IN THE HON'BLE NATIONAL GREEN TRIBUNAL, SOUTHERN ZONE BENCH, CHENNAI

ORGINAL APPLICATION NO. 2 of 2023

IN THE MATTER OF: -

Jagan kumar

…. Applicant

Versus

The Addl. Chief Secretary,

Govt. Of Karnataka & Ors. …. Respondent

ADDITIONAL AFFIDAVIT FILED ON BEHALF OF THE MINISTRY OF ENVIRONMENT FOREST AND CLIMATE CHANGE

Filed by:
G.M. SYED NURULLAH SHERIFF
Senior Standing Counsel
MoEF&Cc.
Mob. No. 9444015330
Counsel for Respondent no.6

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL

SOUTH ZONE, CHENNAI

ORIGINAL APPLICATION No. 2 of 2023

IN THE MATTER OF

Shri Jagan Kumar J . ... APPLICANT

VERSUS

The Additional Chief Secretary, Government of Karnataka, Department of Forest, Ecology and Environmental Science & Ors. . ...RESPONDENTS

ADDITIONAL AFFIDAVIT IN COMPLIANCE OF HON'BLE NGT'S DIRECTION DATED 28.02.2024 ON BEHALF OF THE RESPONDENT NO.6, i.e., MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE.

MOST RESPECTFULLY SHOWETH:

I, Dr. R. Sridhar working as Scientist "D" in the Ministry of Environment, Forest and Climate Change (MoEF&CC), Regional Office, Bengaluru and I the deponent do hereby solemnly affirm and state on oath as under: -

1. That I am competent to swear the present additional affidavit on behalf of MoEF&CC and I am aware of the facts and circumstances of the present case based on its record.

2. That I have perused the contents of the above captioned application so filed by the applicant and I am duly authorized to depose by way of the present additional affidavit.

3. It is humbly submitted that the Hon'ble Tribunal vide its order dated 28.02.2024 has directed the Answering Respondent (i.e., MoEF&CC), SEIAA and CPCB to formulate a rule in coordination regarding the glass facades and make it available in the public domain.

डॉ. आर. श्रीधर / Dr. R. Sridhar
संयुक्त निदेशक/वैज्ञानिक 'डी' / Joint Director / Scientist 'D'
पर्यावरण,वन एवं जलवायु परिवर्तन मंत्रालय
MINISTRY OF ENVIRONMENT, FORESTS & CLIMATE CHANGE
भारत सरकार / Government of India
क्षेत्रीय कार्यालय (दक्षिणी क्षेत्र)
Regional Office (Southern Zone)
केन्द्रीय सदन, कोरमंगला, बेंगलूरु – 560034
Kendriya Sadan, Koramangala, Bengaluru - 560034.

4 . In compliance to the aforementioned direction, a meeting was conducted by the Answering Respondent on 12.04.2024 along with the officers of the Bureau of Indian Standards (BIS), Bureau of Energy Efficiency (BEE), State Environment Impact Assessment Authority (SEIAA), Karnataka and Central Pollution Control Board (CPCB). Since, the matter could not be concluded in this meeting, second meeting was held on 06.05.2024 along with the officers from BIS, BEE and CPCB wherein it has been emerged that there is no need to formulate new rules in respect of use of glass or glass facades as existing norms of National Building Code by BIS and Energy Conservation Building Code by BEE are in place, and in practice across the country including in the State of Karnataka. **A copy of the Minutes of Meeting dated 06.05.2024 is annexed as Annexure-R/1.**

5. It is humbly submitted that the representative of BIS informed that the National Building Code of India (NBC) is a Special Publication of the BIS, which is voluntary in nature and its enforcement depends on adoption by concerned parties or by appropriate adoption by the concerned local bodies/Authorities. It is a national instrument providing guidelines for regulating building construction activities across the country. It serves, as a Model Code for adoption by all agencies involved in building construction works, be the Public Works Departments, other government construction departments, local bodies or private construction agencies.

