



Terwilliger Center for
Innovation in Shelter

Green housing solutions in the Philippines

Making
sustainable,
circular housing
more accessible
and affordable
for low-income
households



The growing need for sustainable and green housing in the Philippines

Underserved populations are most acutely impacted by the effects of climate change. The Philippines is navigating the increasing frequency of natural disasters fueled by climate change, which displace more than 3.6 million Filipinos each year, while also facing a significant shortage of affordable housing stock.¹ More than 3.1 million low-income Filipino families are excluded from formal housing markets and belong instead to the underserved segments at the bottom of the pyramid that access housing through owner driven construction (ODC).²

These families build their homes incrementally over decades. Families that lack access to resilient or secure housing are the most adversely affected by natural disasters because, in addition to poor construction practices, they are more likely to live in areas that are vulnerable to floods, cyclones, mudslides, typhoons and sea level rise. A strong housing sector that supports adequate, affordable, sustainable housing can provide a defense against a changing climate and increasing climate-driven disasters.³

The **owner-driven construction or ODC** housing segment is a housing segment in the Philippines characterized by (1) security of land tenure; (2) daily income ranging from US\$ 5 to 15 or a maximum annual income of Php 90,000 to Php 270,000 based on the prevailing exchange rate of Php 50:US\$ 1 (according to Philippine Statistics Authority and World Bank data); (3) ownership of a residence which may start as a “temporary” housing unit but which they are willing to invest in and upgrade; and (4) usually rural or peri-urban location.

¹ IDMC, 2011-2020 PH Internal [Displacement](#) Data, IDMC

² Habitat for Humanity Terwilliger Center for Innovation in Shelter, Clearing the Housing Backlog: An Updated Supply and Demand Study on Unserved Owner-Driven Construction Segment in the Philippines, 2020

³ UN Disaster Risk Reduction, Global Assessment Report on Disaster Risk Reduction, 2019







What is the role of green housing in the construction sector?

Adequate planning, design and safe construction practices should result in housing that is more resilient to disasters and climate hazards. But there are challenges in ensuring low-income families' access to such services. There is also an unmet opportunity to leverage new green housing construction as a means of climate change mitigation.

In the Philippines, there is a need to harmonize and align sustainable building practices, policy and financing mechanisms to enable the adoption of green construction for the affordable housing sector. The importance of green housing is clear when we examine the opportunity and need through three lenses:

- 1 As a driver of economic growth:** The housing sector significantly impacts the national economy and has tremendous potential to increase productivity through increased efficiency. With 75% of infrastructure planned by 2050 projected to be built in the Global South, green housing should be affordable, support the local economy and have a sustainable life cycle that considers costs, maintenance, and reuse of construction materials. As an engine of growth, greening the housing sector can support local business development, promote jobs and livelihoods, and reduce greenhouse gas emissions from the construction sector.
- 2 As a foundation for social cohesion:** Green housing solutions should consider the local cultural identity, respect and value of heritage, tap into the bayanihan spirit, preservation of the landscape, and emotional well-being of the people. It must involve local communities in the development processes particularly to drive broad uptake and acceptance and is an opportunity to address social inclusion, especially for marginalized and vulnerable groups.
- 3 Essential to environmental sustainability:** Green housing should respect the biodiversity and natural resources of the area and augment pollution reduction solutions to counteract the effects of climate change. Many people do not connect climate change and sustainability as a primary driver of their own decisions, instead focusing on price when they purchase building materials or choose where and how to construct their home. Part of the opportunity involves increasing public understanding of the risks associated with climate change such as extreme weather, flooding, sea-level rise, etc. and the ways to build that respond to a changing world. This includes site selection that considers intensifying weather conditions such as typhoons and flooding, reducing the negative impact of construction and operations to the local ecology, preservation of biodiversity and avoiding the depletion of natural resources.

Green, resilient, and inclusive approaches to housing in the Philippines

The Philippines' National Climate Action Plan points to green building as a path to creating adequate housing and land-use development that can adapt and promote infrastructure resilience against the effects of climate change.⁴ To address the growing need of adequate housing, the Philippine government has emphasized the construction of safe, resilient, and sustainable communities through various policies and government programs.

