
Social Nudging for Green Homes

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Countries need to accelerate the adoption of their national green rating systems, such as Green Rating for Integrated Habitat Assessment (GRIHA) in India, to meet climate targets. Countries should also ensure that the steps taken are economical and easily implementable so that other countries can follow their example. This article describes the three options available to governments: (1) mandate the use of environmentally-friendly construction materials; (2) incentivize homeowners to utilize them; and (3) adopt behavioral science tools (in this case, “social nudges”). This article analyzes the advantages and disadvantages of each option and concludes that applying behavioral science tools is appropriate to increase the adoption of national green rating systems.

India has been ranked within the top ten for two consecutive years in the Climate Change Performance Index,¹ an independent monitoring tool² that evaluates the performance of countries responsible for 90 percent of global greenhouse gas (GHG) emissions.³ During the 2021 United Nations Climate Change Conference (COP26), India further committed to reducing carbon emissions⁴ and meeting 50 percent of its energy requirements from renewable energy by 2030.⁵ Other countries also strengthened their pledged

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Nationally Determined Contributions or climate action plans to cut emissions and adapt to climate impacts required under the Paris Agreement.⁶

Even with these targets and achievements, India's adoption of green buildings and its national green rating system need to strengthen as houses continue to be constructed using conventional (non-green) materials.⁷ Like India, other emerging economies also have twin objectives: to develop economically and industrially while tackling climate change. Different options are available to such governments to achieve the desired results: mandate the use of environment-friendly construction materials, incentivize owners to utilize them, or adopt behavioral science tools.

In emerging economies, mandating that new homeowners disclose their green ratings – a behavioral science tool – would create social pressure that spurs them to construct climate-friendly buildings.

SOCIAL NUDGES AND THEIR EFFICACY

A social nudge – an intervention that induces voluntary cooperation in social dilemmas – can influence individuals' behavior.⁸ Nobel Laureate Richard Thaler and Harvard professor Cass Sunstein in their book *Nudge: The Final Edition*, suggest that social influences come in two basic categories: the first involves information wherein several people doing or thinking something convey information to others about what is best to do or think; the second involves peer pressure wherein people who care about what others think follow the crowd to avoid judgment. The fundamental principle is that humans are easily nudged by others, partly because they like to conform. The authors also share research findings on social nudges influencing individuals' behavior. For example, if people buckle their seatbelts, drive under the speed limit, save for retirement, or wear masks, others might think these behaviors are the right things to do.⁹

Research also suggests that informing people about social norms can be highly effective. For instance, teenage girls who see other teenagers having children are more likely to become pregnant. Similarly, the academic effort of college students is influenced by their peers, and randomly assigned dormitories or roommates impact their grades and future prospects.¹⁰

Further, the Emergency Planning and Community Right-to-Know Act (EPCRA) – enacted in the aftermath of an industrial chemical accident in history from an American plant in Bhopal, India – mandated that firms and individuals in the United States report the quantities of potentially hazardous materials stored or released into the environment.¹¹ Such disclosure requirements reduced toxic releases throughout the United States as

an unanticipated consequence. Thaler and Sunstein argue that a significant reason is that environmentally concerned groups and media drew attention to severe offenders and produced a kind of “environmental blacklist,” an example of a social nudge.¹² Many other areas and countries used similar interventions, such as the Swedish municipalities’ climate index and an Italian sea resort cleanliness and recycling initiative.¹³ Similarly, depicting low-emissions houses online would nudge a new homeowner in emerging economies like India to build a low GHG emissions house and avoid being on the “negative” list.