6 . It is humbly submitted that the representative of BEE informed that Energy Conservation Building Code (ECBC), 2007 and 2017 are already published. The purpose of the Energy Conservation Building Code is to provide minimum requirements for the energy-efficient design and construction of buildings. As per section 15 of the Energy Conservation Act,2001, the State Government may, by notification, in consultation with the Bureau of Energy Efficiency

a. amend the energy conservation and sustainable building codes to suit the regional and local climatic conditions and may, by rules made by it, specify and notify energy conservation building codes with respect to use of energy in the buildings and implement the same through building bye-laws of the state.

डॉ. आर. श्रीधर / Dr. R. Sridhar
संयुक्त निदेशक/वैज्ञानिक 'डी' / Joint Director / Scientist 'D'
पर्यावरण,वन एवं जलवायु परिवर्तन मंत्रालय
MINISTRY OF ENVIRONMENT, FORESTS & CLIMATE CHANGE
भारत सरकार / Government of India
क्षेत्रीय कार्यालय (दक्षिणी क्षेत्र)
Regional Office (Southern Zone)
केन्द्रीय सदन, कोरमंगला, बेंगलूरु – 560034
Kendriya Sadan, Koramangala, Bengaluru - 560034.

b. direct every owner or occupier of a building or building complex being a designated consumer to comply with the provisions of the energy conservation building codes.

ECBC codes may be adopted as such or modified by the State Governments as per their policy and are generally implemented through Urban Local Bodies. In view of this, it is humbly prayed that, if required, any further information in respect of the status of implementation of ECBC norms in the State of Karnataka may directly be obtained from the State Government of Karnataka, one of the respondents in this matter.

7. It is submitted that the present additional affidavit may kindly be taken on record and into consideration and the Hon'ble Tribunal may pass appropriate Order(s), direction(s) as deemed fit and proper under the facts and circumstances of the present case.

8. That other/ancillary issues raised in the application under reply do not pertain to the answering respondent. The Answering Respondent seeks leave to make additional submissions, if required, during the course of the proceedings.

DEPONENT

डॉ. आर. श्रीधर / Dr. R. Sridhar
संयुक्त निदेशक/वैज्ञानिक 'डी' / Joint Director / Scientist 'D'
पर्यावरण,वन एवं जलवायु परिवर्तन मंत्रालय
MINISTRY OF ENVIRONMENT, FORESTS & CLIMATE CHANGE
भारत सरकार / Government of India
क्षेत्रीय कार्यालय (दक्षिणी क्षेत्र)
Regional Office (Southern Zone)
केन्द्रीय सदन, कोरमंगला, बेंगलूरु – 560034
Kendriya Sadan, Koramangala, Bengaluru - 560034.

VERIFICATION

Verified at Bengaluru on this 20th day of August, 2024 that the contents of the above affidavit are correct to my knowledge and belief based on official records and nothing material has been concealed therefrom.

DEPONENT

डॉ. आर. श्रीधर / Dr. R. Sridhar
संयुक्त निदेशक/वैज्ञानिक 'डी' / Joint Director / Scientist 'D'
पर्यावरण,वन एवं जलवायु परिवर्तन मंत्रालय
MINISTRY OF ENVIRONMENT, FORESTS & CLIMATE CHANGE
भारत सरकार / Government of India
क्षेत्रीय कार्यालय (दक्षिणी क्षेत्र)
Regional Office (Southern Zone)
केन्द्रीय सदन, कोरमंगला, बेंगलूरु – 560034
Kendriya Sadan, Koramangala, Bengaluru - 560034.

Minutes of the Meeting held on 06.05.2023 in the matter of Hon'ble NGT OA No. 02/2023 titled as Shri Jagan Kumar J Vs The Addl. Chief Secretary, Government of Karnataka, Dept. of Forest, Ecology& Environmental Science, Bengaluru, Southern Zone, Chennai.

