

Planning high-performance affordable housing

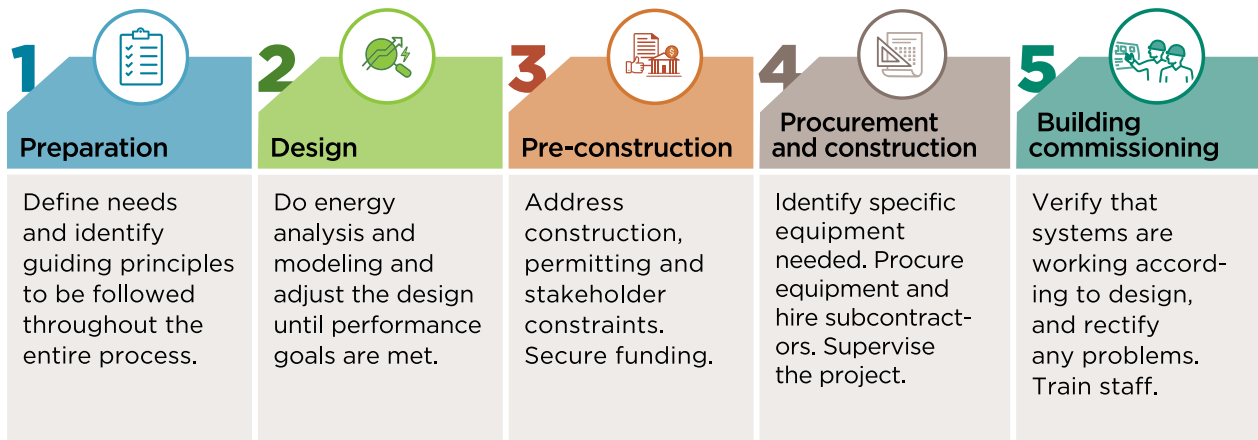
This factsheet for housing providers presents a general approach to planning and implementing successful new construction projects for high-performance affordable housing.

Planning your new construction project

Planning high-performance buildings involves an Integrated Design Process (“IDP”). IDP is a holistic and collaborative approach to the design of a building. It creates synergies through a collaborative design process involving a team of professionals that normally work independently on their part of a project. The aim is to meet performance targets and minimize the cost of building ownership.¹

Designing to achieve high energy performance

The Integrated Design Process favours a high degree of collaboration between professionals and trades, including architects, engineers and builders. It is designed to allow the housing provider and other stakeholders to work together to define, develop and realize clear functional, environmental and economic goals and objectives. The process involves five steps.



¹ “[Integrated Design Process](#),” Public Services and Procurement Canada, 2019.

1 Preparation: Get organized and define “success”



- **Identify a project lead and a project champion:** Appoint a staff member as a point person who keeps the project moving, and a board member who will keep the board informed.
- **Conduct research:** Review other recently built sustainable affordable housing projects, new trends in sustainable housing, and certifications, to understand the possibilities.
- **Establish a mission and vision:** Develop mission and vision statements for your project, ideally endorsed by the board and/or the highest position of authority. Declare your energy and environmental performance goals. Be as ambitious as you can, and be mindful of funders' requirements.
- **Set energy and environmental performance targets:** Your target can be a building certification (or equivalent), a benchmarking score (such as an ENERGY STAR® score), or a percentage of savings compared to a code-compliant building.
- **Review funding requirements:** Government funding and energy-efficiency incentives (offered through governments or utilities) may have certain requirements. Ensure that you understand these requirements early and integrate them into the design.
- **Assemble a design team:** This team will be responsible for seeing that the mission and vision are accomplished. Recruit an architect and share your intention of following an IDP process. Be forthcoming about your budgetary constraints, and adjust and scale the project accordingly. Have the architect assemble a team that includes design engineering specialists (e.g. lighting, HVAC). Don't forget to include internal stakeholders, perhaps with representation from your tenants, on the team.