GREEN RATING SYSTEMS

Around the world, numerous green building rating systems have existed for years, such as Building Research Establishment Environmental Assessment Method (BREEAM) in the UK; Green Star in Australia; German Sustainable Building Council (DGNB) in Germany; Green Globes¹⁴ in the United States and Canada. The Green Building Assessment System (GBAS) is the first building environmental assessment system that can be used for different kinds of buildings in China.¹⁵ Southeast Asian countries also devised their own systems: the Green Building Index in Malaysia, Green Mark in Singapore, and Greenship in Indonesia.¹⁶

The U.S. Green Building Council’s Leadership in Energy and Environmental Design (LEED) green building certification label was introduced in 2000. LEED claims to be a holistic system that considers all critical elements, such as energy, water, and health, to create the best building possible.¹⁷

India launched GRIHA, its national rating system for environmentally-friendly buildings, in 2007. The underlying principle for the system is: “what gets measured gets managed.” The rating is voluntary and uses thirty-four criteria, such as site planning, conservation, and efficient utilization of resources, to recognize energy-efficient buildings and stimulate their large-scale replication. The system designs and evaluates residential and official buildings. It covers all three lifecycle stages – pre-construction, planning and construction, and building operation and maintenance.¹⁸ GRIHA assesses the performance of buildings for parameters such as waste generation, renewable energy utilization, energy consumption, and reduction in demand for water. It has five ratings, and a higher number denotes a more environmentally-friendly building.

GRIHA-certification of the buildings and the activities and processes that lead up to it can reduce GHG emissions, energy consumption, and

stress on natural resources without sacrificing user comfort.¹⁹ Green designs can also reduce water consumption, the destruction of natural habitats, soil erosion, air and water pollution, and waste generation due to recycling and reuse.²⁰

Despite the proliferation of standards, the uptake of green ratings in different countries remains low. For example, according to a report by the China Real Estate Association, only 14.9 percent of certified green buildings in China were three-star in 2018,²¹ and 48 percent met only the lowest level green building requirements.²² In the United States, 38 percent of commercial office space across thirty office markets was certified green or efficient by LEED or Energy Star in 2017.²³ In India, too, there is room for significant improvement.

Different factors contribute to the low uptake of green ratings. Although launched many years back, public awareness remains limited. Additionally, estimates show that the difference in capital expenditure for green versus conventional buildings varies from 5 to 12 percent.²⁴ The additional cost plays into citizens' present bias of being more concerned with the short-term than the long-term. The fact that the social benefit from green buildings exceeds the private benefit is another reason for individuals' low uptake of such a system, and there could be a free rider problem.²⁵

The government has three options to accelerate the adoption and construction of green buildings to mitigate climate change. First, the government can mandate that every new residential house adhere to the green rating and receive a minimum rating.

Second, the government can incentivize citizens to adopt green buildings. For instance, the government can subsidize the additional capital cost for green buildings.

Third, the government can continue the rating's voluntary adoption but mandate its online disclosure requirement. The government can launch a website and require new homeowners to upload their ratings. The homeowners can do so either while buying their houses or registering their apartments. Requiring owners to disclose green ratings would spread awareness about the GRIHA system. Examples like ECPRA suggest that homeowners nudge one another to change their behavior. Thaler and Sunstein add that people seem to respond best to norms set by others in similar settings and circumstances.²⁶ The government can also link the disclosure to faster environmental clearances, which are required before construction.

CONTEXT AND EVIDENCE

Historically, with about an 8 percent rise in annual energy consumption in the Indian residential and commercial sectors, building energy consumption has increased from a low of 14 percent of total yearly energy consumption in the 1970s to nearly 33 percent in 2004-2005.²⁷ This figure was 37 percent in 2016.²⁸

Forty percent of India's population is expected to be urban by 2030, compared to 30 percent currently,²⁹ and 70 percent of buildings required by 2030 have yet to be constructed.³⁰ India could double its building material-related emissions from 2020 to 2060.³¹

In the face of this situation, India adopted a demand-driven approach to address its housing shortage. Through the Pradhan Mantri Awas Yojana program, the government assists with constructing houses for low- and middle-income groups. The mission is to build around 20 million homes.³² Even otherwise, many other houses get built. The project sizes vary from less than five to a few hundred houses.

