Feb 27, 2026

BC Housing Best Practices in Building Systems

Case Study: Advancing Residential Housing Sustainability and Resilience using Community Solar: The Crossing Place – Kanaka Bar Indian Band (KBIB)

1. Introduction to The Crossing Place

The Kanaka Bar Indian Band also known as T'eqt' aqtn'mux or "the crossing place people", is a First Nations government located at Kanaka Bar, BC, Canada, between the towns of Boston Bar and Lytton in the Fraser Canyon. Beginning in 2019, KBIB proposed and subsequently developed through 2024, Phase I of "The Crossing Place"; a multi-family development consisting of 24 modular homes comprised of single, duplex, and triplex units, with a shared community amenities building and agricultural space. The Crossing Place provides affordable housing for Elders, members of the Kanaka Bar Indian Band, as well as other Indigenous Peoples and families in the Fraser Canyon region.

As an inclusive resilient housing project, The Crossing Place offers residents and the community a gathering place that contributes to Kanaka Bar's regional reconciliation and vibrancy. It has supported Kanaka Bar's members and regional residents return to the traditional lands of the community and accelerate Kanaka Bar's transition to self-sufficiency following the catastrophic 2021 Lytton fire, while improving the Fraser Canyon's overall resiliency. The community amenities building in particular, could potentially serve as a regional emergency evacuation centre in a future phase of the development. Given sustainability and resilience as underpinning priorities, on-site community renewable energy generation and energy storage options are key in the development's design and phased implementation.

2. Motivations for community solar

A community solar strategy allows a group of electricity users (households and/or businesses) to collectively benefit from a larger shared generation and energy storage facility. This method can offer significant operational and cost benefits over a more traditional approach using multiple smaller individually owned solar PV installations on separate buildings.

Where utilities allow it, community solar can also offer opportunities for simplified electrical servicing and improved distributed energy resource (DER) management. Additionally, incorporating community-scale battery energy storage systems (BESS) can provide grid-resilience during outages, and support utilities with peak shaving and load shifting during heavy demand or other grid compromising events.

For the Crossing Place, Kanaka Bar preferred a larger shared community solar generation facility approach for a number of reasons including:

- Improved economies of scale reducing overall installation capital costs.
- Simplified maintenance and performance monitoring of centralized systems.
- Ease of future ground-mounted solar PV capacity expansion beyond what limited individual rooftop spaces could provide.
- Ease of equitable renewable energy production benefits sharing amongst households.
- Ease of future addition of centralized community energy storage for improved grid resilience of the entire development.

3. Community solar and electrical servicing design

In consultation with Kanaka Bar leadership, a phased design strategy was created to serve the housing development based on forward looking desired operational features to support future solar PV upsizing and battery energy storage systems (BESS) integration for grid-resilience. As shown in Figure 1, key design features include:

- Use of three BC Hydro master meter services located in the Amenities Building electrical room. Two residential accounts separately supply north and south residential microgrid zones with 6 and 5 residential buildings respectively. One general service account supplies the Amenities Building microgrid zone. In the absence of community solar or virtual net-metering tariffs, this approach would leverage the existing BC Hydro Net-Metering 100 kWac cap, for up to a 300 kWac collective solar PV generation capacity for the development.

- Providing for future BESS systems interconnections in support of grid resilience for the Amenities Building, and North and South Residential micro-grids. Centralized BESS systems would connect to their respective microgrids in the Amenities Building electrical room.

- Ground mounted centralized solar PV arrays share a footprint with the developments septic field system. Ballasted ground mounted solar PV racking strategy was adopted as shown in Figure 2, using a custom inter-row spacing to accommodate septic system infrastructure, and reduce impacts to septic field performance and maintenance.

