

# The Power of Integrated Design: Building Sustainable Homes with Collaborative Strategies

👤 Reid Madiuk 📅 May 15, 2025

An Integrated Design Process (IDP) is essential for building sustainable homes. It brings together architects, designers, engineers, energy consultants, builders and homeowners from the project's inception, to collaboratively optimize every aspect of the design for performance, efficiency and sustainability.

The IDP approach is not fixed, but rather flexible and adaptable. While there may be common elements and principles, the specific implementation and steps can vary depending on the project, stakeholders, and goals.

## What is the Integrated Design Process (IDP)?

IDP is a collaborative approach to home design. Architects, engineers, contractors and clients work together to achieve sustainable, holistic outcomes. Technical considerations include energy performance, environmental impacts, the indoor environment, functionality of interconnected systems, and design loops, focusing on optimizing performance, cost, occupant comfort, and resilience throughout the home's lifecycle.

The Integrated Design Process was developed in 1993 as a small demonstration of very high levels of performance under NRCan's C-2000 program, for the IDEAS Challenge design competition for multi-unit residential buildings, offered by the Canada Mortgage and Housing Corporation (CMHC). The C-2000 process has become known as today's Integrated Design Process (IDP).

To streamline decision-making, reduce design conflicts, and prevent costly retrofits or changes later in the project, IDP prioritizes early engagement and holistic planning.

## Why the IDP approach is important for sustainable homes?

In the traditional design process, the designer or architect and client come to an agreement on the design concept, typically consisting of a general massing scheme, openings in a building envelope, like windows and doors, orientation, the basic exterior appearance and materials that will be used. The contractor, and mechanical and electrical engineers are then asked to implement the design and to suggest appropriate systems. It's a linear design process, from concept to completion, with successive contributions of the members of the design team, but with limited possibility of optimization along the way.

IDP is a collaborative approach to home design that involves all key stakeholders from the earliest project stages and continues through to post-occupancy. In the Integrated Design Process, the homeowner takes a more active role. The designer or architect becomes the team leader rather than the sole form giver; and the builder, structural, mechanical and electrical engineers, and energy consultants, take on active roles at the early stages of this whole-building approach to design.

IDP is collaborative from the start and iterative. Ideas are proposed, tested, revised, and retested through energy and cost modelling to test design options. Results are discussed and the project team is encouraged to identify synergies between systems. Whole-building thinking seeks solutions that will benefit multiple systems and objectives at the same time. And this systems-thinking approach can deliver custom home or deep renovation successes that can rarely be achieved with conventional siloed planning.

IDP's primary goal is sustainability – Net Zero Energy, Passive House, or LEED, with BC Energy Step Code compliance – but with clearly defined subsidiary goals, objectives and targets set for getting there.

## Phases of the Integrated Design Process

**Pre-design / visioning:** The foundation of IDP is usually laid before the design software is opened on the computer or pen hits paper. The pre-design phase defines the goals, constraints and vision for the project.

During this phase, ideas are gathered by the homeowner and lead designer or architect. A diverse project team is assembled. Concise environmental, financial, and functional goals are defined.

If the property has not yet been secured, a suitable lot is selected and purchased. A site analysis is conducted, to evaluate solar access, wind patterns, shading, and orientation. If it's a deep energy renovation project, the existing building is assessed. Applicable building codes are identified, available incentives explored, and certification programs, such as the BC Energy Step Code/Net Zero Ready, Passive House, or BuiltGreen Net Zero Energy+ are considered.

A project charter is drawn up, a document that outlines the details of the home construction project, ensuring alignment among all stakeholders and providing a framework for successful completion. It articulates goals such as Net Zero Energy, low embodied carbon, affordability, and flexibility. This project plan will typically include the project's purpose, scope, objectives, milestones, budget, timeline and identify the key stakeholders.

**Conceptual design:** With the goals established, the team begins to explore broad design options that meet multiple performance criteria, guided by building science and system synergies.

Passive design elements such as solar orientation, window-to-wall ratios, and the use of shading devices are evaluated. Massing and layout considerations are explored for energy optimization. Preliminary energy modelling and costs are factored into the decision-making process.

Materials and systems brainstorming include HVAC types, envelope strategies, and renewable energy sources. A whole-building focus leads to energy modelling and conversations about mechanical systems. Envelope design, the level of insulation and airtightness will impact mechanical system size. For example, passive solar design can reduce or perhaps even eliminate the need for space heating. Design choices at the conceptual design phase can also improve natural ventilation and interior lighting.

**Schematic design:** The team will begin to lock in major systems while allowing flexibility for optimization along the way. Engineers, energy advisors and the builder will provide real-world input on constructability, costs, and performance to help the team in their decision-making.

A schematic design is created to meet targets within budget and constructability constraints. Focus areas include:

- The thermal envelope: insulation, airtightness, eliminating thermal bridging and window specifications,
- Mechanical systems selection: heat pumps, HRVs/ERVs and radiant floors
- Structural systems and detailing,
- Refined energy and cost modelling analysis, and
- On-site renewable energy sources: solar PV, solar thermal and wind turbines

**Design development and documentation:** The details are refined and documented in this phase, with IDP ensuring the design integrity is preserved as the systems and assemblies are finalized. Quality assurance is key at this stage in the process. Design choices are cross-checked for alignment with performance goals, and the builder is actively involved in the selection of products, or suggesting alternatives.