From a policy lens, for example, the Philippine National Building Code along with national development and climate action plans promote climate-resilient projects that incorporate infrastructure and social services that mitigate against the effects of climate change while addressing the urgent and growing need for adequate housing.⁵ Resilience covers the full disaster continuum and includes aspects of positive transformation that enhances the ability of future generations to meet their needs. Therefore, it is imperative that green housing efforts embrace resilient solutions.

The Philippines also has a growing niche in the construction sector focused on the local production of, and construction with, low-impact materials – meaning they are either made from recycled materials or are low-carbon. For example, Base Bahay Foundation Inc.'s Cement Bamboo Frame Technology is a prefabricated bamboo building system designed to be earthquake resistant and to last at least 25 years.⁶ The technology is accredited by certifying by Accreditation for Innovative Technologies for Housing (AITECH).⁷ Bamboo, a plentiful material in the Philippines, is not commonly considered for permanent shelters given the challenges with pests, but the prefabrication process treats the bamboo to make it more resilient and upgrades the quality. Because bamboo is a fast-growing plant, it is also proficient at sequestering carbon from the atmosphere.

Additionally, there have been developments in the production of materials such as sand, concrete, steel, and aggregates that enable these materials to be manufactured with significantly lower carbon footprints. For example, Holcim's ECOplanet low-carbon cement reduces emissions by at least 30% and uses low-emission raw materials and recycled construction and demolition waste.⁸ Green Antz's EcoBrick and EcoCaste use a mix of cement and non-biodegradable plastic waste, which displaces some of the cement requirement reducing the carbon footprint and locking in non-recyclable plastic waste. Traditional materials sourced by sustainable means – such as sustainably sourced lumber – have also risen in popularity in recent years. Wood uses less energy and water than concrete products, thus producing a smaller carbon footprint. Matimco, one of the biggest manufacturers of wood products in the country, produces Ecofor and Nuwood wood products that

⁴ National Climate Change Action Plan 2011-2028

⁵ Housing and Land Use Regulatory Board, Philippine National Urban Development and Housing Framework, Chapter 12, 2017-2022

⁶ <https://www.agriculture.com.ph/2022/12/12/cement-bamboo-frame-technology-promises-to-be-a-sturdy-and-low-cost-answer-to-weather-proof-housing/>

⁷ <https://base-builds.com/cement-bamboo-frame-technology/>

⁸ <https://www.philstar.com/business/2021/11/28/2144253/holcim-rolls-out-green-cement>



Base Bahay Foundation Inc.'s Cement Bamboo Frame Technology is a prefabricate bamboo building system designed to be earthquake resistant

are sourced from responsibly managed forests and 90% recycled materials, such as PE plastic and wood.⁹ Builders and developers are also initiating steps to increase affordability by designing housing units more efficiently, including modular housing assembly solutions which can cut construction times by at least 40%.¹⁰ An example of this in the Philippines is CUBO Modular Inc., a startup using engineered bamboo panels in modular home construction projects.

Passive design, which incorporates the local climate conditions into the building design to minimize the need for artificial lighting and heating and cooling, ventilation, has gained traction as well as by developers. For example, BluHomes by Aztala Corporation, a local real estate development company, is an eco-friendly housing project that promotes efficient use of energy and water. Each housing unit incorporates native, endangered trees planted in its front lot to provide natural shade, the exterior walls are painted with reflective coating while the roof has insulation and solar panels to augment energy use for LED lighting. Water-efficient plumbing fixtures are also installed in its plumbing system to reduce water consumption.