During COP26, India also committed to achieving net zero by 2070, reducing carbon emissions by 1 billion metric tons from 2021 to 2030, and reducing the carbon intensity of its economy by more than 45 percent.³³ Underlining the significance of a green lifestyle, India also proposed a one-word movement—LiFE or Lifestyle for Environment—and called for the world to unite and take the movement forward as a global campaign. Recently, the Prime Minister, in the presence of the UN Secretary-General, launched Mission LiFE,³⁴ an initiative that intends to nudge individuals to undertake simple acts in their daily lives that can contribute significantly to climate change.

Given the scale of requirements for and commitments by emerging economies like India, supply-side and demand-side interventions are critical. As part of mitigation efforts, India is implementing an extensive renewable energy expansion program to achieve 500 gigawatts (GW) of renewable energy capacity by 2030.³⁵ It has also coupled its post-pandemic revival with environmental protection. The government announced several green measures as part of its fiscal stimulus, including a USD 26.5 billion investment in biogas and cleaner fuels, USD 3.5 billion in incentives for producing efficient solar photovoltaics (PV) and advanced chemistry cell batteries, and USD 780 million toward an afforestation program.³⁶

Other emerging economies are also working towards developing their citizens' social and economic lives while simultaneously contributing to global efforts to tackle climate change. Several countries have set net zero

targets, pledging to achieve a balance between the greenhouse gases put into the atmosphere and those taken out.

Behavioral changes can complement these efforts. The International Energy Agency estimates that consumer choices – such as purchasing an EV, retrofitting a house with energy-efficient technologies, or installing a heat pump – can reduce 55 percent of cumulative emissions.³⁷ Behavioral changes, particularly in advanced economies – such as replacing car trips with walking, cycling, or public transport or foregoing a long-haul flight – can further reduce them. Therefore, citizens' participation and behavior changes can aid in achieving the net zero pathway.

OUTCOMES

Green buildings can have a significant impact on GHG emissions. Green-rated commercial buildings could lower GHG emissions by 38 percent by 2030 compared to the business-as-usual scenario (-1370 metric tons of carbon dioxide equivalent (MtCO₂e)).³⁸ Similarly, residential buildings have a high potential for environmental impact.³⁹ Green buildings can also assist in achieving India's national emissions reduction targets. Above all, green buildings can increase environmental consciousness and inspire global action. Indeed, India can motivate other nations.⁴⁰

Research suggests that the GRIHA rating, which by 2019 had been applied to 565 million square feet of building since its inception, has contributed to 85 megawatt peak (MWp)⁴¹ of renewable energy installations through rated projects, offset 741,801 metric tons of carbon dioxide per year, and saved 2,620,557 megawatt hours (MWh) in post-construction energy consumption.⁴² A single five-star rated commercial building in New Delhi achieved a 62.2 percent reduction in energy consumption compared to the GRIHA benchmark.

By 2030, as per an estimate, the registered GRIHA projects as of 2019, following rating and occupancy, can, among other things, contribute to the installation of 2.5 gigawatts (GW) peak of renewable energy and save 84,871 GWh/annum in post-construction energy consumption.⁴³ If the adoption of GRIHA goes up, the impact can be even more significant.

CRITERIA AND TRADEOFFS

Each available option needs to be evaluated against the benefits that it can accrue. For economies like India, securing housing for all is essential. Simultaneously, these emerging economies need to reduce their

energy demand, and the construction industry needs to be able to supply environmentally-friendly goods and services to construct them. The solution should be cost-effective, for India's GDP contracted by a record 7.7 percent due to the pandemic, and it must also be politically feasible. By 2024, developing economies (excluding China) will have fallen 5.5 percent below their pre-pandemic expected GDP growth.⁴⁴

The first option – the government mandating every house to adhere to the adopted GRIHA norms – would reduce energy demand and tackle climate change. However, it would also be expensive for citizens, as not all citizens may be able to afford it. Given the scale, the construction-material industry might be unable to supply goods and related services for eco-friendly construction, which would constrain the provision of materials and increase construction time. As a result, “housing for all” may become difficult to achieve by the target date, reducing housing demand and affecting other sectors.

The second alternative is subsidizing the incremental capital cost of making environmentally-friendly houses to reduce GHGs. However, the additional charge will be economically burdensome for the government. Requiring citizens to produce documents for the subsidy might increase administrative inefficiencies. The industrial challenges to supply materials are also likely to continue, again, given the scale. As a result, the construction process might decelerate.

