i>5</i>
	<i>Substituting OPC ≥ 70%</i>	<i>10</i>
	<i>Substituting OPC ≥ 75%</i>	<i>15</i>
	<i>Substituting OPC ≥ 80%</i>	<i>20</i>
<i>Credit 2.4</i>	<i>Pervious Concrete</i>	
	<i>Concrete with high percolation rates</i>	
	<i>Percolation rates ≥ 200 lit/minute/m²</i>	<i>5</i>
	<i>Percolation rates ≥ 300 lit/minute/m²</i>	<i>10</i>
	<i>Percolation rates ≥ 400 lit/minute/m²</i>	<i>15</i>
	<i>Percolation rates ≥ 500 lit/minute/m²</i>	<i>20</i>
<i>Credit 2.5</i>	<i>High Strength Concrete</i> <i>Concrete with high grade strength M 60 to M 100</i>	<i>20</i>
<i>Credit 2.5</i>	<i>High Strength Concrete</i> <i>Concrete with high grade strength</i>	<i>20</i>
	<i>Strength ≥ M60</i>	<i>4</i>
	<i>Strength ≥ M70</i>	<i>8</i>
	<i>Strength ≥ M80</i>	<i>12</i>
	<i>Strength ≥ M90</i>	<i>16</i>
	<i>Strength ≥ M100</i>	<i>20</i>
	<i>Sub Total</i>	<i>20</i>

Documentation Required:

- Quantity of concrete produced in each category for the past one year
- Performance test report of the concrete

Credit 3: Utilization of alternate raw materials

Intent:

Points: 30

To minimize the environmental impacts associated with the use of virgin materials by use of alternate materials like industrial waste.

Mandatory Requirement:

The raw materials should conform to IS requirements (or) equivalent international standards:

- Flyash (IS 3812 Part 1)
- Slag (IS 12089)
- Water (IS 10262)
- Aggregate Size (IS 383)
- Silica Fume (IS 15388)
- Chemical admixtures (IS 9103)
- Metakaolin
- Rice Husk Ash

Award of points:

3.1 Use of Supplementary Cementous Materials (SCM's). Applicable for Low Density Concrete, Self-Compacting Concrete, Pervious Concrete or High Strength Concrete.

Intent:

To encourage use of Supplementary Cementous Materials (SCM's). Applicable for Low Density Concrete, Pervious Concrete, Self-Compacting Concrete and High Strength Concrete.

3	Raw Material	Credits
	Mandatory Requirement	
	<i>The raw materials should conform to IS requirements (or) equivalent international standards :</i> <ul style="list-style-type: none"> • Flyash (IS 3812 Part 1) • Slag (IS 12089) • Water (IS 10262) • Aggregate Size (IS 383) • Silica Fume (IS 15388) • Chemical admixtures (IS 9103) • Metakaolin • Rice Husk Ash 	
Credit 3.1	Use of supplementary cementitious material (Applicable for types such as Low Density Concrete, Self-Compacting Concrete, Pervious Concrete and High Strength Concrete) <i>*Note : High SCM Concrete will gain all 5 credit points</i>	
	<i>Any combination of SCM substituting OPC greater than 20%</i>	
	<i>Substituting OPC ≥ 20%</i>	1
	<i>Substituting OPC ≥ 25%</i>	3
	<i>Substituting OPC ≥ 30%</i>	5

Documentation Required:

Production details of the following concrete for the past one year and the quantity of supplementary cementitious materials used in each type.

