

BUILDING ENVELOPE OPTIMIZATION

Construction is the second largest economic activity in India and has contributed around 8% to the nation's GDP (at constant prices) from 2006-07 to 2010-11. The real estate sector contributes to around 24% to the construction GDP of India and has been growing at a CAGR of 12%.

It has been estimated that 70% of the building stock in the year 2030 would be built during 2010-30. Residential and commercial sectors account for 29% of the total electricity consumption which is approximately 294 TWh in 2012 and would increase to 11948 TWh by 2047, if present trends continue. This analysis works on reducing electricity consumption, through greater penetration of building codes into construction of buildings which would reduce the need for lighting, heating, ventilation and air conditioning.

Level 1

Level 1 assumes that compliance to the ECBC codes remains voluntary, as is the case since its inception at the beginning of the 11th five year plan (FYP). Institutional, technological, informational and financial barriers also exist, which hinder the applicability of the same. By 2047, India's resulting building electricity demand would be 11945 TWh and savings would be 0.03%.

Level 2

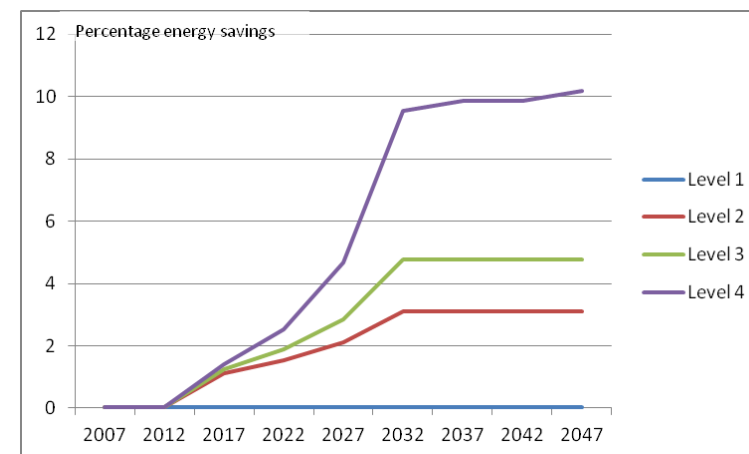
Level 2 assumes, as per the Energy Conservation Act 2001, the introduction of a bye law for ECBC compliance in new commercial buildings, and mandatory compliance in government buildings. It also assumes retrofits in the commercial sector as per an earlier decision in 2009. By 2047, India's resulting building energy demand would be 11677 TWh and savings would be approximately 3%.

Level 3

Level 3 assumes that along with standard building bye laws, there is development of ECBC compliance structures at state level, and the modification of the EPI bandwidth based scheme to multi variable EPI scheme. This level also assumes the adoption of the ECBC code in the residential sector. Further, this level assumes a revision in the code at the end of the 12th FYP, increasing percentage energy savings due to compliance. By 2047, India's resulting building energy demand would be 11541 TWh and overall savings would be 4.8% with 4.5% being contributed by the commercial sector.

Level 4

Level 4 assumes a continuation of the multi variable EPI scheme and increasing mandates in states for implementation of the ECBC code. It also assumes the development of a large retrofitting programme for commercial buildings. Further, this scenario assumes revisions in the code every 10 years increasing the energy savings. By 2047, India's resulting building energy demand would be 11096 TWh and savings would be 10.1%, with 9.5% being contributed by the commercial sector.



Percentage penetration of Energy Conservation Building Codes in different types of construction in 2047

	New commercial construction	Commercial retrofits of existing buildings	New residential construction	Residential retrofits of existing buildings
Level 1	10%	0%	0%	0%
Level 2	50%	35%	0%	0%
Level 3	75%	50%	25%	0%
Level 4	100%	100%	50%	0%