2 Design: Collaborate and model solutions



- **Schedule facilitated IDP charrettes:**² IDP charrettes are workshops that provide a forum for discussions between all professionals and trades involved in the project. Schedule a kick-off charrette to discuss and agree on common project goals and priorities. Then, schedule additional charrettes through the entire project to ensure the integration of the many building systems. IDP charrettes are a defining component of integrated design.
- **Develop an initial design:** Your architect will develop some initial layouts. They will be needed to design the lighting and the heating, ventilation and air conditioning (HVAC) systems and start modeling them.
- **Model solutions:** Computer-assisted energy modeling helps the team anticipate the impact of design decisions on the performance and test to find the best design, forecast energy costs and operation and maintenance costs, and minimize total cost of ownership. Computer-assisted modeling simulates the interactions between the various energy systems, such as lighting and HVAC, under location-specific weather conditions. Energy modeling is often a basic requirement to pursue a certification, or to seek incentives, grants and loans. It is the accepted approach to comparing your high-performance design to an identical building built to code. The architect or engineering firm will be responsible for modelling the proposed design. Ask to see the assumptions and results, and leverage the building model to test alternate technologies and design choices.

2 [“Planning and Conducting Integrated Design \(ID\) Charrettes,”](#) Whole Building Design Guide, 2016.

3 Pre-construction stage: Set up your project



- **Select a builder (general contractor):** Ensure that the documents you prepare to request bids or proposals are clear about the energy performance objectives. Require experience in constructing energy-efficient buildings: make sure the selected construction firm has a track record for successfully implementing features for high energy performance. Specifically, review and discuss qualifications for dealing with specific design-heavy features or specialty equipment being planned (e.g. ground-source heat pumps).
- **Consult stakeholders:** Stakeholder consultations are necessary for any new construction project. Stakeholder engagement helps keep external stakeholders informed and supportive of the project. It can also provide different perspectives, which in turn will help you refine your priorities and design preferences. To get the most out of the consultations, ensure that the energy and environmental goals, and any certification you're pursuing, are explicitly addressed.
- **Obtain permits:** Seek approval from local municipal officials for the planned design. A preliminary consultation is recommended before undertaking detailed design work. Obtaining permits may require adjustments to the design that will have implications on the energy performance.
- **Iterate proposed design:** Iteration of the design involves multiple stages of testing, analysis and revision. Remember to include the builder in your IDP charrettes for additional insights. Take into consideration any feedback from municipal officials received during the permitting process. Make course corrections to your design, and do not forget to update your energy model.
- **Secure funding:** Obtain pre-approval for grants and incentives. Speak with your lenders and secure funding.

4 Procurement and construction: Execute the project



- **Procure equipment:** Work with the builder to ensure that documents requesting bids from subcontractors and equipment suppliers are clear about your intention for the building, including energy-efficiency goals, technologies required, construction methodologies, expected commissioning activities, and the plan for energy performance measurement and verification.
- **Identify specific equipment:** Identify the suppliers of critical equipment such as boilers, chillers, heat pumps and lighting equipment. Once actual models are selected, you may need to adjust design parameters.
- **Validate system compatibility, gather technical information and document key equipment:** Gather technical literature for the specific pieces of equipment identified in the previous step and supplement with design summaries for intended operation and energy targets.
- **Supervise construction:** Establish clear lines of accountability for each party in the project plan to avoid confusion and ensure timely delivery. Have professionals representing you monitor the work. Builders often offer advice on cost-cutting opportunities, presented as “value engineering.” Ensure that essential energy performance features are not cut out of the project during value engineering.
- **Re-assess after making changes:** If changes are made, model the projected energy use once again to ensure that your goals will still be achieved, or at least understand the holistic impact of the change.

5 Building commissioning: Get systems up and running



- **Commission the building:** Work with a commissioning firm to ensure that the building is operating as designed. Commissioning firms should be brought into the process prior to construction, with commissioning expectations, roles and responsibilities clearly laid out in project contracts.
- **Train staff:** Train staff on the correct use and maintenance of systems. Ensure that training requirements are clearly laid out in contracts, with the appropriate vendors or qualified subcontractors providing the training as needed. Training should include classroom and field time. Consider having staff participate in commissioning as appropriate.

Get started!

Consult the following resources and factsheets in this series for tips on how to plan and implement your project:

[FCM's Sustainable Affordable Housing initiative](#)

[Why build high-performance affordable housing?](#)