⁹ <https://matimco.com/a-delightful-christmas-celebration-starts-at-home/>

¹⁰ Interview with anonymous expert who is a construction developer, February 2022

Challenges to Green Affordable Housing

The housing market in the Philippines is inching towards green sustainable affordable housing, with particular emphasis in the planning and design stages, including through the development of sustainable design principles and green project financing frameworks – such as the Philippine Green Building Code, Formulation of Philippine Climate Change Action Plan, Leadership in Energy and Environmental Design (LEED), BERDE Green Building Rating Framework, IFC Green Financing Framework, Edge Green bond, Philippine National Urban Development and Housing Framework and UN SHERPA.¹¹

Still, one of the key challenges is to adapt these existing green standards to suit both the formal and informal affordable housing markets. The affordable housing value chain is ripe for sustainable, green innovation in the material and transport, construction, and use stages. Gaps in green transition strategies and technology investments will need to be addressed by policy innovations. The end-of-life and reuse stage offers major opportunities for recovery, reuse, and reverse logistics.

Planning and Design

- The Philippine government has implemented a Green Building Code; however, it is not mandatory or enforceable. The government has not yet implemented mandatory regulations requiring sustainable practices, such as investments in energy retrofits and capacity building towards more sustainable, green building practices, although some incentives do exist.
- The planning and design stage determine how buildings use energy and generate waste. Therefore, designing structures that both require fewer natural resources and generate less – ideally minimal – waste could cut up to 38% of materials¹² and energy input compared to conventional design practices. However, this requires design professionals to be aware of these considerations and incorporate them early on.
- Frameworks must test and adapt to the informal and low-income segment of the housing market in order to be relevant in incentivizing green building. The EDGE (Excellence in Design for Greater Efficiencies) green building certification system was created to reduce and mitigate the environmental impact of buildings in direct energy consumption, water consumption, and the energy footprint of its construction materials. In the Philippines, the EDGE tool is currently being adapted for the socialized housing segment but has yet to be adjusted to suit the informal and low-income owner driven construction segment.¹³

Materials and Transport

- Currently green housing projects are expected to incur more upfront costs due to supply constraints. However, the adoption of green material and procurement standards would

¹¹ <https://edgebuildings.com/balai-berde-and-edge-scaling-up-green-housing-in-the-philippines/>

¹² https://www.ifc.org/wps/wcm/connect/news_ext_content/ifc_external_corporate_site/news%2Band%2Bevents/news/impact-stories/philippines-green-buildings

¹³ Cebu Landmasters eyes green certification for Mandaue tenement - BusinessWorld Online (bworldonline.com)

relax such constraints by enabling increased production levels. These constraints could be further reduced by providing frameworks for suppliers to qualify for green financing. Still, stakeholders in the affordable housing segment generally perceive green buildings to be more expensive and thus the private sector needs to demonstrate that it is price-competitive and affordable. Green financing schemes are needed to support this transition.

- Research and development of green materials needs to align with prescribed performance standards, however, currently there are no standards that have been adopted on a national level. A unified approach for the selection of materials based on strength, durability, and sustainability must be developed, adopted and enforced to enable the uptake of alternative and sustainable materials and provide confidence to consumers.
- The transport of material is a major barrier to accessibility and has great implications on the sustainability of a product's footprint. The local challenge of transport requires investment in infrastructure that mitigates economic losses due to congestion and, at the same time, promotes alternative and efficient transport modes.

Construction

- Good building practices combine well-planned design and well-executed construction. The National Building Code of the Philippines emphasizes design but lacks context around how buildings should be constructed, leaving room for interpretation. It is estimated that at least 20% of total construction resources are wasted due to poor workmanship and issues with design and constructability. Additionally, there are no guidelines from the national government on owner driven construction practices for simple and small structures, with consideration to risks to geography, location, and the frequency natural hazards.



- Though more efficient construction technologies have the potential to reduce resources, waste and cost over time, the switch to alternative materials can translate to 10-20% higher upfront costs. Green products are perceived as costly not just by builders, but also by prospective homebuyers because of the 'green premium' or how green homes and buildings are generally marketed to buyers. In the affordable housing market, the current local price ceiling for socialized and economic housing only provides for small adjustments within which homebuilders to invest in technology and green design upgrades, since the price ceilings are based on traditional housing design and construction. The government should assess where they could incorporate green design into the price of socialized housing and provide incentives for those developers who are able to incorporate green design innovations.