Meeting date & time	:	6th May, 2024 at 3:00 PM
Agenda	:	ECBC Norms for Buildings Vis a Vis Glass Façade w.r.t EIA notification.
Participants	:	List is enclosed as **Annexure-I**

Hon'ble NGT vide order dated 28.02.2024 in the matter of OA No. 02/2023 southern zone titled as Jagan Kumar J., Bengaluru. Versus The Addl. Chief Secretary, Govt. of Karnataka, Deptt. of Forest, Ecology & Environmental Science, Bengaluru has directed that the MoEF&CC, SEIAA and CPCB in coordination to formulate a rule regarding the glass facades and make it available in the public domain.

2. In compliance to the aforementioned direction, a meeting was conducted by the Ministry on 12.04.2024 along with the officers of the Bureau of Indian Standards (BIS), Bureau of Energy Efficiency (BEE), State Environment Impact Assessment Authority (SEIAA), Karnataka and Central Pollution Control Board (CPCB). Since, the matter could not be concluded in the meeting, second meeting was held on 06.05.2024 along with the officers from BIS, BEE and CPCB wherein it has been emerged that there is no need to formulate new rules in respect of use of glass or glass facades as existing norms of National Building Code by BIS and Energy Conservation Building Code by BEE are in place, and in practice across the country including in the State of Karnataka.

3. Representative of BIS informed that the National Building Code of India (NBC) is a Special Publication of the BIS, which is voluntary in nature and its enforcement depends on adoption by concerned parties or by appropriate adoption by the concerned local bodies / Authorities. It is a national instrument providing guidelines for regulating building construction activities across the country. It serves as a Model Code for adoption by all agencies involved in building construction works, be the Public Works Departments, other government construction departments, local bodies or private construction agencies. Key provisions in the *National Building Code of India 2016 (*NBC 2016) related to the use of Glass Facades in Building Construction are enclosed in Annexure-II.

4. Representative of BEE informed that Energy Conservation Building Code (ECBC), 2007 and 2017 are already published. The purpose of the Energy Conservation Building Code is to provide minimum requirements for the energy-efficient design and construction of buildings. Key provisions in the Energy Conservation Building Code

2007 and Energy Conservation Building Code *2017* related to the use of Glass Facades in Building Construction are enclosed in Annexure-II.

5. As per section 15 of the Energy Conservation Act (2001), the State Government may, by notification, in consultation with the BEE: (a) amend the energy conservation and sustainable building codes to suit the regional and local climatic conditions and may, by rules made by it, specify and notify energy conservation building codes with respect to use of energy in the buildings and implement the same through building bye-laws of the state; and (b) direct every owner or occupier of a building or building complex being a designated consumer to comply with the provisions of the energy conservation building codes.

Annexure-I

List of Participants

Sl. No.	Name & Designation	Organization
1.	Ashish Kumar, Additional Director & Scientist-E	MoEF&CC
2.	Dr S Prabhu , Scientist D	MoEF&CC
3.	Sharandeep Singh, Scientist E &DH-UPC-I	Central Pollution Control Board
4.	Dr. Arun Kumar S , Scientist E & Head NBC Cell	Bureau of Standards
5.	Saurabh Diddi, Director, BEE	Bureau of Energy Efficiency
6.	Meenal Anand, Senior Sector Expert, BEE	Bureau of Energy Efficiency
7.	Sh Danish Meena, Scientist, C UPC-I	Central Pollution Control Board
8.	Dr. Shubham Choudhary, Scientist B & Assistant Director of BIS	Bureau of Standards
9.	Ms. Suman, Associate Legal	MoEF&CC

Annexure-II

Key provisions in the Energy Conservation Building Code (ECBC) *2007 and* Energy Conservation Building Code *2017* related to use of Glass Facades in Building Construction

1. ECBC 2007 was introduced by the Bureau of Energy Efficiency, Ministry of Power in 2007 to establish minimum energy efficiency requirements for commercial buildings, as well as providing guidelines for their design and construction. The ECBC 2007 outlines standards related to building envelope, lighting, heating, ventilation, air conditioning, and electrical systems to ensure energy efficiency in commercial buildings.

