SEE MORE

Sustaining the cities - Glazed way

Introduction

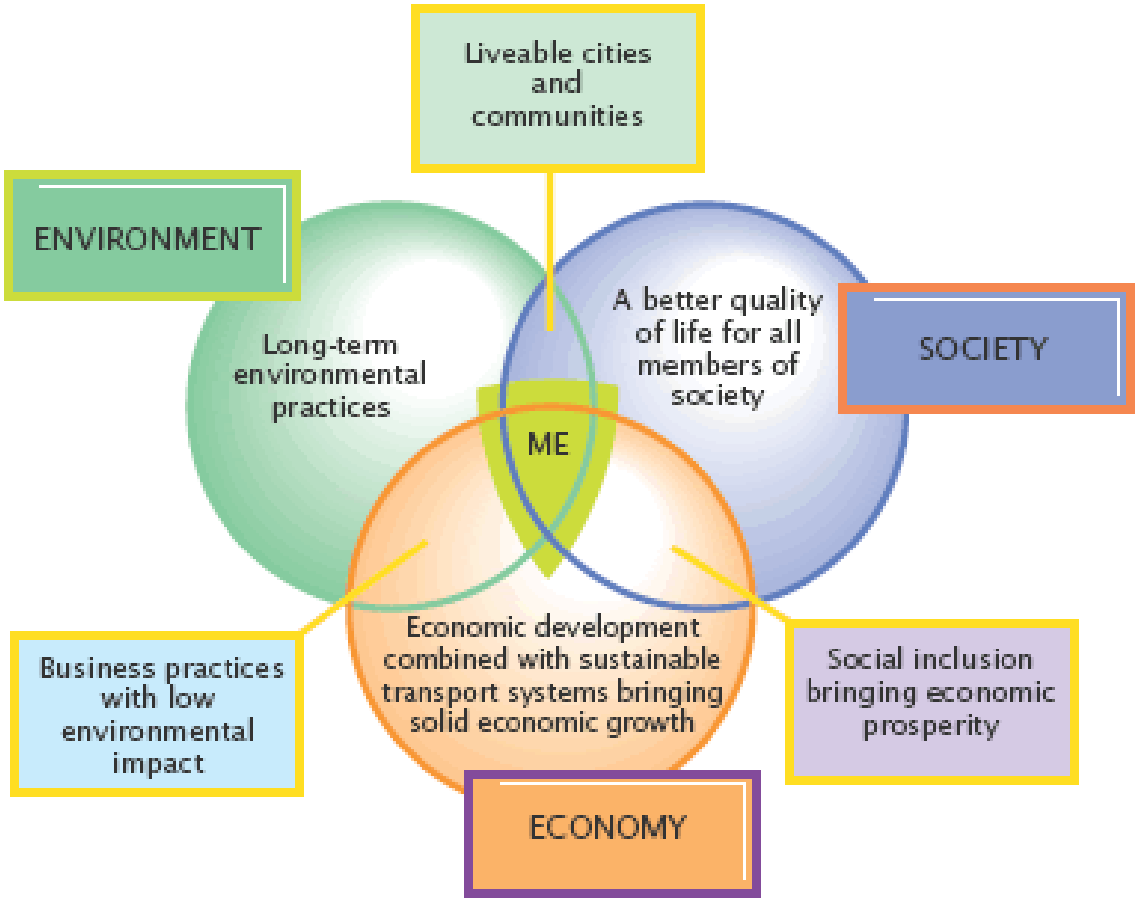
A **sustainable city**, or **eco-city** is a city designed with consideration of environmental impact, inhabited by people dedicated to **minimization of required inputs of energy, materials, water and food, and waste output of heat, air pollution - CO2, methane, and water pollution.**

Introduction

The definition itself and implementation of all these components calls for very high level of commitment. Now the question is-

If any one of the criteria is not meeting, can we call such development as Sustainable?

Hence we need materials and technology which addresses all these issues.



Introduction

Any city mainly consists of buildings (Office/Residential/ Industrial/ Commercial/ Recreational etc.). Hence Sustainability of city largely depends upon how sustainable are the buildings. If we look back at the definition of sustainable cities, few key issues are highlighted within a building domain -

1. **Better quality of life implied by better living spaces here**
2. **Minimum wastage**
3. **Long Term Environmental Benefits**
4. **Liveable Cities**

Glass ensures a Sustainable development in more comprehensive way than any other material.

Better Quality of Life

Better living spaces means building which have-

1. Better visual comfort – Ensured by Glass due to its unique quality of transparence.
2. Better thermal comfort – Ensured by high performance coated glass which allows only visible spectrum of solar radiation to come in and blocks IR and UV radiation.
3. Better aesthetics – Smooth and clean surfaces provide better looking finishes which are easy to maintain. Unlike other building materials, glass doesn't deteriorate, flake or disintegrate thereby maintaining the same look for years.

