Project Deliverable B: Need Identification and Problem Statement
GNG 1103 – Engineering Design
Faculty of Engineering – University of Ottawa

Project Deliverable B: Needs Identification

Team:

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General Information:

- The shed will be used as a temporary home to accommodate women and children (up to a family of size 4) for a 1-2 month period in Ottawa.
- It will be located in a secure and isolated neighborhood
- Accessible by those with disabilities

Needs regarding power supply:

- The energy generated by the solar panels should be enough for:
    - Lights
    - Heating
    - Hot water
    - Small fridge
    - Outlets to charge phones and other small appliances
- Sharing excess energy generated from one shed to other neighbouring sheds in case of a power shortage (should store the excess energy).
- Solar panels should be mounted in a way that is easy to extend when needed
- Must stand and provide energy through different weather conditions (during rainy, snowy or cloudy days)
- Solar panels must be easily removable, reconstructed, and transported (resistant to damage)
- Central heating control system within the modular house (Not easily accessible by children)
- Satisfy building code requirements (regulations involving solar panels)

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Needs regarding construction:

- No carpet floors
- Hardwood or laminate floors
- Hardwear should be concealed. No easily-accessible dangerous objects (ex: sharp, hot, etc.) by children.
- 2x2 window(s)
- Be aware of provincial living and building regulations.
- Dry wall

Needs related to design maintenance:

- Must avoid snow build-up on the roof and solar panels
- Good heat insulation to lower the energy loss
- Must stand extreme weather conditions
- Water collection from a nearby source
- A long lasting structure that will require minimal fixing during its functional time

General requirements/limitations:

- Must be cost effective
- Dimensions: 4x8 feet
- Non-intrusive towards the environment (net-zero)
- Portable and extendable (modular)
- Aesthetically, it should look just like a normal house from outside

Problem Statement

Many women and children risk getting killed every year due to domestic violence but cannot leave their abusive situation in fear of having nowhere safer to go. There are currently almost over 500 shelters for women and children who are fleeing due to violence in Canada, but their accessibility is limited. This structure must be able to withstand the extreme weather conditions in Canada and must be accessible for those with special needs. It should be able to generate enough energy to be a suitable temporary living space for a maximum capacity of 4 people. The students from the lab will design and construct a net-zero modular home that will meet all of the previous stated requirements as well as limiting the consumption of household energy and the production of greenhouse gases.