2. The ECBC 2007 has undergone revisions and updates over the years to keep pace with advancements in building technology and to enhance energy efficiency standards. ECBC 2017 with amendment upto 2020 is the latest published code, is presently undergoing further revisions to integrate sustainability criteria.

   The salient features of the Code are:

   - Technology Neutral
   - Renewable Energy Integration
   - Incremental energy performance levels (ECBC, ECBC plus and Super ECBC)
   - Integration of passive design strategies like daylighting and shading
   - Efficiency requirements specific to climate, building types and operation intensity

   With respect to the construction of building envelope, ECBC 2007 provides the mandatory and prescriptive requirement for Fenestration, opaque construction (Exterior walls & Roof).

   In ECBC mentioned the parameter values such as the, Solar Heat Gain Coefficient (SHGC), and Visible Light Transmittance (VLT) of the glass to achieve the compliance.

   ECBC 2007 defines under "Vertical Fenestration (refer Section 4.3.3)",

   - The maximum allowed SHGC (Solar heat gain coefficient)
   - Window to wall Ratio (WWR) requirement in accordance with the climatic zone.
   - Further, in the section 4.3.3.1 it provides the minimum Visible Light Transmission (VLT) requirement of the glass in accordance with the window to wall Ratio (WWR).

   Wherein, Fenestration means- all area (including the frames) in the building envelope that let in light, including windows, plastic panels, clerestories, skylights, glass doors that are more than one-half glass and glass walls.

3. In ECBC 2017, the code sets the mandatory and prescriptive provisions within building envelope chapter for Roof, opaque wall and Fenestration. Section 4.3.3, outlining prescriptive requirements, stipulates that the maximum allowable Window-to-Wall Ratio (WWR) is 40%, applicable to buildings demonstrating

compliance through the prescriptive method, including the building trade-off method.

For all climatic zones, vertical fenestration compliance requirements for all three energy efficiency levels, i.e. ECBC, ECBC+, and Super ECBC, shall comply with the following:

a) Maximum allowable Window Wall Ratio (WWR) is 40% (applicable to buildings showing compliance using the Prescriptive Method, including Building Envelope Trade-off Method)
b) Minimum allowable Visible light transmittance (VLT) is 0.27
c) Assembly U-factor shall be determined for the overall fenestration product (including the sash and frame)

Vertical fenestration shall comply with the maximum Solar Heat Gain Coefficient (SHGC) and U-factor requirements of Table 4-10 for ECBC buildings and Table 4-11 for ECBC+ buildings and Super ECBC buildings. Vertical fenestration on non-cardinal direction, shall be categorized under a particular cardinal direction if its orientation is within ±45°of that cardinal direction.

Table 4-10 Vertical Fenestration Assembly U-factor and SHGC Requirements for ECBC Buildings

	Composite	*Hot and dry*	*Warm and humid*	*Temperate*	*Cold*
Maximum U-factor ($W/m^2.K$)	3.00	3.00	3.00	3.00	3.00
Maximum SHGC Non-North	0.27	0.27	0.27	0.27	0.62
Maximum SHGC North for latitude ≥ 15°N	0.50	0.50	0.50	0.50	0.62
Maximum SHGC North for latitude < 15°N	0.27	0.27	0.27	0.27	0.62
See Appendix A for default values of unrated fenestration.					

Table 4-11 Vertical Fenestration U-factor and SHGC Requirements for ECBC+ buildings and Super ECBC buildings

	Composite	*Hot and dry*	*Warm and humid*	*Temperate*	*Cold*
Maximum U-factor ($W/m^2.K$)	2.20	2.20	2.20	3.00	1.80
Maximum SHGC Non-North	0.25	0.25	0.25	0.25	0.62
Maximum SHGC North for latitude ≥ 15°N	0.50	0.50	0.50	0.50	0.62
Maximum SHGC North for latitude < 15°N	0.25	0.25	0.25	0.25	0.62