3.2 Use of Recycled Aggregates**Mandatory Requirement:**

- a) Compliance to local authorities and state governments norms for the use of river sand

Credit 3.2	Coarse Aggregates	<i>Credits</i>
	Utilization of industrial waste in coarse aggregate <i>Sintered Flyash Aggregate</i> <i>Aggregate made of copper slag or steel slag</i> <i>Recycled Concrete Aggregates</i>	
	<i>Percentage Substitution ≥ 50%</i>	2
	<i>Percentage Substitution ≥ 60%</i>	4
	<i>Percentage Substitution ≥ 70%</i>	6
	<i>Percentage Substitution ≥ 80%</i>	8
	<i>Percentage Substitution ≥ 90%</i>	10
Credit 3.2	Fine Aggregate	
	Utilization of the following as fine aggregate in lieu of river sand or sand produced from pebbles <i>Sand produced from crushed stone</i> <i>Crushed Gravel Sand</i>	
	<i>Percentage Substitution ≥ 50%</i>	3
	<i>Percentage Substitution ≥ 60%</i>	6
	<i>Percentage Substitution ≥ 70%</i>	9
	<i>Percentage Substitution ≥ 80%</i>	12
	<i>Percentage Substitution ≥ 90%</i>	15
	<i>(or)</i>	
	<i>Mixed Sand – Substitution with River Sand</i>	
	<i>River sand less than < 50%</i>	3
	<i>River sand less than < 40%</i>	6
	<i>River sand less than < 30%</i>	9
	<i>River sand less than < 20%</i>	12
	<i>River sand less than < 10%</i>	15
	Sub Total	25

Limits for utilization of recycled materials for coarse and fine aggregates:

3.2.1 Aggregates		Maximum Utilization		
1	Coarse Aggregates	Plain Concrete %	Reinforced Concrete %	Lean Concrete % (Less than M15 Grade)
1. a	<i>Iron Slag Aggregate</i>	50	25	100
1. b	<i>Steel Slag Aggregate</i>	25	Nil	100
1. c	<i>Recycled Concrete Aggregate (RCA)</i>	25	20 (Only upto M25 grade)	100
1. d	<i>Recycled Aggregate</i>	Nil	Nil	100
1. e	<i>Bottom ash from thermal power plants</i>	Nil	Nil	25
3.2.2	Fine Aggregates	Plain Concrete %	Reinforced Concrete %	Lean Concrete % (Less than M15 Grade)
2. a	<i>Iron Slag Aggregate</i>	50	25	100
2. b	<i>Steel Slag Aggregate</i>	25	Nil	100
2. c	<i>Recycled Aggregate</i>	40	35	50
2. d	<i>Recycled Concrete Aggregate (RCA)</i>	25	20 (Only upto M25 Grade)	100

Source: Bureau of Indian Standards IS 383 – 2016

Documentation Required:

- Types of coarse and fine aggregates used for manufacturing concrete.
- Quantity of recycled aggregate (Coarse and fine) used in each type of concrete.

Exemplary Performance:

This credit is eligible for exemplary performance. If the quantity of alternate raw materials substituted in the aggregates is 100%, additional one credit point will be allocated as part of the innovation credit.

Credit 4: CO₂ Emission per ton of Concrete

Points: 10

Intent:

To reduce CO₂ emissions per tonne of concrete produced over the base year and thereby reduce the associated environmental impacts.

Requirement:

- Estimate CO₂ emission per tonne of concrete as per CO₂ accounting

Award of points:

The award of points would be based on the reduction of emission per tonne of concrete as shown below:

3	CO ₂ Emission per tonne of concrete	Credits
	<i>Reduction in CO₂ emission ≥ 2%</i>	2
	<i>Reduction in CO₂ emission ≥ 4%</i>	4
	<i>Reduction in CO₂ emission ≥ 6%</i>	6
	<i>Reduction in CO₂ emission ≥ 8%</i>	8
	<i>Reduction in CO₂ emission ≥ 10%</i>	10

Exemplary Performance:

This credit is eligible for exemplary performance. If the % reduction in CO₂ emission exceeds the threshold limits, additional one credit point will be allocated as part of the innovation credit.

Documentation Required:

- Carbon foot print report for the past 1 year as per CO₂ accounting and reporting standard for concrete industry.

Credit 5: Manufacturing Process

Credit 5.1: Energy Efficiency

Points: 5

Intent:

Enhance energy efficiency in the manufacturing process of the product, to reduce environmental impacts.