The third option – nudging the citizens socially through their disclosures⁴⁵ – would increase construction of green buildings without any financial outflow from the government budget. Transparent disclosures create a social nudge and spur the adoption of green residences without any mandate. Such displays can draw public attention, create a negative list of those constructing conventional buildings, and establish healthy competition. The intervention would be cost-effective for the government and homeowners. Evidence suggests⁴⁶ that there is no significant difference in the average cost of a green building and other new construction over its life due to low operating expenses.⁴⁷ Hence, over time, people's demand would lead to an increased supply of eco-friendly houses. The gradual rise would prepare the construction industry to meet new green demand.

Critics may still argue that constructing green-efficient buildings costs an incremental amount of money upfront, which some of the population may not want to invest initially. The publicity campaigns to promote the adoption of green ratings can also have financial implications. However, even though the adoption is voluntary, given that it is linked to faster approvals, builders, *suo moto*, are likely to advertise about green ratings. The

cost of green buildings would come down with an increased supply of green materials, enabling others to opt in. Further, those who adopt the standards initially could inform others, potentially creating a domino effect.

Internet penetration in India and other emerging economies presents an additional challenge, but data entry (mostly once) on a website does not necessarily require a connection. The high penetration of mobile phones in the country can also help overcome this barrier.

CONCLUSION AND IMPLICATIONS

Emerging economies like India are accelerating the adoption of green rating systems to tackle climate change. For this purpose, they have options, including the mandated use of environment-friendly construction materials, user-oriented incentivization, and other behavioral science tools. Each option has its benefits and tradeoffs. The first option could make it unaffordable for some people to own a house, while the second can make it difficult for governments to sustain costs financially.

The third option – nudging house owners through disclosures to adopt the national green rating system – is economical and relatively easy to implement. Having owners disclose the ratings on a transparent website while buying units or before their registration would create a social nudge. It can improve awareness, establish healthy competition among residents, and spur them to construct climate-friendly buildings.

Given that green building construction will continue to be voluntary, owners who can afford the additional capital cost would adopt and disclose green ratings. The moment of intervention – at purchase or registration – can improve acceptance, addressing the present bias. Faster environmental clearances would also help the cause. In the long run, homeowners could compare the energy consumed and total costs (capital, operation, and maintenance) between green and conventional houses and spread awareness of the reduced energy requirements. These aspects, coupled with the moral imperative of meeting future generations' needs, make it politically feasible to undertake these steps. The government can also achieve its target of “housing for all.”

This cost-effective solution would help change citizens' behavior in the largest democracy and other emerging economies. Increasing the adoption of the national green ratings would contribute toward reductions in GHG emissions intensity. Given its political feasibility, it could further prod other nations. Such a simple yet effective effort could accelerate the LiFE campaign. *f*