A phased solar PV and BESS systems deployment strategy was proposed for the Crossing Place, as described below. Possible future Phases II through IV would be based on evolving requirements and priorities, and need not be completed in any specific order.

i. **Phase I (Completed 2024) –** Installation of 109.2kWp/100 kWAC ground mounted solar PV capacity, consisting of two 54.6kWp/50 kWAC grid connected systems; one on each of the North and South Residential microgrid electrical services as shown in Figure 1.

ii. **Phase II (Future) -** Deploy suitably sized ground mounted solar PV to the Amenities Building service with BESS for grid-resilience and to support emergency evacuation centre operation.

iii. **Phase III (Future) -** Upsize North and South residential solar PV systems for reduced grid energy dependence based on Phase I systems operating experience.

iv. **Phase IV (Future) -** Integrate BESS systems for North and South residential micro-grids with existing solar PV systems for long term grid-resilience.

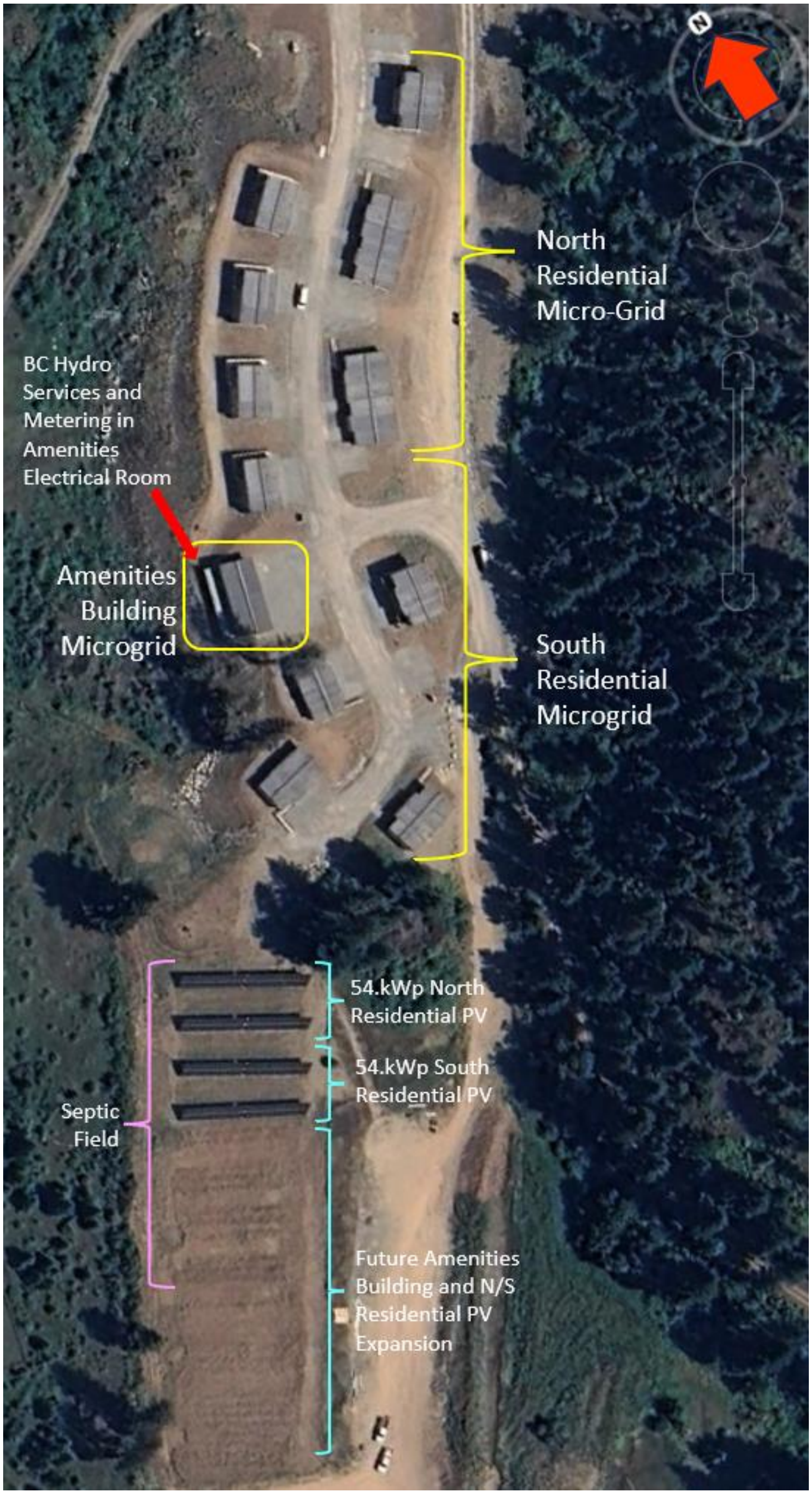

Figure 1: The Crossing Place - Community Solar and Electrical Servicing

Figure 2: Ballasted Racking Strategy for Solar PV - Septic Systems Footprint Sharing

4. Phase I implementation

Phase 1 solar PV systems design and installation outcomes were made possible by thoughtful design stage engagement and planning with Kanaka Bar leadership, and their advising consultants. Considerable design and construction stage collaborations with BC Hydro, project design team members, and site contracting providers were also essential. These integrated design strategies were also vital to setting foundational design and installation features on which the viability of future phases will rely.