Award of points:

Establish specific consumption of the plant and monitor on a continuous basis. Eg: specific electrical energy consumption in KWh / Tonne of concrete produced and specific thermal energy consumption in Kcal/Tonne of concrete produced.

Implement projects for improving energy efficiency in the process, various equipment and recovery waste heat for improving internal power generation and reducing the specific energy consumption of the plant.

Carryout benchmarking at national and international level.

5	Manufacturing Process	Credits
Credit 5.1	Energy Efficiency	
	<i>ISO 50001 certified manufacturing plant</i>	1
	<i>Reduction in specific energy consumption $\geq 5\%$</i>	2
	<i>Reduction in specific energy consumption $\geq 10\%$</i>	3
	<i>Reduction in specific energy consumption $\geq 15\%$</i>	4
	<i>Sub Total</i>	5

Exemplary Performance:

This credit is eligible for exemplary performance under Innovation Credit, provided, the measures implemented for reducing the energy consumption have exceeded the specified threshold limits

Documentation Required:

- Details of annual production, energy consumption & specific energy consumption for the preceding 2 years
- Details of implementation of energy efficiency improvement measures with actual benefits achieved

Note:

Manufacturing units which are in operation for less than 2 years need to demonstrate a system in place for specific energy consumption monitoring and provide the benchmarking details.

Credit 5.2: Water Efficiency**Points: 6****Intent:**

Incorporate water efficiency measures in the manufacturing process to reduce the specific portable water consumption and implement measures to benefit the society at large.

Award of points:

Implement water efficient measures like re-use of water from settlement tank to reduce the fresh water consumption

Harvest or Capture minimum of 95% of rain water runoff from roof & non roof areas of the manufacturing facility

Disposal of concrete process water, having high PH, in a safer way

Implement measures for improving the availability of portable water beyond the fence for the benefit of the local community

Credit 5.2	Water Efficiency	Credits
	<i>Reduction in specific portable water consumption</i>	
	<i>Reduction \geq 5%</i>	1
	<i>Reduction \geq 10%</i>	2
	<i>Reduction \geq 15%</i>	3
	<i>Rain Water Harvesting</i>	
	<i>Harvest 75% rainwater run-off from Roof & Non- Roof areas</i>	1
	<i>Minimize water use for washing transit mixture trucks</i>	1
	<i>Beyond the fence initiatives</i>	1
	<i>Sub Total</i>	6

*Recycling of water can be factored into the reduction in specific water consumption

Exemplary Performance:

This credit is eligible for exemplary performance under Innovation, if the facility achieves the status of "Zero effluent Discharge"

(OR)

The measures taken exceed the threshold mentioned in the compliance options.

Documentation Required:

- Details of annual water consumption & specific water consumption for 2 years
- Rain water harvesting system installed and quantity of water harvested annually
- Details of water utilized for cleaning transit trucks and measures implemented to reduce them
- Details of re-use of recovered water from the settlement tanks
- Details of the beyond the fence initiatives and the benefits

Credit 5.3: Particulate Emission Reduction**Points: 4****Intent:**

Reduce particulate emissions within the plant premises and surroundings to reduce the related health impacts.

Award of points:

The award of points for the use of alternate fuel would be based as below:

Credit 5.3	<i>Particulate emission reduction</i> <i>Measure the particulate emission within the plant premises and the surrounding areas</i>	<i>Credits</i>
	<i>Particulate emissions within the plant</i>	
	<i>PM 10: 60 – 100 ppm</i>	2
	<i>PM 2.5: 40 - 60 ppm</i>	
	<i>Particulate emissions in the surrounding areas</i>	
	<i>PM 10: 60 – 100 ppm</i>	2
	<i>PM 2.5: 40 - 60 ppm</i>	
	<i>Sub Total</i>	4

Note:

In case the particulate emissions in the surrounding are higher compared to specified threshold limits due to various external factors, credits will be awarded if the particulate emissions in the plant and the surroundings are at the same level.