Use and Occupancy

- We need to rethink the way we use land and buildings, particularly in constrained or at-risk disaster areas. In urban settings, rental housing is a vital component of the housing stock. This is particularly true in major cities where the rental market is absorbing a growing young and urbanizing population, providing a stepping-stone toward the aspiration of future home ownership.
- Alternatively, multi-family vertical housing programs that promote affordability, efficient land use and proper building management are ripe for cost-effective maintenance and property management, combined with energy efficiency and resilience upgrades.

End of Life and/or Reuse

- While there are solid waste management efforts and material reuse and recycling initiatives, such as plastic and biodegradable materials, the Philippines still lacks a construction and demolition waste (CDW) recycling protocol and industry. On the policy side, there is proposed legislation to address this: 2.2.5. Recycle Construction Materials Act (HB No. 7044), which was submitted in June 2022. The proposed law suggests a) measures in providing economic incentives and assistance to establish facilities that recycle CDW into building or construction materials; as well as b) financial incentives for using recycled CDW; and c) supporting local government units with funding to develop programming on CDW.¹⁴
- Recovery of materials is impossible in the absence of an integrated solid waste management program, which makes the cost of recovery higher than procuring new materials. National regulatory frameworks on waste management – especially on solid waste management, plastic waste and pollution – exist but lack operational mechanisms. With plastic waste in particular, the informal market has tackled the lack of waste management systems with the creation of waste reuse and recycling business models. Local social enterprises that partner with local businesses to divert waste to local facilities. Waste products such as plastics and fibers are upcycled to eco-friendly construction materials, such as framing materials and bricks. These enterprises also provide services that certify plastic waste credits to manufacturers.

¹⁴ Dimaculangan, Eroid Pasajol Current construction and demolition waste management strategies for Philippine construction sector – A systematic literature review. Journal of Sustainable Construction Materials and Technologies, Vol. 8, Issue. 1, pp. 66–77, March 2023

The Way Forward

Green, sustainable, affordable housing is not going to be a choice in the future. It must be the standard. The question is when and how we get there. There is an opportunity to continue to align sustainability principles in establishing planning and design standards to guide how housing units are constructed and to complement programs that incentivize green building. There is also the opportunity on the market side to ensure that industry is driving change in how business is done and to increase the availability of sustainable products and services in the market. This will not be a switch but a transition, and there are helpful policy and market levers that can help get us there:

- 1 Policy is a key driver:** The transition to greener affordable housing development in the Philippines must be backed by effective policy to further validate its business case and attract investments, ensuring a sustainable housing sector for all. This includes policies covering the recycling of key waste areas, such as CDW, but also other materials like plastics and textiles to upcycle and reintegrate into the construction sector.
- 2 Update building standards:** Review and update current building standards to incorporate green and resilient building practices that are applicable to the affordable segment. Adopt performance-based standards for housing to guide homebuilders to adopt the use of materials and methodologies that contribute to a greener housing value chain over time.
- 3 Drive circular solutions at the market level:** The private sector must work with the public sector to offer solutions that promote less waste, are more efficient than conventional materials and are price competitive.
- 4 Investment in green, affordable housing:** Financing and policy innovations can accelerate affordable housing production by attracting homebuilders to test or build green housing. However, the government must be a key project sponsor and active regulator of housing projects to ensure affordability and timely delivery, in order to build consumer and private sector confidence. The transition to greener affordable housing projects must be backed by effective policy and incentives to further validate the business case and attract investments.

Acknowledgments

In 2022, Habitat for Humanity International's Terwilliger Center for Innovation in Shelter collaborated with Engineering for Change and other industry leaders to research the landscape of sustainable, green and circular housing solutions in the Philippines. This effort aimed to answer the question "How might we make green housing more affordable and accessible for financial service providers, builders, and end-users" in the Philippines. This paper draws heavily on that piece work while offering updated insights on what is next for green affordable housing in the country.

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