BC Hydro provided 120V/208V 3-phase electrical service for the Crossing Place development to the Amenities Building electrical room. Accommodating three master-meter services to optimize a community solar strategy required service design stage negotiation. A more traditional BC Hydro residential service design approach using individual services and revenue metering for each residence, would not have easily supported a community solar paradigm. Kanaka Bar accordingly assumed responsibility for design and provision of underground electrical service to each residential unit.

Septic field and solar PV systems needing to share a common footprint required careful collaborative design with the Crossing Place septic system design and installation consultant. To reduce impacts to septic field performance and maintenance, ballasted ground mounted solar PV racking was used as shown in Figure 2. This required custom inter-row spacing to accommodate septic system infrastructure, and careful cable trenching coordination with septic system and earthworks providers.

Phase I installation was completed in 2024 in parallel with installation of other development infrastructure and delivery of modular housing units.

5. Energy performance and long-term community benefits

Based on solar access and shading obstruction measurements, minor to moderate solar energy production compromise was expected due to east and west mountains flanking the Fraser Canyon as shown in Figure 3. Software modelling projected annual harvests in the order of 1050 kWh/kWp; approximately 87% that of a completely shade free site at the same latitude and longitude. Phase I total PV system capacity of 109.2 kWp was accordingly projected to produce about 114.7 MWh annually.