Minimum Wastage

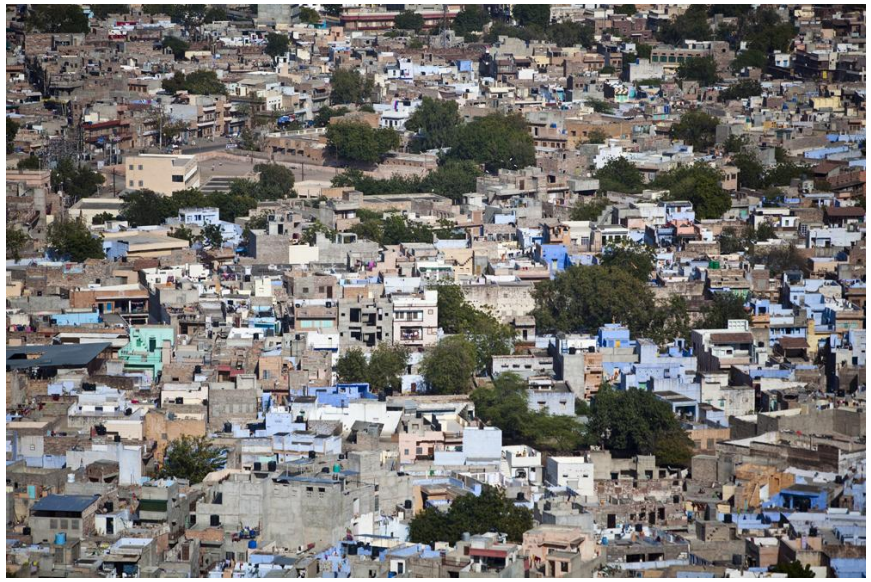
1. Glass is a material which is fully recyclable. Wastage that occurs during installation and after the full life use can be fully recycled infinitely without disintegration.
2. Glass is manufactured from sand as its main ingredient which is abundant in nature and doesn't stress our ecosystem.

Long Term Environmental Practices

According to a detailed study undertaken in 2005*, the manufacturing of 1sqm of low-E double glazing leads to the **emission of 25 kg of CO2** and this has been further reduced by the introduction of new manufacturing technologies in recent years. On the other hand, the CO2 saved by replacing one square metre of single glazing by low-E double glazing represents 91 kg CO2 per year. The **CO2 emitted during production is thus offset after only 3.5 months use**.