ENDNOTES

- 1 “Climate Change Performance Index,” *Drishti IAS*, December 10, 2020, <https://www.drishtiias.com/daily-updates/daily-news-analysis/climate-change-performance-index> (accessed July 24, 2021).
- 2 “CCPI Philosophy & Team,” *Climate Change Performance Index*, November 14, 2022, <https://ccpi.org/ccpi-philosophy-team/>.
- 3 “Climate Change Performance Index 2021,” *Climate Change Performance Index*, <https://ccpi.org/> (accessed December 7, 2020).
- 4 “National Statement by Prime Minister Shri Narendra Modi at COP26 Summit in Glasgow,” *Ministry of External Affairs, Government of India*, November 2, 2021, <https://www.mea.gov.in/Speeches-Statements.htm?dtl/34466/National+Statement+by+Prime+Minister+Shri+Narendra+Modi+at+COP26+Summit+in+Glasgow>.
- 5 *Ibid.*
- 6 “All About the NDCs,” *United Nations Climate Action*, <https://www.un.org/en/climate-change/all-about-ndcs> (accessed December 20, 2022).
- 7 *Green Buildings Market Intelligence: India Country Profile, Report of the International Finance Corporation*, April 2022, <https://edgebuildings.com/wp-content/uploads/2022/04/India-Green-Building-Market-Intelligence.pdf>.
- 8 Michiru Nagatsu, “Social Nudges: Their Mechanisms and Justification,” *Review of Philosophy and Psychology* 6, no. 3 (September 2015): 481–94, <https://doi.org/10.1007/s13164-015-0245-4>.
- 9 Richard H. Thaler and Cass R. Sunstein, *Nudge: The Final Edition*, The Final Edition (Penguin Random House LLC, 2021), 65–67.
- 10 *Ibid.*, 66.
- 11 Thaler and Sunstein, *Nudge: The Final Edition*, 302.
- 12 *Ibid.*, 303.
- 13 *Ibid.*, 302.
- 14 Libby Duane, “Top 12 Green Building Rating Systems,” *Sustainable Investment Group*, June 1, 2020, <https://sigearth.com/top-12-green-building-rating-systems/>.
- 15 Lei Tian and YingXin Zhu, “Study of Adaptability for China’s Specific Condition in GBAS,” n.d., 4, <https://www.irbnet.de/daten/iconda/CIB8216.pdf>.
- 16 Veronica Soebarto and David Ness, “Rethinking the Adoption of Green Building Rating Systems in Developing Countries.” Paper presented at the 11th International Conference on Sustainable Environmental Architecture, Surabaya, Indonesia, January 2010, <https://doi.org/10.13140/2.1.1456.8968>.
- 17 “LEED Rating System,” *U.S. Green Building Council*, accessed April 23, 2022, <https://www.usgbc.org/leed>.
- 18 “About GRIHA,” *Green Rating for Integrated Habitat Assessment India*, accessed February 27, 2022, <https://www.grihaindia.org/about-griha>.
- 19 *Ibid.*
- 20 *Ibid.*
- 21 Yu Cao et al., “A Systematic Review of Green Building Development in China: Advantages, Challenges and Future Directions,” *Sustainability* 14 (September 27, 2022): 12293, <https://doi.org/10.3390/su141912293>.
- 22 *Ibid.*
- 23 Jennifer Gunby, “2017 National Green Building Adoption Index Releases Data on Growth,” *U.S. Green Building Council*, accessed December 3, 2022, <https://www.usgbc.org/articles/2017-national-green-building-adoption-index-releases-data-growth>.
- 24 Makandar and Sanadi, “Limitations of Green Building Rating Systems – A Case of LEED and GRIHA,”; Vaibhav Ganjapure, “Green Building Costs Just 10% Higher