B. Key provisions in the *National Building Code of India 2016* (NBC 2016) related to the use of Glass Facades in Building Construction

1. ***Part 6 'Structural Design'/Section 8 'Glass and Glazing'*** *of the National Building Code of India 2016 (NBC 2016) on Glass and Glazing provides detailed requirements. The scope of this Part/Section of NBC covers the following aspects:*

   a. Selection and application of glass in buildings, different types of glass, their requirements and associated glazing materials;
   b. Guiding provision for glazing in buildings with respect to their effect on energy, visual (light) and solar environments in the building;
   c. Selection of glass in buildings, subject to wind loading, seismic loading and special considerations for fire rated glass and related materials;
   d. Provisions for the selection, manifestation of glass in buildings, subject to safety with respect to human impact of the occupants; and
   e. Provisions relating to glazing systems such as selection, design, fabrication, installation, testing and maintenance.

2. The window wall ratio (WWR) is limited to 70 percent means total fenestration area to the total gross area of the building envelope should be less than 70 percent. The corresponding minimum visible light transmission is given below:

WWR	Minimum Visible Light Transmission Percent
0 – 0.3	27
0.31 – 0.4	20
0.41 – 0.5	16
0.51 – 0.6	13
0.61 – 0.7	11

3. The Part 11 'Approach to Sustainability' of NBC 2016 covers the parameters required to be considered for planning, design, construction, operation and maintenance of buildings and those relating to land development, from sustainability point of view. Part 11 of NBC is a necessary supplement to all other Parts/Sections of the NBC and shall be read along with the same.

   - As per para 3 of Clause 6.2.2 'Building Form, Orientation and Shading' under 6.2 'Site Design and Development' of Part 11 'Approach to Sustainability' of NBC 2016:

     "The responsible design professional shall carry out building orientation and shading studies and establish the optimal building orientation for the project and ensure appropriate shading design such that the facades are shaded for more than 50 percent of the summer solstice."

   - Clause 8 Envelope Optimization of Part 11 of NBC 2016 discuss the building climatic response. Under Clause 8.1.3 provides the requirements on 'Fenestration'. The Clause 8.1.3.2 covers 'Design for windows in air conditioned and non-air-conditioned spaces/mixed mode ventilated spaces' respectively under clauses 8.1.3.2.1 and 8.1.3.2.2.

     Clause 8.1.3.2.1 of Part 11 'Approach to Sustainability' of NBC 2016 covers aspects such as 'Windows in air-conditioned buildings' including

U-value of fenestration, Solar heat gain coefficient (SHGC) of fenestration, Shading and adjusted SHGC, Projection factor, Impact on lighting energy consumption. According to this clause, the window wall ratio on a façade, correlated to the visible light transmittance of the glazing shall not exceed 60 percent.

Clause **8.1.3.2.2** in Part 11 'Approach to Sustainability' of NBC 2016 covers:

"The maximum permissible WWR on a facade should not exceed 60 percent. Window opening requirements for naturally ventilated low-rise residential and office buildings include the following:

1. In order to allow outside air to enter the space, window openings should be oriented appropriately to optimize heat and solar heat gain.
2. In order to facilitate cross ventilation, location of window openings should be located opposite to each other on walls parallel to each other.
3. In order to achieve the required air change per hour in a given space, cross ventilation and stack ventilation mode of natural ventilation should be adopted."

- Clause 9 Materials of Part 11 of NBC 2016 discusses the requirements of various building materials. Under Clause 9.2.3 'Building Fenestration and Detailing', Clause 9.2.3.1 on Glazing indicates the following:

  "Glass is a high embodied energy mineral material. Its usage is in skylights, windows, glazing systems, flooring, infill panels for doors. Glass helps to get in natural daylight to interior spaces and provides views. Glazing, if not chosen and positioned in a building properly, may lead to lot of heat ingress/egress. Glass shall be selected with high recycled content and shall be so sized as to minimise wastages. Use of glazing in fenestration shall be in accordance with 8.1.3."

*****