Documentation Required:

Measure of particulate emissions within the plant premises and surroundings and produce the results.

Credit 5.4: Concrete Sludge Management**Points: 5****Intent:**

Reduce the quantity of concrete sludge generated and maximize the reuse to minimize the environmental impacts associated with its disposal.

Award of points:

Estimate the reduction of sludge generated and re-use of waste sludge in concrete

The award of points would be based as below:

<i>Credit 5.4</i>	<i>Waste or Concrete Sludge Management</i>	<i>Credits</i>
	<i>Reduction in quantity of sludge disposed over previous year (Specific Reduction)</i>	
	<i>Reduction \geq 10%</i>	<i>1</i>
	<i>Reduction \geq 20%</i>	<i>3</i>
	<i>Reduction \geq 30%</i>	<i>5</i>
	<i>Sub Total</i>	<i>5</i>

Exemplary Performance:

This credit is eligible for exemplary performance under Innovation Credit, provided, 100% of sludge generated is re-used.

Documentation Required:

Reduction in quantity of sludge disposed of over the previous year.

Credit 5.5: Renewable Power**Points: 5****Intent:**

Encourage the use of on-site & off site renewable energy sources to reduce the dependence on fossil fuels and their associated environmental impacts.

Award of points:

Install on-site & off-site renewable energy system to reduce dependence on fossil fuels.

Credit 5.5	<i>Renewable Power</i>	Credits
	<i>Use of on-site or off-site renewable sources for meeting the power requirements</i>	
	<i>≥ 5% substitution</i>	1
	<i>≥ 10% substitution</i>	3
	<i>≥ 15% substitution</i>	5
	<i>Sub Total</i>	5

A company is eligible for claiming the allotted points to the threshold level of 2 Credits if they have done exceedingly in either on-site or off site renewable energy generation.

Exemplary Performance:

This credit is eligible for exemplary performance under Innovation Credit, if the contribution from the renewable energy sources is more than 40% of the annual energy requirement of the manufacturing facility

Documentation Required:

- Details of installation of onsite and offsite renewable power generation Certification sources including the technology, installed capacity and location with photographs of installations.
- Details of total power consumption in the manufacturing facility and renewable power produced in kWh

Credit 6: Product Stewardship

Product stewardship advocates that all those involved in the Life Cycle of product share responsibility for reducing its health and environmental impacts with producers bearing the primary responsibility.

In the Green Product Certification, Product Stewardship credit focuses on the following:

1. Education for the Stake holders on Green Products for reaping the intended benefits fully
2. Quality management system for minimizing the rejection rate after product dispatch
3. Extended producer responsibility increasing the concrete recycling or safer disposal

The credit points are allotted for the focus areas as applicable for the individual product categories.

In case of Green Concrete all the three aspects such as education of stake holders, Quality management system after dispatch of products and extended producer responsibility are considered.

Credit 6.1: Education**Points: 2****Intent:**

Educate those involved in handling the product at every stage post-dispatch, so as to reap the intended environmental benefits of the green product fully.

Award of points:

Companies to develop and implement stake holder specific awareness and information sharing programmes for reaping the benefits of Green products at every stage after dispatch of the product.

Credits	Criteria	Credit Points
6	Product Stewardship	
Credit 6.1	<i>Education</i>	
	<i>≥ 10% of people involved in handling the product after dispatch and users</i>	1
	<i>≥ 20% of people involved in handling the product after dispatch and users</i>	1

Exemplary Performance:

This credit is not eligible for exemplary performance under innovation criteria.

Documentation Required:

- Details of the stake holders specific awareness or information dissemination programmes about the Green Products, its features and their roles to reap the intended benefits
- Estimation of % of stake holders covered

Credit 6.2: Quality management system**Points: 1****Intent:**

Intent of quality management system is to reduce rejection & waste during dispatch & storage

Award of points:

Establish a quality management system for monitoring the quality of the product after dispatch till the use.