- than Conventional Ones,” *The Times of India*, November 15, 2015, <https://timesofindia.indiatimes.com/city/nagpur/green-building-costs-just-10-higher-than-conventional-ones/articleshow/49786119.cms>; Shaik Rehana Begum and B. Harish Naik, “Greenomics–Cost Efficiency of Green Buildings in India,” *International Journal of Innovative Research in Science, Engineering and Technology* 6, no. 6 (June 2017): 11336, International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 07 Issue: 07 | July 2020, <https://www.irjet.net/archives/V7/i7/IRJET-V7I7345.pdf>
- 25 Considered an example of a market failure, it is an inefficient distribution of goods or services that occurs when some individuals are allowed to consume more than their fair share of the shared resource or pay less than their fair share of the costs.
- 26 Thaler and Sunstein, *Nudge: The Final Edition*, 92.
- 27 Samreen S. Makandar and Nadeem A. Sanadi, “Limitations of Green Building Rating Systems – A Case of LEED and GRIHA,” *International Research Journal of Engineering and Technology (IRJET)* 6, no. 5 (May 2019): 6.
- 28 Ameya Pimpalkhare, “‘Building’ an Energy Efficient India,” *Observer Research Foundation*, July 26, 2018, <https://www.orfonline.org/expert-speak/42744building-an-energy-efficient-india/>.
- 29 “GRIHA for Affordable Housing,” *Green Rating for Integrated Habitat Assessment*, accessed February 27, 2022, <https://www.grihaindia.org/griha-ah>.
- 30 *Green Buildings Market Intelligence: India Country Profile, Report of International Finance Corporation*.
- 31 Xiaoyang Zhong et al., “Global Greenhouse Gas Emissions from Residential and Commercial Building Materials and Mitigation Strategies to 2060,” *Nature Communications* 12, no. 1 (October 21, 2021): 6126, <https://doi.org/10.1038/s41467-021-26212-z>.
- 32 “Pradhan Mantri Awas Yojana,” *Ministry of Housing and Urban Affairs, Government of India*, accessed March 13, 2022, <https://mohua.gov.in/cms/pradhan-mantri-awas-yojana.php>.
- 33 “National Statement by Prime Minister Shri Narendra Modi at COP26 Summit in Glasgow.”
- 34 Press Information Bureau, Government of India, Press Release, Press Release, 20 October 2022 “PM & UNSG Launch Mission LiFE at Statue of Unity, Gujarat,” <https://pib.gov.in/PressReleasePage.aspx?PRID=1869550>.
- 35 *India: Third Biennial Update Report to the United Nations Framework Convention on Climate Change, Ministry of Environment, Forest and Climate Change, Government of India*, 2021, <https://unfccc.int/documents/268470>.
- 36 “Greenness of Stimulus Index: An assessment of COVID-19 stimulus by G20 countries and other major economies in relation to climate action and biodiversity goals,” *Vivid Economics and Finance for Biodiversity Initiative*, February 2021: 54, <https://www.vivideconomics.com/wp-content/uploads/2021/02/Greenness-of-Stimulus-Index-5th-Edition-FINAL-VERSION-09.02.21.pdf#page=54>.
- 37 “Net Zero by 2050: A Roadmap for the Global Energy Sector,” *International Energy Agency*, May 2021, <https://www.iea.org/reports/net-zero-by-2050>.
- 38 “Reaffirming India’s INDCs through GRIHA: Green Rating for Integrated Habitat Assessment,” *Green Rating for Integrated Habitat Assessment*, accessed February 27, 2022, <https://www.grihaindia.org/reaffirming-india>.
- 39 *Green Buildings Market Intelligence: India Country Profile, Report of International Finance Corporation*.
- 40 “Congratulatory Messages on the Launch of Mission LiFE from Heads of States/

Governments,” *PIB Delhi*, October 20, 2022, <https://pib.gov.in/PressReleasePage.aspx?PRID=1869544>.

- 41 MWp is an abbreviation for Megawatt peak—a unit of measurement for the output of power from a source such as solar or wind where the output may vary according to the strength of sunlight or wind speed. MWp is a measure of the maximum potential output of power. *See*: “MWp,” *Quoted Data by Marten & Co (blog)*, <https://quoted-data.com/glossary/mwp/> (accessed November 11, 2022).
- 42 “Why Green Ratings for Buildings Matter?,” *GRIHA India* 7(4) (July-September, 2019), https://www.grihaindia.org/sites/default/files/pdf/News/Energy_Insights_EF_Jul-Sep19.pdf.
- 43 *Ibid.*
- 44 “The Global Risks Report 2022, 17th Edition,” *World Economic Forum*, accessed December 10, 2022, https://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2022.pdf.
- 45 Sumant Narain, “Green Housing Is the Way Forward,” *The Hindu*, May 27, 2022, sec. Real Estate, <https://www.thehindu.com/real-estate/green-housing-is-the-way-forward/article65456291.ece>.
- 47 Nora Knox, “Green Building Costs and Savings,” *U.S. Green Building Council*, accessed March 13, 2022, <https://www.usgbc.org/articles/green-building-costs-and-savings>.
- 47 Ashwini Kumar Sharma, “It is a myth that green buildings cost more; sustainable is affordable,” *Mint*, January 9, 2018, <https://www.livemint.com/Money/4NU5wmfTwMEqrixyhUml5I/It-is-a-myth-that-green-buildings-cost-more-sustainable-is.html>.