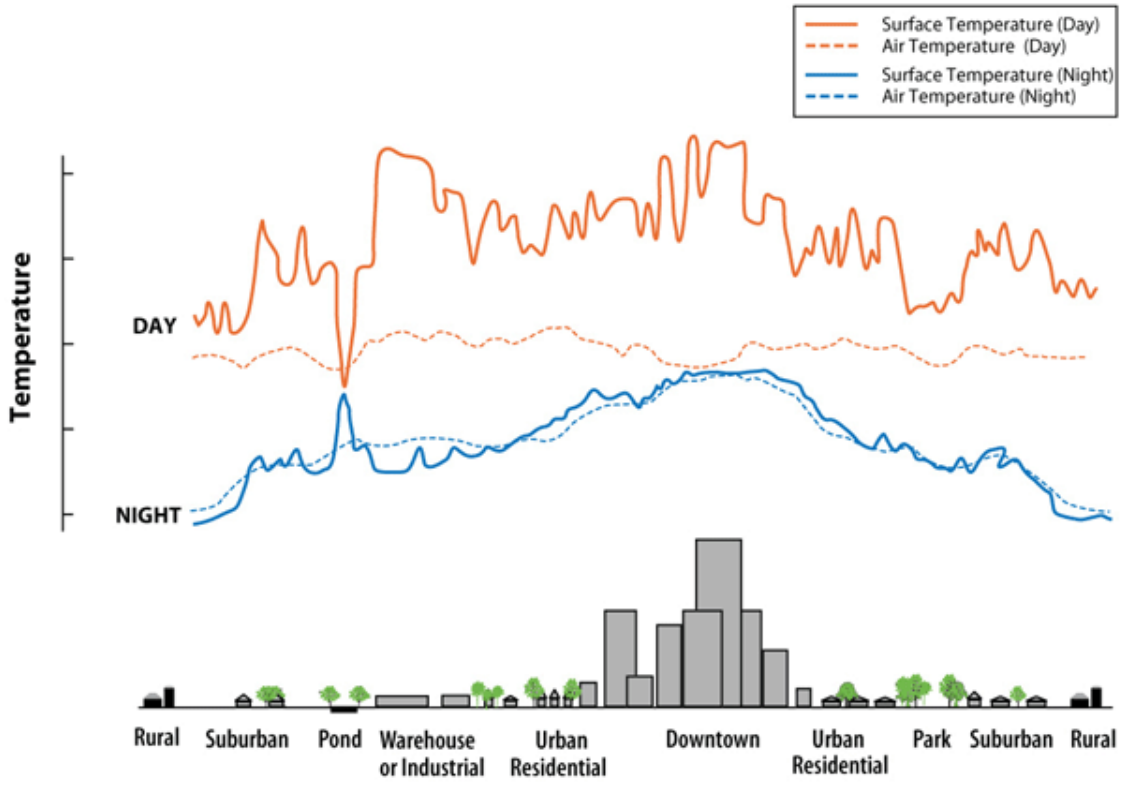
Liveable Cities

Main issue which is making cities unsustainable for living - Heat Island Effect



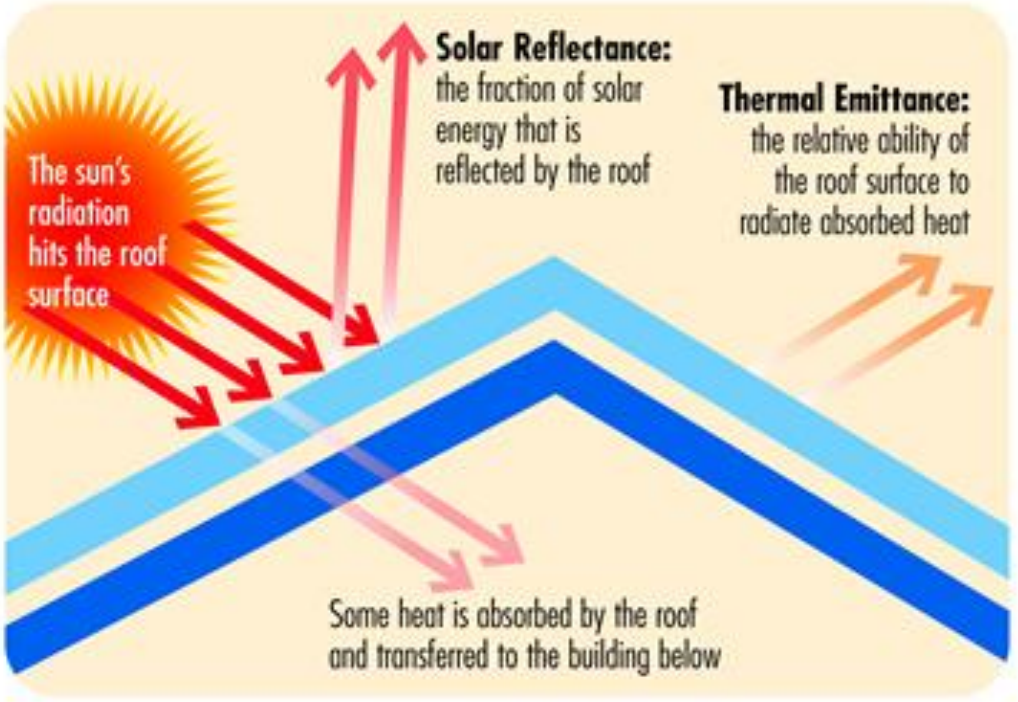
Liveable Cities- Heat Island Effect

An **urban heat island** (**UHI**) is a metropolitan area which is significantly warmer than its surrounding rural areas. The **main cause of the urban heat island is modification of the land surface by urban development which uses materials which effectively retain heat.** Waste heat generated by energy usage is a secondary contributor.



Liveable Cities- Heat Island Effect

Mitigation of the urban heat island effect can be accomplished through the use of green roofs and the use of lighter-colored surfaces in urban areas, which reflect more sunlight and absorb less heat. If materials which have high SRI are used in building, Heat Island Effect can be mitigated by at least 50%.



Liveable Cities- Heat Island Effect

A composite index called the solar reflectance index (SRI) is used by the U.S. Green Building Council and others to estimate how hot a surface will get when exposed to full sun. The temperature of a surface depends on the surface's reflectance and emittance, as well as solar radiation. The Solar Reflectance Index (SRI) is used to determine the effect of the reflectance and emittance on the surface temperature, and varies from 100 for a standard white surface to zero for a standard black surface.

Material surface	Solar Reflectance	Emittance	SRI
Black acrylic paint	0.05	0.9	0
New asphalt	0.05	0.9	0
Aged asphalt	0.1	0.9	6
"White" asphalt shingle	0.21	0.91	21
Aged concrete	0.2 to 0.3	0.9	19 to 32
New concrete (ordinary)	0.35 to 0.45	0.9	38 to 52
New white portland cement concrete	0.7 to 0.8	0.9	86 to 100
White acrylic paint	0.8	0.9	100

Liveable Cities- Heat Island Effect

Glass has a high emmissivity of around 0.85 and medium reflectance of 0.50. If reflective glass is used instead of normal float glass, reflectance can be increased further.

Therefore **Glass can** be used as a replacement for many building materials if SRI is considered thereby **reducing Heat Island Effect considerably**.

Liveable Cities- Heat Island Effect

Only issue with glass would be high transmission as compared to other building materials which have zero transmission. Transmission has been considerably brought down by application of selective coatings where U value comes as low as 1.1 and Solar Factor is reduced to 0.20. Thereby reducing the amount of heat transferred inside.

Conclusion

Glass has many advantages which make it a sustainable material from all perspectives-

1. **Life Cycle Analysis**
2. **Environment friendly**
3. **Recyclability**
4. **High SRI**
5. **Visual connectivity with nature**
6. **Environment friendly ingredients**

A sense towards sustainability- Ecosense

Now as we have the technology, Ecosense , to create better environment, we must do it to ensure that our future generations inherit an environment which is worth living.

Welcome to a world which enables you to do more

Thank you

for your time