In architecture, we used to build with the elements of our environment, now we build against them, or combat them. Yet, the Inuit have developed innovative ways to adapt architecture and assembly with climate and environment.

MATERIALS & ASSEMBLY: Arctic Food Network (AFN) seeks to merge new technologies with traditional cultural practices to support an emergent twenty-first century northern future. Construction of the AFN structures merges traditional construction techniques with contemporary. A wrapper of copper shingles with standing seams defines a continuous facade surface in one orientation of the cabin prototypes. The copper roofing is supplemented with solar cell units at strategic points that collect energy to make the hubs self-sufficient. Copper performs very well in response to the dramatic temperature swings in Nunavut. The energy collected by the PVs assists with data and light transmitters for communication and traveler safety. Since 1995, significant research and progress in northern climate photovoltaics has been made at the Nunavut Research Institute. The end-surface facades have a seasonal snow wall, using the traditional knowledge of igloo construction. These walls can be filled with snowpack in the winter as desired.

LOGISTICS: The cabin frames employ pre-assembled as well as prelaminated joints. The frames are tied together using a method similar to Qamutik construction (traditional Inuit sled) and umiak construction (large Inuit canoe). Cabins are made through a collaboration in construction trades between University of Toronto and Arctic College students, facilitating a knowledge exchange from the south to the north and the north to the south. A significant challenge to construction involves designing units that can be transported and built out in the land. All the structures are conceived as a kit of parts that can be transported by traditional Qamutik, and erected by four people on-site easily. A single cabin can be constructed in 3-4 days by a skilled Inuit assembly team.

The Western science should give credibility to the traditional knowledge and try and take that knowledge with the Western science and combine it, to have more credible information about climate change and wildlife.

Simon Awa, Deputy Minister, Nunavut Department of Culture, Language, Elders, and Youth.

Assembly Sequence

Cabin frames are a hybrid of standard cut stock wood and CNC-milled “special” joints to connect standards. All cabin frame assembly employs minimal hardware and accounts for small assembly teams.

Snow Walls

The two end walls of the cabin prototype are left as optional closures. They are an open-frame system dimensioned to a typical snow block, as found in traditional igloo structures. This allows the option for the cabin to be porous in the warmer sunny months.

Assembly

Solar Skin

Photovoltaics are integrated into the cabins through clip-on strip cell panels. PV panels are independent of the copper shingle roofing below, and strip cell locations can be customized to performance data.

Qamutik Fastening

Cabin frames employ the same know-how of the traditional Inuit sled. Cabin profile frames are laterally stabilized by napuit, or struts, fastened between frames, as in a ladder. As in the Qamutik, fastening is done with rope, not hardware.