6	Product Stewardship	Credits
Credit 6.2	<i>Quality management system after dispatch of the product</i>	1

Documentation Required:

- Details of in place to oversee the quality of the product during distribution up to the user end.

Credit 6.3 Extended Producer Responsibility

Points: 2

Intent

To encourage manufacturers to institute a mechanism for product take-back for recycling or safe disposal at the end of useful life.

Compliance options:

The company is encouraged to have a mechanism for product take back which would involve:

- ❖ Collection
- ❖ Environmentally sound treatment of collected product
- ❖ Use of product & materials in the form of reuse or recycling

The company has to employ an environmentally friendly procedure or method to dispose of products that cannot be reused or recycled. The disposal method to comply with the Law of the country

6	Product Stewardship	Credits
Credit 6.3	<i>Extended Producer Responsibility : Institute a system for product take-back for recycling or safe disposal</i>	1
	<i>Encourage recycling of concrete at end of life</i>	1

Exemplary Performance:

This credit is not eligible for exemplary performance under innovation criteria.

Documentation Required:

1. Details of the mechanism in place for product take back
2. Quantity of reduction in product take back.

Credit 7 : Innovation

Product Innovation

Points: 5

Intent:

Recognize initiatives that are not addressed in this Certification system but have a profound impact in protecting the environment.

Award of points:

- As part of the credit, the product manufacturer can apply for four innovative measures. If the implemented measures meet any one of the following criteria mentioned below can be considered as an innovative measure.
 - Any environmental measure not covered in the Certification but addressed by the manufacturer
 - Any measure surpassing the credit threshold of any of the credits included as part of this Certification
- Receipt of Eco labels, Awards & accolades

The points for innovative measures are as follows:

7	Innovation	Credits
Credit 7.1	<i>Innovation : Each innovative measure implemented at any stage of Life cycle will gain 1 Credit Point</i>	4
Credit 7.2	<i>Other Credentials, Awards and Accolades</i>	1

Note: Use of emission reduction devices from DG sets shall be encouraged

Documentation Required:

- Details of the innovative measures highlighting the Intent and the measured Impacts
- Copy of the certificates for the details of Eco-labels, Awards & accolades obtained

About CII

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering industry, Government, and civil society, through advisory and consultative processes.

CII is a non-government, not-for-profit, industry-led and industry-managed organization, playing a proactive role in India's development process. Founded in 1895, India's premier business association has over 8000 members, from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 200,000 enterprises from around 240 national and regional sectoral industry bodies.

CII charts change by working closely with Government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness and business opportunities for industry through a range of specialized services and strategic global linkages. It also provides a platform for consensus-building and networking on key issues.

About IFC

IFC, a member of the World Bank Group, is the largest global development institution focused on the private sector in emerging markets. Working with more than 2,000 businesses worldwide, we use our capital, expertise, and influence to create markets and opportunities in the toughest areas of the world. In FY17, we delivered a record \$19.3 billion in long-term financing for developing countries, leveraging the power of the private sector to help end poverty and boost shared prosperity. For more information, visit www.ifc.org

The Energy & Water Advisory works both with firms across the value chain and at the market level to develop competitive, clean, high quality and affordable modern energy and resource efficiency solutions. The unit works to accelerate the development of commercial markets, including in FCS and IDA countries, improve people's access to modern energy services, and increase power generation from renewables. These customized solutions help companies reduce their energy and water use, minimize waste, and deploy climate-smart technologies, all while strengthening the client bottom line and developing bankable opportunities for IFC and the private sector. IFC would like to thank the Sustainable Development Investment Partnership (SDIP- Australia) and Canada IFC Partnership Fund for supporting the project.

For further details, please contact:



Confederation of Indian Industry

CII-Sohrabji Godrej Green Business Centre

Survey No 64, Kothaguda Post, R.R. Dist., Near HITEC City, Hyderabad - 500 084
Tel: +91 40 44185111 Fax: +91 40 44185189

S Karthikeyan
+91 98400 02983