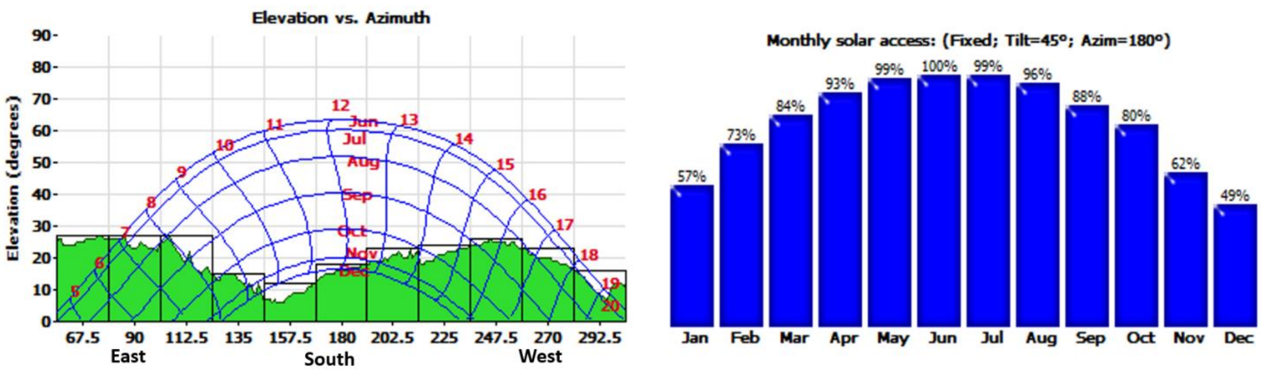

Figure 3: Solar Access and Shading Obstruction Measurements

2025 annual energy production for the two 54.6kWp/50 kWAC North and South residential solar PV systems installed at Phase I, was 120.8 MWh as shown by month in Figure 4; about 5.3% higher than predicted. Based on Kanaka Bar 2025 BC Hydro billing records, North and South residential solar PV systems consumed approximately 257.8 MWh of electricity in 2025. Crossing Place residential solar PV systems thus reduced grid electricity use by about 47% in 2025, suggesting that future doubling of PV capacity in the future could achieve near net-zero electrical energy performance for the dwelling units.

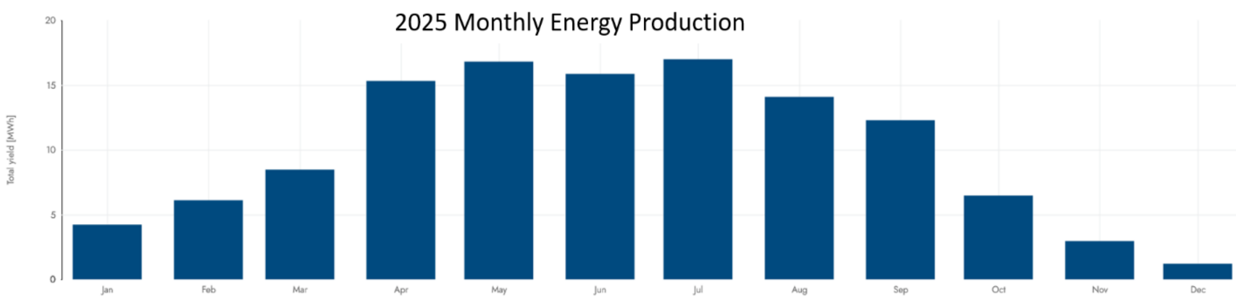

Figure 4: 2025 Crossing Place Phase 1 Solar PV Systems Energy Production

Crossing Place North and South residential accounts are served on the BC Hydro tiered residential rate, such that solar PV production offsets Step 2 consumption at $0.1408/kWh. 2025 solar energy production thus saved approximately $17,000 in 2025 electrical energy costs the Crossing Place. Annual savings from community PV solar systems will increase as utility rates increase.

Based on BC government electricity emission intensity factor for grid-connected entities of 9.9 tCO_2e/GWh (2024) for the integrated BC Hydro grid, Crossing Place Phase I solar PV systems reduced GHG emissions by approximately 1.2 tCO_2e in 2025.

6. Best practices lessons learned

Community solar PV integration into the Crossing Place housing development, showcases how forward thinking shared solar PV and BESS strategies can provide renewable energy savings and grid resilience benefits at a neighborhood scale, versus only to individual households.

Successful completion of the Crossing Place Phase I community solar initiative has reinforced the following:

a) Shared community solar facilities not only reduce long term housing operational costs, but also provide economies of scale reducing initial capital costs versus a collection of smaller separate PV systems for each individual housing units.

b) Improved grid-resilience and emergency response support is possible at a lower cost per household using centralized neighbourhood community solar PV and BESS distributed energy resources (DER) versus multiple smaller systems for individual buildings.

c) Collaborative electrical service design with electrical utilities is required early in development design to ensure the unique electrical service requirements of neighbourhood community solar PV and energy storage integration can be satisfied within the prevailing utility practices and rate tariffs.

d) Community solar shared land use collaboration with other utility systems designers and providers; including roads, water systems, sewage systems, house and agriculture is mandatory early in the integrated design to ensure best outcomes.

e) Residential developments in other parts of BC could likewise realize the benefits of community scale solar PV and storage following these best practices, where development guidelines and electrical utility policy will allow.