Deliverables typically include construction drawings and specifications, detailed energy models, permit documentation and construction cost updates.

**Construction and commissioning:** The construction phase often reveals where the traditional design process breaks down. To mitigate risk, IDP involves builders early to maintain continuity of information. This is where collaborative planning and design decisions are realized and validated in the built environment.

Commissioning ensures that your home's systems will function as intended. It's a quality-driven, systematic process that focuses on verifying and documenting that your home and all of its systems are carefully planned, installed, inspected, tested, operated and managed exactly as designed.

Pre-construction meetings clarify intent and the sequence. Regular site inspections and blower door testing ensure that the building envelope and construction will meet sustainability and certification targets. HVAC commissioning, controls calibration, and air quality testing provide verification of systems. Trades are also involved in the problem-solving process.

**Post-occupancy evaluation:** IDP doesn't stop at hand-off the way conventional projects do. Following occupancy, energy use, air quality and thermal comfort are monitored and utility bills are tracked to verify performance. Key occupants are asked to fill in feedback surveys and systems are fine-tuned to occupant behavior.

The insights gained from each project can also inform future projects, or lead to adjustments that improve your home's performance.

## Whole-building strategies in IDP

The Integrated Design Process (IDP) enables seamless integration of thermal envelope optimization, mechanical system right-sizing, lighting/daylighting strategies, water efficiency and stormwater management, material selection with life cycle thinking, and renewable energy integration, through its collaborative, systems-focused approach.

**Thermal envelope optimization:** To reduce heating and cooling loads, IDP prioritizes passive design strategies early in the design phase. Reliance on mechanical systems is minimized through strategic building orientation and fenestration (window placement), to maximize solar gain in winter and minimize it in summer. Significantly lower energy demands are achieved with superior insulation and air barriers designed to minimize thermal bridging and heat loss.

By addressing the building envelope first, IDP ensures that the mechanical systems in your home can be smaller and more efficient.

**Mechanical systems right-sizing:** IDP's iterative feedback loops allow the mechanical systems in your home to be tailored to the building's actual needs. A well-insulated, airtight envelope with optimized glazing reduces heating/cooling loads, which means that right-sized HVAC systems can be of lower capacity, which costs less.

IDP supports holistic budgeting, so investments in envelope improvements reduce mechanical system costs. Energy modelling simulations verify that mechanical systems align with envelope performance. This avoids oversizing, which causes short-cycling and inefficiency and undersizing, with inadequate performance.

**Lighting and daylighting:** IDP can harmonize natural and artificial lighting with other systems. By optimizing building orientation, window placement, and shading devices, collaboration can reduce reliance on artificial lighting, while minimizing solar heat gain.

Electric lighting systems can be designed to complement daylighting, using sensors and automated controls to adjust the lights based on natural light availability. There's also an interplay with HVAC because any reduction in heat gain realized from efficient lighting also lowers cooling loads, which allows mechanical systems to operate with greater efficiency.

**Water efficiency and stormwater management:** Cross-system coordination, employing water-efficient plumbing fixtures, greywater reuse and stormwater harvesting solutions, integrated with landscaping and HVAC systems, can dramatically reduce potable water use.

Designed collaboratively with hydrologists and engineers, green roofs, permeable pavements, and retention basins can manage runoff while supporting biodiversity.

**Material selection with life cycle thinking:** Embodied carbon reduction is a growing concern. Using Whole Building Life Cycle Assessments (LCA), materials can be evaluated for environmental impact across their lifecycle: extraction, use, and disposal.

Modular construction and reusable materials minimize waste and future retrofit costs while providing durability and adaptability.

**Renewable energy integration:** Solar PV system sizing is matched to modelled energy use. Panels or tiles may be incorporated into the architectural design, to align with aesthetics and energy needs.

Renewable energy is paired with energy storage and the grid to balance supply and demand, optimized through iterative modelling. And IDP helps assess return on investment and incentive alignment.

## The takeaway

The Integrated Design Process is more than a new way to design homes. It's a smarter, more effective way to meet the increasing demands placed on residential buildings to meet standards for sustainable development. Whether you're building new, or completing a deep energy renovation, IDP offers a pathway to creating a beautiful, energy-efficient, functional and economically sensible home.

By focusing on collaboration, whole-building thinking, and iterative optimization, IDP empowers you to achieve ambitious goals, transforming your vision into a sustainable reality.

## Resources

[Energy efficiency basics – Government of Canada](#)  
[Integrated Design Process Guide – Alberta.ca](#)  
[The Integrated Design Process – iISBE](#)

### COMPANY

About Us

Projects

Awards & Press

Careers

### LOCATION

110 – 29279 Queens Way  
Squamish, BC V8B 0T5

[View on Google Maps](#)

### HOURS

Monday to Friday: 8 am – 5 pm  
Saturday & Sunday: Closed

### CONNECT

604.390.2299

